Scientific Activities

2007-2008
FOREWORD

It is our pleasure to present to you this overview of the research being carried out at Ariel University Center of Samaria.

As even a quick perusal will show, the range of activities in which the Center’s scientists are engaged is very wide, spanning as it does the natural sciences, engineering, psychology, the health sciences, the social sciences, and the humanities. Indeed, one of our aims was to keep our own faculty members informed about the diverse research projects ongoing at our Center and thereby stimulate collaboration and more especially interdisciplinary work among our academic staff.

Our researchers receive technical and financial support from the Research and Development Authority. In addition, many of their R&D projects are funded by outside sources. The latter include Israel government entities (e.g. the Ministry of Science, the Ministry of Defense, the Ministry of Industry, Trade and Labor, the Ministry of National Infrastructures), national and foreign foundations, and Israeli and foreign industrial companies.

The number and scope of the research projects undertaken at Ariel University Center increases year by year. This is paralleled by the steady increase in the number of research proposals submitted to various funding bodies, papers published in scientific journals, and presentations at national and international scientific conferences.

We hope that this overview will give the reader a good idea of the research being carried out at our Center and that it faithfully reflects the richly varied talents of our researchers.

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Prof. David Wolf
Vice President and Dean for Research and Development

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SEARCH AND RESCUE MULTI-TRACKED ROBOTS

Prof. Shraga Shoval

Search and rescue missions involve serious technological and social issues, related to a very large number of heterogeneous agents acting in hostile environments. Disaster mitigation requires rapid and efficient search and rescue of survivors. The environmental conditions often prevent rescue workers from entering the site, due to the unacceptable personal risk and physical maneuverability limitations. As a result, the concept of including robots in Search and Rescue missions is being promoted by official and non-official organizations. Robots, which can perform as scouts able to navigate, adapt, and perceive, have great potential in complementing human's physical limitations.

In the past three years, we have been working on the development of autonomous platforms for Search and Rescue missions, mainly tracked platforms for motion on difficult terrains. It has been recognized that one way to overcome some of the difficulties encountered in traversing rough terrain using tracked robotic vehicles is to operate two or more of the vehicles in tandem. Advantages of operating in this manner include:

- A wider effective wheel base provides a better mobility and prevents the vehicle from overturning.
- The flexible linking mechanism provides a wide range of internal configurations for stable motion in various types of environments.
- Vehicles can help each other to overcome obstacles, such as steep up or down slopes, by employing a push-pull effect.
- Combining positioning data from several vehicles improves overall accuracy and reliability in navigation and mapping missions.
- Multiple-vehicle system increases load capacity, allowing a wide range of onboard tools and sensors.
- On-board power supply significantly increases vehicle's autonomy, maneuverability and working time.

During fixation, binocular visual axes are assumed to be aligned on the target. Recent studies (Wagner & Ehrenstein 2003; 2004) show that such binocular alignment holds only for 2-5 seconds, until divergent drifts occur, up to magnitudes of 3° within 60 sec. Measuring binocular eye movements (using EyeLink system) revealed asymmetries of eye movement patterns for different fixation procedures. Typically, one eye stays more accurately and steadily on the fixation mark, whereas the other eye is less stable and shows marked excursions from the fixation mark. This indicates an eye dominance mechanism, which has, so far, not yet been demonstrated.

The visual system tolerates certain levels of binocular misalignment. These levels are known to be higher in open-field natural scenes, but tend to be lower in close-distance stereoscopic or acuity demanding tasks, resulting in either diplopia or suppression effects. Hence, eye dominance might serve to avoid diplopia in certain viewing conditions, probably by causing suppression of the non-dominant channel.

In stereo vision, vergence typically fluctuates until achieving a proper disparity, appearing perceptually as sufficient image fusion. Recent results indicate that in stereo vision, the dominant eye (which has more stable fixation on 2D targets), fluctuates more, being more active in vergence corrections (Wagner & Ehrenstein, 2004). This peculiar finding deserves corroborating research.

Binocular convergence also changes when the search space is defined by linear perspective rather than stereo depth (Wagner & Hochstein 2000). Therefore, binocular eye-movement patterns are being compared during visual exploration in three layers (2D, 3D-stereo, and 2 ½ D-perspective) including fixation, smooth pursuit, and saccadic exploration tasks. Oculomotor performance is being compared with individual achievements in various optometric tests of visual and binocular functions.

Results are expected to deepen our understanding of human binocular visual processes, their neurological mechanisms and cognitive utilities.

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VISUAL DEPTH PERCEPTION BASED ON STATIC AND DYNAMIC CUES: AN OCULOMOTOR APPROACH
Dr. Michael Wagner*, Walter H. Ehrenstein† & Thomas Papathomas‡

Depth perception relies on binocular and monocular mechanisms that reconstruct the representation of three-dimensional space from two-dimensional retinal images.

Binocular cues result from vergence (the eyes fixate on objects in different depths by changing their angle of convergence) and disparity (the difference in the retinal projections, due to the different vantage points of the eyes). With larger observation distances, retinal image differences become increasingly smaller, making binocular cues invalid beyond 15 m. Within and beyond this distance range, monocular cues (such as linear perspective and optic flow) provide further depth information. Based on preliminary data, we differentiate between “strong” and “weak” depth perceivers and focus on peculiar phenomena by which monocular depth cues also elicit vergence eye movements, “converging” to a virtual target rather a real object.

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THE ROLE OF SIDE AND REAR-VIEW-MIRRORS IN DRIVER SITUATION AWARENESS: A TRAINING APPROACH
Dr. Michael Wagner* & Dr. Tzila Shamir**

Driver situation awareness refers to the driver’s on-going perceptual comprehension of the surrounding traffic load and dynamic road conditions. Perception of dynamic traffic events on either side or behind the car is based on visual scanning of the side and rear-view mirrors. Performing this kind of visual search task is attention demanding and dependent on traffic load in the frontal visual field.

Efficient perception of the mirror’s image also involves overcoming optical aberrations caused by panoramic mirrors. The perceptual process needed for mirror image correction is described as an “Affine Transformation”, involving “projection”, “transition”, and aberration correction. Scanning of car mirrors that enables efficient visual perception of the road environment is an important part of driving skill. Very little has been done to investigate this skill’s role in the creation of proper driver situation awareness.

This research project addresses the following questions and tasks:
A. Survey of driver’s habits and behavior characteristic of car mirror scanning.
B. Laboratory study of the effect of driving load on the efficiency of rear mirror scanning.
C. Improving training procedures for mirror scanning skill acquisition.

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VISUAL PERCEPTION OF VELOCITY: A MATHEMATICAL MODEL
Dr. Tzila Shamir* & Dr. Michael Wagner**

Recently, the first researcher proposed a mathematical theory of visual perception of velocity. The theory is based on the conjecture that visual space is a curved manifold. Therefore, the velocity of a moving object is perceived as, where \( w \) is a perceptual scaling factor, \( \omega \) the angular velocity vector relative to the observer, and \( x \) the position vector relative to the eyes of the observer. From this simple model, we derive several interesting consequences that may explain various phenomena concerning velocity perception.

Next, on the basis the above theory, a model was developed for the problem of distance perception of a moving object. From this mathematical model, the first author obtained the two “laws” that are the well-known empirical models of psychophysics, namely the Fechner law and the Stevens law.

In the near future, we intend to perform a series of psychophysical experiments in order to validate the results of this research, which, to this point, have been purely theoretical.

CRAWLING MICRO ROBOT FOR COCHLEAR ImPLANT SURGERY ASSISTANCE
Dr. Nir Shvalb, Prof. Moshe Shoham1 & Oded Salomon1

A cochlear implant is a surgically implanted electronic device that provides a sense of sound to a person who is profoundly deaf or severely hard of hearing. The cochlear implant works by directly stimulating any functioning auditory nerves inside the auditory portion of the human inner ear, the cochlea, with electrical impulses. During the procedure, external components of the cochlear implant – a microphone, a transmitter, and a speech processor - are surgically placed under the skin behind the ear. The internal components include a receiver and stimulator secured in bone beneath the skin, and an array of electrodes wound during surgery through the cochlea, which send electrical impulses directly into the brain. As of now, the intracochlear electrodes are surgically inserted deep into the cochlea, a procedure which requires dexterity and which may cause local trauma, demolishing any residual hearing the patient may have had. There is an increasing interest in minimizing intracochlear trauma, thus preserving residual hearing.

A crawling micro-robot may be applied in the insertion of the mentioned electrodes through membranes that connect the inner and middle ear, a procedure, which will not require drilling through bone. Recently, a miniature robot (1mm in diameter and 4mm in length) had been designed, fabricated, and is hereby presented. The robot is capable of moving autonomously within small cavities having diameters ranging from 3.175mm up to 4mm, with velocities up to 9mm/sec. The purpose of this research is:

- To adjust sizes and to fabricate a suitable electrode payload for the procedure in hand.
- To fabricate the robot out of a medically compatible material.

The current research may be the first step towards an autonomous robot traveling through human body’s cavities, for drug delivery treatments, transmitting information from within and minimal invasive treatments.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

USING MILLIMETER AND THZ RADIATION FOR DETECTION OF FAR HIDDEN OBJECTS
Prof. Asher Yahalom & Prof. Yosef Pinhasi

The idea is to use the THz part of the electromagnetic spectrum to image and recognize hidden objects, such as explosives and drugs. The project includes the following steps:

1. Development of a theoretical model for reflection, transmission, and absorption through the above materials.
2. Design of an experimental setup for measuring the reflection, transmission, and absorption properties of the above materials.
3. Combining the information obtained from the experimental work and the literature survey to create a database.
4. Development of an algorithm that will enable the recognition of an unknown material by comparing its spectrum to the available spectra in the database.

ACTIVE IMAGING USING FREE-ELECTRON LASER
Prof. Asher Yahalom, Prof. Yosef Pinhasi & Prof. Boris Kapilevich

The free electron laser (FEL) is a powerful source of radiation in the millimeter wavelength range. In this project, the FEL radiation is used to illuminate outdoor objects in order to image them under adverse conditions, such as darkness, fog, and camouflage (active imaging). We have made a preliminary investigation of the conditions, in which an antenna can transfer the radiation created by the FEL to the outdoors. In this study, several parameters, such as the angular dimensions of the main lobe and antenna gain, were measured.
DEVELOPMENT OF A GENERALIZED MODEL FOR ATMOSPHERIC PROPAGATION OF MILLIMETER, SUB-MILLIMETER, AND THZ ELECTRO-MAGNETIC WAVES

Prof. Asher Yahalom, Prof. Yosef Pinhasi, Prof. Boris Kapilevich & Dr. Moshe Einat

The understanding of the effect of the atmosphere on the propagation of THz electro-magnetic waves is important for many applications, such as broadband communications, outdoor imaging of hidden objects, detection of hazardous materials in the atmosphere, and identification of hidden materials.

The project includes:
1. Construction of a model for the complex atmospheric dielectric constant in the THz spectral regime, as function of the atmospheric conditions such as temperature, humidity, rain, and fog.
2. Analysis of a wideband transmission in the THz spectrum.
3. Analysis of the effect of the spatially changing dielectric constant, in particular with respect to changing height.
4. Literature survey and analysis of the propagation of THz radiation in living tissue, with respect to penetration depth, damage, and the ability to perform imaging.
5. Design of an experimental setup that will enable to deduce the interaction parameters of THz radiation with living tissue.

UNIVERSAL SINGLE-PIXEL DETECTOR FOR PASSIVE AND ACTIVE MM-WAVE IMAGING

Prof. Boris Kapilevich, Dr. Moshe Einat, Prof. Yosef Pinhasi & Prof. Asher Yahalom

The goal of this project is to develop a universal mm-wave imaging single-pixel detector that can be used for detection of both metallic and non-metallic threats and contraband objects, using both active and passive modes of operation. The detector might be used as part of a mm-wave image scanning system or a focal plane imager.

The project includes the following steps:
1. Preliminary investigation, followed by designing and building a prototype of the detector.
2. Investigation of multi-array detector realizations based on planar configurations. Simulating the performance of basic detector components (LNA, mixer, LO, envelope detector etc.) to be employed in multi-detector array.
3. Systematic study and collection of scattering signatures, along with the creation of the signature database. This stage will include recording the forward and backward scattering signatures from different objects and materials, such as plastics, metals, liquids powders, building materials, as well as their combinations, like human body+metal object or human body+plastic explosives.
4. Investigation of the role of depolarization factors and comparison of the reconstructed mm-wave images using linear and circular polarized waves.
PORTABLE SENSOR FOR HIDDEN NON-METALLIC WEAPON AND EXPLOSIVES: FROM CONCEPT TO REALIZATION

Prof. Boris Kapilevich & Dr. Moshe Einat

We have developed a sensor prototype based on mm-wave scattering properties of all objects, both metallic and non-metallic. It consists of small receiving and transmitting antennas and a specially designed mm-wave modulator providing audio registration of hidden objects.

As the sensor is manually passed over the subject, any concealed objects cause a change in the reflected mm-wave signal, which, in turn, causes a change in the sensor’s audio output, alarming the user. Transmitted power is about 1 mW and not harmful to human body.

SPECTRAL BALLISTIC IMAGING FOR HOMELAND SECURITY APPLICATIONS

Prof. Shmuel Sternklar & Dr. Er’el Granot

We have developed a new technique, called Spectral Ballistic Imaging (SPEBI), for imaging through optical scattering media. In the past, ballistic imaging has been carried out in the temporal domain in order to extract the information from the first arriving light. SPEBI is essentially an affordable emulation of ballistic imaging, carried out in the frequency domain.

Based on this technique, we develop a system for applications in homeland security, among them detection of hidden weapons, imaging through fog and smoke, and imaging under water.

SPECTRAL BALLISTIC IMAGING FOR MEDICAL APPLICATIONS

Prof. Shmuel Sternklar & Dr. Er’el Granot

The Spectral Ballistic Imaging (SPEBI) technique is being developed for imaging through biological tissue as well as security applications. Important medical applications are, for example, detection of cancerous growths, imaging through bone, and other applications, where the non-hazardous nature of this technique is particularly valuable.

Applications in homeland security and the military include: detection of hidden weapons, imaging through cloud, smoke or fog, and imaging through water.
DETECTION OF HIDDEN OBJECTS IN DIFFUSIVE OR TURBID MEDIA

Prof. Shmuel Sternklar & Dr. Er’el Granot

There are many military, security, and medical applications, which require detection of hidden objects in diffusive media. During the last year, we developed several new techniques to image such objects. One of these methods, called “Spectral Ballistic Imaging”, measures the impulse response of the diffusive medium, and therefore can be used to characterize the optical properties of the medium. Moreover, since the measurements are performed in the frequency domain (instead of the time domain) in a wide spectral range, this method does not require complicated and expensive equipment. We also demonstrated that the Kramers-Kronig technique can also be used to reconstruct the impulse response of the diffusive medium. The two techniques were implemented in various scenarios to investigate and to image diffusive media and hidden objects.

NONLINEAR OPTICS WITH INTENSITY WAVES

Prof. Shmuel Sternklar & Dr. Er’el Granot

We are studying the behavior of modulated light in nonlinear medium, such as optical fibers. We have shown that, in these cases, the light can be modeled as an intensity wave. This work allowed, for the first time, to develop a method for phase-matching optical intensity waves. This opens new possibilities for characterizing nonlinear media and development of new optical methods for manipulating modulated light.

TUNABLE ALL-OPTICAL SIGNAL REGENERATOR

Prof. Shmuel Sternklar, Dr. Er’el Granot, Dr. R. Zaibel1, Dr. S. Ben-Ezra1 & S. Tsadka1

We have carried out an experimental and theoretical study of a highly robust high-bit-rate (10 Gbit/s) wavelength converter based on a narrow Brillouin filter. The conversion is performed in a cross-gain/phase process using a semiconductor optical amplifier (SOA), which operates in a weak-modulation mode, and the output signal undergoes a DC-reduction with a narrow spectral filter. Since we use a Brillouin grating as a narrow filter, the signal is distorted due to the filter’s finite spectral width (~20MHz). To overcome this problem, we use a relatively slow electronic mechanism to effectively narrow the filter’s spectral width and to improve its SNR.

SHORT-TIME DYNAMICS OF INITIALLY SINGULAR WAVE-PACKETS IN QUANTUM MECHANICS

Dr. Er’el Granot & Dr. Avi Marchewka2

We investigate the Schrödinger dynamics of initially singular wave-packets. It was demonstrated that the dynamics depends only on the values of the initial wave-packet and its derivatives at the singular points. Moreover, at short times, the dependence on the derivatives vanishes, and the dynamics depends primarily on the value of the initial wavefunction at the singularity. We also derived a general expression for the transmission of a singular wave-packet through an arbitrary potential. Finally, it was demonstrated that the short-time dynamics can be used to determine whether a barrier is absorptive only by measuring the transmitted part of the wave-packet.

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CHARACTERIZATION OF MATERIALS, POWDERS, AND AEROSOLS AT TERAHERTZ FREQUENCY RANGE USING FOURIER TRANSFORM INFRA RED SYSTEM

Dr. Amir Abramovich & Dr. Eliyahu Farber*

Terahertz (THz) radiation, spanning the range between microwaves and infrared, possesses several properties that can promote its use as a security tool for identification of concealed objects, materials, powders, and aerosols. There is no ionization hazard for biological tissue, and Rayleigh scattering of THz radiation is low compared to infrared and optical rays. Consequently, the characterization of objects, materials, powders, and aerosols at THz frequency range may be useful in a wide range of practical applications. At present, there are only few scientific instruments capable of characterizing materials at THz frequencies. Among them are the THz spectrometers, usually based on Backwards Wave Oscillators (BWO) sources, and Fourier Transform Infra Red (FTIR) systems used for a wider frequency range.

The major advantage of the FTIR system is its ability to cover a wide frequency band. The spectrum is then recovered via a Fourier transform of the interferogram, that is, the recorded signal as a function of the optical path difference. Our FTIR system operates over a wide spectrum range from 90 GHz to 300 THz in vacuum environment, using the same optics except for changing beam splitters according to the required band. The measured resolution of our system is 900 MHz, which can be improved to some tens of MHz using some mathematical manipulations of the recorded data. As part of this research, we have developed a sophisticated method for measuring the complex index of reflection and the dielectric function of one layer samples using Kramers-Kronig transform. Furthermore, we have measured the spectra of polystyrene, polyethylene, and other materials. Finally, we have introduced a new technique of preparation for measuring the spectra of explosive powders.

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BIOLOGICAL SENSORS OF ENVIRONMENTAL EXPOSURE TO ELECTROMAGNETIC RADIATION ASSOCIATED WITH CELLULAR PHONES

Dr. Amir Abramovich, Prof. Rafi Korenstein1 & Prof. Shimshon Belkin2

The exponential increase in the use of cellular mobile communication over the last few years leads to a correspondingly increasing exposure of world population to radiofrequency (RF) electromagnetic radiation. This growing environmental exposure of humans to RF radiation raises questions regarding the biological and health consequences of this exposure, especially the long-term effects. In particular, the connection between cancer and exposure to RF radiation is continuously debated. There is a lack of scientific consensus regarding experimental evidence, either refuting or supporting the cancer induction or promotion potential of RF and microwave radiation from mobile phones. While cancer, particularly central-nervous-system cancers, continues to be in the focus of the research concerning the exposure of human cells to cell phones, several studies have reported microwave induced blood-brain-barrier permeability changes at an extremely low level of microwave exposure (below 1.6W/kg), subjecting the central nervous system to possible assault from extraneous microorganisms. In this research, we investigate the influence of cellular phone electromagnetic radiation on human cell parameters and its possible connection to cancer.

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LOW-ENERGY SPECTROSCOPY OF THE ORDER PARAMETER IN HIGH-\(T_c\) FILMS

Dr. Eliyahu Farber*, Prof. Guy Deutscher1, Dr. Amir Abramovich, Prof. Martin Dressel2, Dr. Boris Gorshunov3, Dr. Nicole Bontemps4 & Dr. Jean-Pierre Contour5

This research deals with the nature of the symmetry of the order parameter in high \(T_c\) YBCO superconductors, which is fundamental to any theoretical description and also of great technological importance for a large variety of applications. We are investigating the low-energy electrodynamics of doping dependence of \(Y_{1-x}Ca_xBa_2Cu_3O_7-\delta\) thin films grown by DC off-axis sputtering. Reports based on tunneling measurements showed that a complex order parameter of the form \(\Delta = d_{x^2-y^2} + i\delta\) exists in the overdoped regime. However, tunneling measurements are sensitive to the surface on the scale of the coherence length \(\xi \approx 10\) nm. In the present project, we are studying whether a complex order parameter is a property of the bulk, by probing the scale of the penetration depth of \(\lambda \approx 1\) µm.

According to tunneling spectroscopy, the sub-gap, \(\delta\), is of the order of 2meV, which is right between the microwave and infrared spectral ranges. We propose two approaches to obtaining information on the complex order parameter:

1. In microwave resonator measurements of \(\lambda(T)\), we show a deviation from the linear temperature dependence reported for pure \(d_{x^2-y^2}\)-wave in the underdoped regime.

2. A direct test of the sub-gap \(\delta\) can be obtained by optical transmission measurements. Therefore, we plan to detect the gap with sub-millimeter waves using a Mach-Zehnder interferometer, which allows measuring the real and imaginary parts of the complex electrodynamic response.

Since tunneling results also show an induced complex order parameter in optimally doped \(Y_{1-x}Ca_xBa_2Cu_3O_7-\delta\) films when a magnetic field is applied, we plan to measure the surface impedance in an external magnetic field using these films.

TERAHERTZ SPECTROSCOPY OF THE ORDER PARAMETER IN HIGH-\(T_c\) FILMS

Dr. Eliyahu Farber*, Prof. Meir Lewkowicz**, Dr. Amir Abramovich, Dr. B. Gorshunov1, Dr. A. Lobanov1, Prof. A. Volkov1, Prof. A.S. Prokhorov1, Prof. D. Vitukhnovskii1 & Prof. V. Nozdrin1

The nature of the symmetry of the order parameter in high \(T_c\) superconductors is still under debate, even though it is known to be dominated by a \(d_{x^2-y^2}\) component. Tunneling measurements on overdoped \(Y_{1-x}Ca_xBa_2Cu_3O_7-\delta\) films showed a splitting of the zero-bias conductance peak at low temperature. This splitting was interpreted as evidence for the appearance of a sub-dominant complex order parameter, thus leading to an order parameter of the form \(d_{x^2-y^2} + is\) or \(d_{x^2-y^2} + id_{xy}\). It was shown that a complex order parameter will split the zero-bias conductance peak caused by Andreev bound states at the surface. Although the temperature dependence of the penetration depth at low temperatures is known to fit a \(d_{x^2-y^2}\)-wave order parameter at optimum doping, there are indications of a weak exponential temperature dependence in fully oxygenated thin films. These thin films also show a reduction of the surface resistance at low temperature.

Our present research studies the temperature dependence of \(\lambda(T)\) for overdoped \(Y_{0.9}Ca_{0.1}Ba_2Cu_3O_7\) thin films. For the task of data fitting, we use a numerical calculation based on the BCS equation.

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SUPERCONDUCTING PHASE SHIFTER FOR MULTI CHANNEL WIRELESS COMMUNICATION

Dr. Eliyahu Farber*, Prof. Guy Deutscher¹, Dr. Amir Abramovich

Since the discovery of High Temperature Superconductors (HTSC) in 1986, there has been a great effort worldwide to develop and characterize these materials. Meanwhile, applications based on these materials have become very popular. Within the framework of our recent research, we are developing a new kind of superconducting phase shifter that enables transmission over several channels using a single antenna. This configuration will reduce significantly the transmitter power loss and consequently the cost of operation as well. The current phase shifter is based on high quality 3” YBCO superconducting thin films grown on sapphire substrate using the magnetron sputtering method.

We have investigated several possible geometries for the HTSC phase shifter and compared them to phase-shifters based on normal conductors. In the present research, we have analyzed a phase shifter that is based on two serially connected components. This configuration allows us to get a total phase shift of 200°.

Our development procedure uses the Agilent Advanced Design System (ADS), which is a leading microwave simulation tool in this field, and a 3D electromagnetic field simulation code, Microwave Studio (MWS), which gives us a full picture of the HTS properties in a microwave circuit.

The RF losses of these superconducting films are characterized by superconducting resonators specially developed for this purpose: a parallel plate resonator and a dielectric resonator.

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DESCRIPTION OF WEAKLY BOUNDED THREE-BODY NUCLEAR SYSTEMS IN THE J-MATRIX APPROACH AND PHASE-EQUIVALENT TRANSFORMATION OF CORRESPONDING BINARY POTENTIALS

Dr. Yuri Lurie, Prof. A. Shirokov¹ & Dr. A. Mazur²

The extension of the oscillator-basis J-matrix formalism to the case of true A-body scattering is considered. The formalism is applied to loosely-bound ¹¹Li and ²He nuclei within three-body cluster models ⁹Li + n + n and α + n + n. The J-matrix formalism is used not only for the calculation of the three-body continuum spectrum wave functions, but also for the calculation of the S-matrix poles associated with the ¹¹Li and ²He ground states, to improve the description of the binding energies and the ground state properties. The effect of the phase-equivalent transformation (PET) of the binary n-α interaction on the properties of the α + 2N three-body system is examined. These results are used in the construction of a “realistic” inverse scattering n-α potential, devised to reproduce both the binary Na scattering data and the structure of α + 2N three-body systems.

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Solar energy projects span both basic and applied research aimed at converting the sun’s energy to heat, electricity, and biological materials. Stress has also been laid on systems analysis and the importance of optimization and economic feasibility. The list of projects includes:

- Building and examination of central water heating systems
- Development of collectors made of metallic and non-metallic materials
- Energy storage through phase change materials and testing of a greenhouse
- Characterization and investigation of materials and surface properties, mathematical and computer simulation of solar collectors and systems, systems analysis, and parameter sensitivity studies
- Inquiry into the feasibility of utilization of solar energy in the chemical industry
- Investigation of the profile of temperature in a water storage vessel and stability of the stratification
- Use of solar energy to cultivate algae

A MULTI-LOOP AIR-LIFT BIOREACTOR FOR PHOTOSYNTHETIC GROWTH AND FOR IMMOBILIZED CELLS OR ENZYMES

Prof. David Wolf

A multi-loop air-lift bioreactor was developed for use in photosynthesis and other bioreaction processes. The proposed bioreactor was tested in laboratory-scale indoor experiments on the cultivation of *Porphyridium* sp. The multi-loop bioreactor, which operates as a closed system, performs better than open raceway ponds and compares favorably with the ‘sleeve’ type of closed system. Its advantages and prospects for utilization in other biotechnology processes are quite good.

Plasticating extrusion is probably the most widely used unit operation in the polymer industry. The mixing conditions, flow patterns, and residence time distribution (RTD) in the plasticating extruder have highly significant effects on the product, especially when polymers sensitive to heat are extruded or when good mixing of additives is required. In common applications a knowledge of the RTD in the plasticating extruder is particularly important. Accordingly, we undertook an experimental study of the RTD of a polymer material in a single screw plasticating extruder and compared the results with the available theory. The RTD was determined using a radioactive tracer. The results provided insights into mixing conditions and flow patterns in the extruder. Based on the knowledge acquired, further applications of the extruder are being envisioned.

Mixing is a very important factor in chemical processes, as well as in the performance of many unit operations. Blending, extraction, heat and mass transfer, and chemical reaction conversions are just a few examples of operations which are directly affected by the degree of mixing. One can define mixing as the process of bringing two or more dissimilar materials to a desired degree of uniformity. The efficacy of the mixing can be measured by the scale and intensity of segregation.

The concept of ideal conditions of mixing prevailing in reactors or unit operations has been replaced by non-ideal mixing models and mathematical equations. Our studies of mixing, agitation and residence time distributions have yielded significant insights into mixing phenomena, and more especially into the performance of unit operations with regard to fluid motion and its characteristics. With the introduction of the residence time distribution functions, combined with what we know about turbulence effects, a good understanding of mixing and agitation phenomena has been achieved.
CONTROLLED-RELEASE CHEMICALS

Prof. David Wolf

Controlled-release chemicals (CRCs) are obtained by a simple technique using a plasticating extruder. The author has been involved in studies aimed at determining the relationship between the process parameters and the potential contact time of the active ingredient with the environment. Various CRCs have been prepared using an extrusion process, sometimes in combination with a supplementary coating. The active ingredient is incorporated into the matrix or the coating, which comprises plastic materials such as polyethylene, or polyurea with or without the addition of paraffin waxes. The studies have shown that the cumulative release of the active ingredient into water can be controlled by manipulating the preparation techniques, the types and concentrations of inert materials, and the concentration of the active ingredient. The release time can be adjusted to fit the required time period. Many applications of these systems could be envisioned, such as for release of fertilizers, insecticides, pesticides, etc.

MECHANOCHEMICAL SYNTHESIS OF SALICYLIC ACID - FORMALDEHYDE CHELATING COPOLYMER

Dr. Svetlana Lugovskoy, Dr. Marina Nisnevitch, Prof. Michael Zinigrad* and Prof. David Wolf

A mechanochemical synthesis of copolymer of salicylic acid and formaldehyde was developed. New IR absorbance bands found after performing the mechanochemical synthesis are attributable to the formation of the salicylic acid-formaldehyde copolymer. Dislocation deformation along slide planes in the salicylic acid structure occurs in the course of the mechanochemical activation but causes no essential changes in the more stable hydrogen bond net. The weaker inter-layer bonds in the acid structures are broken during activation but restored soon after completion of the process. A polycondensation reaction occurs as a result of the mechanochemical processing of the salicylic acid-formaldehyde mixture. The copolymer obtained is a chelating agent capable of binding Pb^{2+}, Cu^{2+}, and Fe^{3+} ions. The ion exchange and metal ion binding capacities of the mechanochemically produced copolymer were compared with those of the copolymer synthesized by the conventional ‘wet’ method.

* Also a faculty member at the Department of Biological Chemistry

LIQUEFACTION OF BIOMASS

Prof. David Wolf and Prof. Don H. White

Biomass – including wood – is an important renewable source of energy. Several technologies using this energy source have been studied and implemented. Biomass could be used to provide liquid fuels on a regional basis, contingent upon the development of an economic liquefaction process. In this project a unique extruder-feeder reactor system was developed, designed, and experimentally tested for direct biomass liquefaction under high pressure and temperature conditions (around 21 MPa and 375°C, respectively). The idea of pumping highly concentrated slurries to elevated pressures by means of a single screw extruder-feeder is a novel one, and the new technology has proved successful. We have succeeded in pumping up to 60 wt % of biomass in the form of wood flour mixed with 40 wt % of wood oil vacuum bottoms, which are in a solid form at room temperature. Applicability of this system for coal liquefaction can be envisaged. This extruder-feeder reactor system is expected to improve direct liquefaction wood oil quality and process economics, especially as it enables limitation of plant size and reduction of oil carrier recycling volume.

Using this experimental system we were also able to investigate a number of alternatives, including the use of sodium carbonate as catalyst, the use of carbon monoxide as reactant, the effect of the water-gas shift reaction, various pretreatments of the wood flour, and the use of wood oil vacuum bottoms as an oil recycle or carrier medium.

CRYSTALLISATION OF INORGANIC SALTS FROM AQUEOUS SOLUTIONS

Prof. Joseph Epstein

A study is under way of the effect of certain additives known as ‘crystal habit modifiers’ on the physical properties (habit) of salts formed by precipitation from aqueous solutions, by evaporation, out-salting, or chemical reaction. The systems chosen for the study are of industrial importance, e.g. the formation of calcium sulfate (gypsum) and barium sulfate.

The rate of dissolution of magnesia cement and the possibility of stabilizing this cement in humid atmospheres or in contact with water by using additives such coal ash are being examined. The aim is to use this cement as a carrier for slow release fertilizers.
DEVELOPMENT OF METHODS FOR BACTERIA ERADICATION BY PHOTOSENSITIZERS ENCAPSULATED IN LIPOSOMES AND IMMOBILIZED ON A SOLID PHASE

Dr. Marina Nisnevitch

In order to find substitutes for antibiotics known to cause bacterial resistance, antimicrobial properties of photosensitizers (PSs) encapsulated in liposomes or immobilized on solid phase are being studied. The cytotoxic effects of PSs are based on their ability to absorb the energy of visible light and produce reactive oxygen species which destroy bacterial cells. Encapsulation and immobilization of PSs leads to an increase of their antimicrobial activity, the reduction of applied drug dosages and a certain stability enhancement. In addition, these new formulations of PSs give a perspective for a drug targeting against definite cell types and offer a basis for development of a new means of these drugs delivery.

DEVELOPMENT OF METHODS FOR ABSORPTION OF HEAVY METALS IONS FROM WASTE WATER

Dr. Marina Nisnevitch

With the aim to find a solution to a problem of growing ecological importance - purification of wastes from heavy metals ions, two different approaches are being explored. The first approach is based on the use of chelating polymers capable of a selective capture of heavy metals. The second one includes an application of microorganisms for remediation of ions from waste water. A combination of these approaches opens a perspective to supply a complete capture of heavy metals in continuous streams of wastes.

EFFECT OF LIPOSOME-INCLUDED PHOTOSENSITIZERS ON PROKARYOTIC CELLS UNDER CHEMILUMINESCENT EXCITATION

Dr. Marina Nisnevich & Prof Y. Nitzan

Photosensitizers are known to destroy, under visible light illumination, a wide spectrum of eukaryotic and prokaryotic cells. Hence, targeted destruction of problematic cells can be achieved using chemiluminescent agents that are capable to produce light as a result of chemical reactions (Laptev R., Nisnevitch M et al, BJ, 95, 189-196, 2006). On the other hand, for a number of cells, it was shown that drug penetration into the cells is improved by inclusion of the drug into liposomes.

The aim of this project is to study the effect of the liposome-included photosensitizers on prokaryotic pathogens, under artificial illumination and chemiluminescent excitation. This method has a potential to compete with antibiotic treatment, especially in the case of antibiotic resistant cell lines.

PRODUCTION AND SEPARATION OF METALLO-PROTEASE CAMELYSIN

Dr. Marina Nisnevitch & Dr. Rivka Cahan

Proteolytic enzymes of various cleavage specificities play an important role in protein research and analysis. Metallo-protease camelysin was found by us (Nisnevitch M. et al, BBRC, 344, 1, 99-105, 2006) to be present in the cells of gram-positive soil bacterium Bacillus thuringiensis israelensis (Bti).

The aim of this project is to purify the camelysin and to investigate its characteristics.

MECHANO-CHEMICAL SYNTHESIS OF CHELATING POLYMER FOR SORPTION OF HEAVY METAL IONS IN WASTEWATER

Dr. Marina Nisnevich, Dr. Svetlana Lugovskoi & Dr. Moti Cohen

Mechano-chemical synthesis is a promising method that enables a quick and high-efficient chemical reaction without organic solvents, that is, the synthesis process is environmentally friendly and clean. This method is widely described for various organic syntheses. We studied an application of this method to the synthesis of polymer containing chelating groups that is capable to adsorb ions of heavy metals (Lugovskoy S., Nisnevitch M. et al, in preparation).

The aim of this project is to develop an application of the mechano-chemical method to a number of polymerization reactions and to build a filtering device for sorption of heavy metal ions in wastewater.

1 Bar Ilan University
2 Regional R&D Center
PHOTODYNAMIC THERAPY WITHOUT EXTERNAL RADIATION FOR TARGETED DESTRUCTION OF CANCER CELLS

Dr. Michael Firer*

Photodynamic therapy (PDT) is a treatment that uses a drug, called photosensitizer or photosensitizing agent, and a particular type of light. When photosensitizers are taken up into cells and exposed to a specific wavelength of light, they induce the production of oxygen that kills nearby cells.

Efforts to expand the use of PDT in the clinic are hindered by the lack of photosensitizer target cell specificity and the limited tissue penetration by external light radiation for the following reasons:

- PDT is only used to treat tumors on or just under the skin, and on the lining of internal organs or cavities.
- PDT is less effective in treating large tumors, because the light cannot penetrate deep into these tumors.
- PDT is a local treatment and generally cannot be used to treat cancer that has spread (metastasized).
- Patients treated with PDT should avoid direct sunlight and bright indoor light for at least 6 weeks after the treatment.
- PDT can cause burns, swelling, pain, and scarring in nearby healthy tissue.

We have developed a new method, called Intracellular Activation of PDT (IAP), in which the chemical is activated intracellularly to yield chemiluminescent radiation that stimulates PDT-induced cytotoxicity in 95% of cells, hence bypassing the need for external radiation. The method increases the specificity and efficiency of PDT for cancer cells by a factor of almost 20.

This new procedure will allow us to overcome the above drawbacks of PDT and to develop safer and more effective PDT techniques, which could be used for various types of cancer presently not treated with PDT (including treating metastasis).

* Also a faculty member at the Department of Molecular Biology

ACTIVITY OF TARGETED CHEMILUMINESCENT PHOTODYNAMIC THERAPY IN A MOUSE MODEL OF LEUKEMIA

Dr. Michael Firer*

Photodynamic Therapy involves a two-stage process. A light-absorbing photosensitizer (Ps) is endocytosed and then simulated by light, inducing transfer of energy to a cytoplasmic acceptor molecule and the generation of reactive oxygen species that initiate damage to cellular membrane components and cytolysis. PDT is already being used successfully in the clinic for several skin-localized cancers and other skin related diseases, but its wider use is hindered by the lack of Ps target-cell specificity and the limited tissue penetration by external light radiation. We have demonstrated that PDT can be made more specific and efficient by coupling the photosensitizer to a carrier molecule specific for a receptor on the target cell. Moreover, we have overcome the problem of limited tissue penetration by developing a means to chemically activate the PDT process intracellularly. Taken together, these developments should significantly broaden the use of PDT for cancer therapy, by allowing the process to be activated in any chosen target cell, anywhere in the body.

To date, the studies on Targeted, Chemiluminescent PDT (TCPDT) have only been carried out in vitro. The current research is aimed at determining the activity of this system in vivo. A series of experiments will be carried out using a mouse model of leukemia. The research aims to define an effective protocol for the use of TCPDT, in terms of the time of therapy, the number and dosage of treatments required, and the recovery and survival data that might be expected from such a system.

* Also a faculty member at the Department of Molecular Biology
Multiple Myeloma (MM) remains an incurable B-cell malignancy. MM tumor cells derive from a single clone of plasma cells that typically secrete antibody (M-protein). While recent research has identified new therapies for MM, none of them is MM tumor cell specific. On the other hand, the surface Ig of MM cells is clonotypic and could make an ideal MM cell-specific target. Therefore, MM cells might be targeted with a Peptide-Toxin Conjugate (PTC), in which an M-protein specific peptide is employed to specifically deliver a cytotoxin. This approach could allow targeted elimination of tumor cells and has the potential to use the ligands as predictors of disease relapse.

The aims of this project are:
1. To isolate M-protein specific peptide sequences for each patient's tumor cells and to prepare peptide-drug conjugates;
2. To test in-vitro the ability of these conjugates to specifically destroy MM tumor cells;
3. To use bioinformatics tools to study the possible immuno-pathologic significance of the derived peptide sequences;
4. To use the pep-FITC conjugates to monitor relapse in patients during follow-up.

The expected outcomes of this study include effective and specific elimination of target MM tumor cells, early detection of disease relapse, and identification of antigens that may be related to MM pathogenesis.

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TARGETED DELIVERY OF GENETICALLY CONJUGATED CYT1AA FROM BACILLUS THURINGIENSIS ISRAELENSIS INTO MYELOMA MODEL CELLS

Dr. Rivka Cahan, Prof. A. Zaritsky1 & Dr. Michael Firer*

Multiple myeloma is a currently incurable cancer of plasma B cells in the bone marrow, characterized by elimination of normal blood cells, damage to the immune system and overproduction of abnormal monoclonal immunoglobulin (Ig) “M-protein”. This protein is expressed on the membrane of plasma cells and secreted into the blood.

The proteolytically activated fragment of Cyt1Aa from Bacillus thuringiensis israelensis destroys cell membranes non-specifically. To treat myeloma target cells with Cyt1Aa, the lack of specificity must be overcome. This may be achieved by linking Cyt1Aa to a ligand directed to a clonotypic receptor on target cells.

Preliminary results with myelin basic protein (MBP) used as ligand show that the fused protein is active against mouse tumor B cells, serving as a model for multiple myeloma.

This approach provides two benefits: (a) using the surface Ig as a unique receptor; (b) preventing the development of drug resistance, because Cyt1Aa does not penetrate the cell, but rather acts on the cell membrane.

Consequently, the Cyt family of proteins could be used as effective drugs over an extended period, potentially resulting in removal of residual disease causing cells.

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EXAMINING THE EFFECT OF PROTEASES ON CRYSTAL TOXINS PRODUCTION BY BACILLUS THURINGIENSIS ISRAELENSIS

Dr. Rivka Cahan, Prof. A. Zaritsky1, Prof. Y. Nitzan2 & Dr. Dvir Taler2

Bacillus thuringiensis israelensis (Bti) is a gram-positive soil bacterium considered to be the most promising biological control agent against insect larvae. During sporulation, this entomopathogenic bacterium produces parasporal crystalline proteins (δ-endotoxins), which possess larvicidal and cytolytic activities, as well as endo-proteases. The crystal in Bti is composed of four main proteins, Cry4Aa, Cry4Ba, Cry11Aa, and Cyt1Aa. The genes for these and other Cry and Cyt proteins are located on the large plasmid (128 kb) pToxis of Bti. Maximal Cyt and Cry proteins toxicity occurs upon alkali solubilization and proteolysis from both N- and C- termini, converting the pro-toxins to activated forms. Some Bti proteases, synthesized during sporulation, are metalloproteases with possible physiological functions. They can either degrade or activate δ-endotoxins, hence affecting the toxicity against the target insect, for example. In neutral protease A-deficient strains, Cry3Bb and Cry1Bb were not degraded, as they were in the wild-type strain. In addition, cloning the cyt and cry genes separately into E. coli resulted in cell death and low expression, respectively.

The aim of this research is to purify proteases from Bti and to examine their effect on crystal toxins. In addition, we intend to insert the cyt and cry genes separately into E. coli deficient protease strains and to examine their expression.

Results of this study may enable to improve efficacy of entomopathogenic bacteria for Integrated Pest Management.
A NOVEL EQUATION OF STATE COMBINING VAN DER WAALS AND DEITERICI POTENTIALS

Dr. Ilya Polishuk & Prof. Juan Vera

This project proposes a new equation of state (EOS) based on molecular theory for the prediction of thermodynamic properties of real fluids. The new EOS uses a novel repulsive term, which gives the correct hard sphere close packed limit and yields accurate values for hard sphere and hard chain virial coefficients. The pressure obtained from this repulsive term is corrected by a combination of van der Waals and Dieterici potentials. No empirical temperature functionality of the parameters has been introduced at this stage.

A NOVEL EQUATION OF STATE BASED ON HARD-BODY THEORY

Dr. Ilya Polishuk & Prof. Hugo Segura

This project deals with the development of a new equation of state (EOS) model based on molecular theory, designed to predict the thermodynamic properties of real fluids. The proposed EOS uses a novel repulsive term, which generates accurate values of hard chain virial coefficients, previously evaluated by Vega et al., [J. Chem. Phys. 113, 10398 (2000)] according to the Pearl-Necklace theory. Unlike the existing engineering models, which are fitted to the experimental vapor pressure data using the empirical temperature functionalities, the novel EOS employs a molecular-based parameter, namely, the effective chain length. The advantage of the new model lies in a better molecular thermodynamics basis, which makes its predictions more reliable in the entire thermodynamic phase space.

DEVELOPMENT OF THE GLOBAL PHASE DIAGRAM APPROACH FOR PREDICTION OF BIO-THERMODYNAMIC DATA

Dr. Ilya Polishuk & Prof. J. Wisniak

Estimation of bio-thermodynamic data with minimal resort to experimental data is one of the most important problems in modern biotechnology. The proposed research aims at the derivation of a first reliable model for prediction of phase behaviour in water-alcohol solutions of biologically-active substances. The problem will be solved by developing a theoretically-based model, which also includes empirical parts, and a novel Quantitative Global Phase Diagram-based approach. We have recently developed this approach for the proper adjustment of the mutual contribution of different intermolecular forces acting in fluid systems. In contrast to previous models, this approach recognizes the fact that all regions of the thermodynamic phase space are closely inter-related. Therefore, it allows detection of fundamental regularities characteristic of phase behavior in different classes of systems – a trait that endows it with predictive ability.

The fact that, for the first time, the whole thermodynamic phase space is being considered for the quantitative description of data makes our approach substantially different from existing methods. Our starting assumption for the theoretical treatment of the biologically active solutions is that the solubility of proteins is determined by two competing effects, namely, the unfavourable loss in entropy from constraining a protein molecule upon crystallization and the favourable protein-protein energetic interactions due to the formation of crystals.

We also intend to develop a user-friendly computer program package to facilitate fundamental understanding and practical evaluation of phenomena related to solutions of biologically active macromolecules.

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ELECTRO CATALYTIC REDUCTION OF HALO-ORGANIC
COMPOUNDS USING TRANSITION METAL COMPLEXES
INCORPORATED WITH MODIFIED ELECTRODES

Dr. Yael Albo

Halogenated hydrocarbons such as halogenated methanes and ethanes are major environmental contaminants of the Ramat-Hovav industrial complex. Release of these hazardous compounds into the environment by leakage from industrial effluents causes ecological damage to the subsurface water reservoirs. Thus, the reduction, catalytic reduction and the electrocatalytic reduction of halo-organic compounds is of major interest for the removal of such compounds either from the raw effluents or for remediation of contaminated water.

The aim of this research is to develop a dehalogenation method that has an application in industry by employing modified electrodes containing for example nickel complex catalysts which were shown to be electrocatalysts for the reduction of halo-organic substrates in aqueous solutions. By immobilizing such complexes on the electrode surface, one may profit from their electrocatalytic capabilities to conceive new environmental and analytical tools for detection and degradation of organic halides in solution.

Several methods to obtain modified electrodes will be tested: Different complexes (the modified electrodes will contain nickel complexes of different structures and the electrode behavior will be examined) and different electrode materials (Au, Graphite, Glassy Carbon and other special electrodes that allow different methods of modification) will be tested.

It is of great importance to investigate the next mechanistic aspects: 1) factors contributing to the overall stability, catalytic activity and selectivity of the complexes immobilized on electrodes, 2) factors leading to deactivation of the electrochemical catalysts, 3) ways of prevention of this deactivation.

PRODUCTION OF LIGHTWEIGHT CONCRETE BASED ON COAL ASHES – TECHNOLOGICAL AND RADIOLOGICAL ASPECTS

Dr. Mark Nisnevich, Dr. Gregory Sirotin, Prof. Tuvia Schlesinger* & Dr. Ya’akov Eshel

A novel technology for combined utilization of high volumes of fly ash and porous bottom ash for manufacturing a high performance ecologically friendly lightweight concrete was developed at our Research Institute. The required strength, density, and durability were achieved by forming a solid cement-fly ash matrix based on the optimum concrete proportion. An additional improvement of strength and durability was achieved by including a dense and non-active component, namely, the unprocessed crushed sand from stone quarries. This enhancement also allowed to reduce concrete radioactivity in case of using coal ashes with increased concentration of undesirable radionuclides. The suggested technology of binary and ternary concretes was studied in details under laboratory and field conditions. This technology has the potential for producing thermal insulating, thermal insulating/structural, and structural concretes with the following advantages: (a) broadening the use of coal ashes; (b) reducing the damage from the traces of toxic heavy metals and undesirable radionuclides, caused to the environment by power plants (c) reducing the consumption of natural resources for building materials production.

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STRESSED STATE OF COMPOSITE STRUCTURAL COMPONENTS IN CFT UNDER AXIAL LOADING

Dr. Mark Nisnevich, Dr. Gregory Sirotin, Dr. Boris Blostotsky & Dr. Yaakov Eshel

This research revealed an essential difference in the stressed state of the composite structural components in two groups of concrete filled steel tube (CFT) sections: (a) the upper and lower sections and (b) the mid-height sections. Apart from the nature of the load application to the CFT specimens and the value of the load, the behavior of the structural components in the above-mentioned groups of sections is as follows.

The sections of group (a) are characterized by:
- the presence of the confining effect to the concrete core;
- a considerable difference between the axial compressive strains in the steel tube and the concrete core;
- the presence of the tensile hoop stresses in the steel tube;
- the biaxial stressed state of the steel tube and the triaxial stressed state of the concrete core.

The section of group (b) is characterized by:
- the absence of the confining effect on the concrete core;
- the equal or close spaced compressive axial strains in the steel tube and the concrete core;
- the absence of the tensile hoop stresses in the steel tube;
- the uniaxial stressed state of the steel tube and of the concrete core.

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OFF-ROAD MOTION PLANNING AND NAVIGATION

Prof. Zvi Shiller*

This research, which is being funded by the Israeli Space Agency and conducted in cooperation with the field and service robotics laboratory at MIT, is aimed at developing novel motion planning and navigation algorithms to guide autonomous vehicles in unstructured outdoor environments, such as during surface exploration of remote planets and terrestrial search and rescue missions. The planner is based on an original physics-based motion planner that takes into account surface topography, soil properties, and vehicle dynamics.

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TRAVERSABILITY MODELS FOR OFF-ROAD VEHICLES

Prof. Zvi Shiller*

This research, which is being funded by the Ministry of Defense, is aimed at developing traversability models for off-road vehicles on hard and soft grounds that account for vehicle/terrain interactions. An experimental test rig has been developed to measure the vehicle/ground forces and compare them to existing empirical and analytical terramechanics models.

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1 Samaria & Jordan Valley Regional R&D Center

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COLLISION WARNING FOR DRIVER ASSISTANCE  
Prof. Zvi Shiller*

Research funded by a major automobile manufacturer, aimed at developing a unified approach to collision warning due to in-lane and neighboring traffic. It is based on the concept of velocity obstacles, and is designed to alert the driver of a potential front collision and against attempting a dangerous lane change maneuver. Testing the algorithm using real sensor data collected by the industry during actual drive runs demonstrated the velocity obstacle based warning algorithm as a powerful alternative to existing alternatives, with a significant potential to contribute to the next generation collision avoidance safety systems. Parts of this research are conducted in cooperation with the E-Motion project of INRIA, Grenoble, France.

MAPPING ROAD SAFETY  
Prof. Zvi Shiller*, Dr. Dror Rubinshtein

Mapping the safety of existing roads is being achieved by analyzing the dynamic stability of passenger cars and heavy trucks with respect to vehicle dynamics and road geometry. This will allow evaluating unsafe sections in existing roads and help establish procedures for safe road design.

MOTION PLANNING  
FOR AUTONOMOUS ROBOTS ON ROUGH TERRAIN  
Prof. Zvi Shiller* & Dr. Dan Ophir**

We have developed a new robot navigation algorithm based on the graph representation of the environment. The algorithm outline is as follows:

- The shortest constrained path through each node in the graph is generated
- The lengths of the constrained paths produce a “cost map,” in which peaks are treated as obstacles
- The set of constrained paths is subdivided into homotopy classes
- The best in each homotopy class represents a locally optimal path

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** Faculty member at the Department of Mathematics and Computer Science and the Department of Industrial and Management Engineering
PEDESTRIAN SAFETY RESEARCH IN ISRAEL
Dr. Michael Ben Chaim*, Dr. Nir Shvalb**, Dr. Moshe Brand and Prof. Zvi Shiller*

The ultimate goal of this study is to promote pedestrian safety and help avoid collisions related to the sudden emergence of pedestrians on the road. The problem of collisions with pedestrians is particularly severe in Israel, where pedestrians account for one third of all road fatalities, but the problem is also acute in the rest of the world. The study summarizes the theoretical and practical work that has been done on pedestrian safety, with especial focus on crash characteristics and the safety implications of various driver, vehicle, pedestrian, and roadway features. The theoretical research has been based on complex dynamical and statistical modeling of road collisions with pedestrians, while the practical part includes experiments with mannequins. The results of the present study will be useful for transportation researchers, engineers, planners, driving schools, accident reconstruction specialists, and safety professionals involved in improving pedestrian safety.

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MECHANICAL INTERACTION BETWEEN SELF EXPANDING STENT AND ARTERIAL WALL
Dr. Moshe Brand, Prof. Shmuel Ryvkin¹ and Prof. Shmuel Einav¹

Many recent studies were performed in order to understand the catheterizing process, but none of these studies enabled to calculate the actual values of the developing stresses at the wall of the artery, as a function of geometrical parameters and the properties of the materials of the stent and artery. The ability to evaluate the stresses that are formed in the artery, for various types of stents, could help to lessen the number of failures.

In this research, analytical and numerical models were formulated, in order to calculate the stresses applied to the walls of the artery as a function of the above cited parameters. A "Potential Damage Factor" was formulated to describe these stresses. A novel effective numerical approach for deriving Potential Damage Factor of cyclically symmetric stents was suggested. To begin with, 2D and 3D models were formulated. It was found out that the results obtained for the suggested 2D numerical model constitute a very good approximation to the results obtained for the standard 3D model, with the advantage that the results for the 2D model are obtained within a relatively much shorter time. Guided by these results, the Potential Damage Factor was calculated for cases, in which various stent types are inserted into the artery – employing the suggested 2D model.

Finally, cases with asymmetric blockage were examined. It was discovered that when the layer blocking the artery is concentrated on one side of the wall of the artery, lower values of the Potential Damage Factor are obtained in comparison to the case of an artery with identical blocking percentage but wherein the arteriosclerosis layer is distributed symmetrically.

¹ Faculty of Engineering, Tel Aviv University
In this project, we construct special games that increase students’ motivation to study mathematics.

Games play an important role in child’s development: through games, children obtain information on the world at large. In kindergarten and, to some extent, in elementary school, games are used to teach languages and science. However, teaching methods that use games have disappeared from use in high schools and in institutions of higher education, despite the fact that even at these ages, games can help learners learn rapidly and with ease.

Our goal is to construct models, which could be used to involve school children and students in educational games. In all games, learners solve mathematical problems in their free time. This is clear to the teacher, but the activities are presented to students as a game.

During the last two decades, various mathematical models containing functional differential equations were considered in hundreds of papers. Usually, such equations appear when a control using information about previous states of solution vectors can be formed in a mathematical model, constructed on the basis of classical physical, chemical, economic, and others laws and described by a system of ordinary differential equations. The control can be in one of the following two forms. The first is a permanently acting factor introduced in the equations, leading to delay differential equation. In the second form, the control signal immediately changes the state of the system, leading to impulsive differential equations. In economic models, both types of control signals naturally occur, and we get FDEs with impulsive effects as a basic model.

Appropriate transformation (so called Azbelev’s W-transform), developed in the qualitative theory of functional differential equations, reduces the FDE boundary value problems to the analysis of Fredholm integral equations of the second kind in the space of summable functions. By estimating the norm of the integral operator in these equations, we obtain rough estimates regarding the solvability or the corresponding properties of solutions to these boundary value problems. Usually the results of this sort do not allow us to make conclusions in case of practical problems. The second group of results is formulated in terms of fundamental systems of equations or parameters known only theoretically, making these results inapplicable in practice.

On the other hand, the constructive theorems, which are formulated in terms of parameters that can be computed using special computer techniques, are free of these defects. This project is devoted to the development of such computational techniques.
MODERN TECHNOLOGY IN TEACHING MATHEMATICS
Prof. Alexander Domoshnitsky, Roman Yavich, Elizabeth Itskovich

One of the challenges facing the process of teaching mathematics is creating conditions necessary for students’ independent work, which is essential for education in general. For the students to fulfill their potential while working independently, appropriate base needs to be laid. Sites constructed specially for each course could serve as such a basis. These should include theoretical information, as well as a set of tasks to be solved independently by the students. Each site will be accompanied by a set of tapes with lectures by outstanding lecturers on the subject, as well as samples of the exams with keys and tips. Finally, there is one more component in our scheme - internet sites on the subject.

Building components of this scheme have become the basis of the project presented by our department to the Inter-University Center for e-Learning (MEITAL). We also intend to add one more element to this system - distance consultations, with the lecturer sitting in a specially equipped studio/workshop, and the student in front of the home computer. The students will be able to get answers to their questions through the internet in real time. This form of consultation is the most important, as our students live in different parts of the country, which makes it practically impossible for them to come to Ariel University Center for consultations.

NONOSCILLATION INTERVALS IN THEORY OF FUNCTIONAL DIFFERENTIAL EQUATIONS
Prof. Alexander Domoshnitsky and Abraham Magikian

Nonoscillation intervals are very important in the theory of the linear $n$-th order ordinary differential equation 

$$(Mx)(t) \equiv x^{(n)}(t) + \sum_{i=0}^{n-1} P_i(t)x^{(i)}(t) = f(t), \quad t \in [0, \omega].$$

Several important problems, such as existence and uniqueness of solutions of the interpolation boundary value problems for this equation, the problems of positivity (or a corresponding regular behavior) of their Green’s functions, and many others are related to the nonoscillation intervals of the corresponding homogeneous equation $Mx=0$.

In the literature on nonoscillation of functional differential equations, there is no connection between these topics, and the only results on nonoscillation are formulated as existence of eventually positive solutions of functional differential equations on semiaxis. In this project, we attempt to construct a theory of nonoscillation for functional differential equations. We also develop our own procedures for reducing functional differential equations to the standard problems of functional analysis.

Finally, we define a principle of partial monotonicity (comparison of only several components of the solution vector), and reduce it to positivity of elements in only several lines of the Green’s matrix and to nonoscillation of several components of the solution vector.

NUMERICAL APPROACH TO STUDYING STABILITY OF INTEGRO-DIFFERENTIAL SYSTEMS
Alexander Domoshnitsky, Yakov Goltser and Dan Ophir*

Fast development of numerical methods solving integro-differential equations is motivated by an extensive use of such equations in mathematical models of physical and technological phenomena. Integro-differential equations in case of relatively big $t$-interval are very difficult objects for approximate solving. The main reason is as follows: the integral terms are sources of accumulating errors.

Our approach is based on the idea to reduce an integro-differential equation to a corresponding system of ordinary differential equations. For numerical solving this system the standard technique such as the Euler method may be used.

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DIFFERENTIAL, INTEGRO-DIFFERENTIAL AND COUNTABLE SYSTEMS OF EQUATIONS

Prof. Yakov Goltser, Prof. Alexander Domoshnitsky & Elena Litsyn

In this study, we propose to investigate several problems arising in the theory of parametrically perturbed systems of Ordinary Differential Equations (ODE), Integro-Differential Equations (IDE) and Countable System of Differential Equations (CSDE). Specifically, we consider the following topics:

Normal forms of differential equations
One objective of this research is to construct a general theory of normal forms for countable systems of ODE and to develop computation schemes for calculation of the coefficients of the normal form in different critical and non-critical cases. As a step in this direction, we have obtained a theorem on quasi-normal form of autonomous CSDE with a block-diagonal linear approximation.

Stability of IDE systems
We examine a nonlinear integro-differential equation (IDE) system continuously dependent on a small parameter. We propose an approach to the problem of stability of the IDE system and to the study of bifurcation phenomena in the neighborhood of the stationary point. Our approach is based on the reduction of the finite system of IDE to a countable system of ODE, under certain structural assumptions regarding the kernel of IDE. It also allows to characterize the various types of critical cases in IDEs, whenever the linear approximation is stationary.

Bifurcation phenomena in parametrically perturbed IDEs
We have investigated stability and bifurcations for several classes of IDEs:
1. Stability in the non-resonance critical case of purely imaginary roots;
2. Stability of nonlinear system at resonance;
3. Bifurcation of stationary resonance modes in IDE system near internal resonance;

SHARP REAL-PART THEOREMS FOR ANALYTIC FUNCTIONS

Prof. Gershon Kresin & Prof. Vladimir Maz'ya

Sharp pointwise estimates occupy a special place in analytic function theory. In a way, they provide the best description of the pointwise behaviour of analytic functions over a given space. We present a unified approach to the sharp pointwise inequalities for analytic functions and their derivatives in a disk, with the real part of the function on the circumference as the right-hand side. We refer to these inequalities as “real-part theorems”, after the first assertion of this kind, the celebrated Hadamard’s real-part theorem (1892). The inequalities in question are frequently used in the theory of entire functions and in the analytic number theory.

We consider various inequalities of this type from a coherent point of view that reveals their intimate relations. We assume that the real part of an analytic function belongs to the Hardy space of harmonic functions in the disk. The sharp estimates for the increment of an analytic function are written in a parametric form, where the role of the parameter is played by an arbitrary real-valued function in the disk. We also give Hadamard-Borel-Caratheodory, Landau and Carathéodory type sharp inequalities for the modulus of the derivatives of an analytic function in the disk. Moreover, we obtain the so-called Bohr type real-part estimates. Each of these Bohr type real-part estimates refines a certain sharp Hadamard-Borel-Caratheodory type inequality. The sharpness of the inequalities is proved with the help of parameter dependent families of test functions, each of them being analytic in the closure of the disk.

We hope that this unified approach to the above-mentioned inequalities, as well as their generalization and refinement, may prove useful in various applications. In particular, one can anticipate interesting opportunities to extend these inequalities to analytic functions of several complex variables and solutions of partial differential equations.
CALCULUS IN ITS DUAL ALGORITHMIC MODE FOR EDUCATIONAL PURPOSES
Dr. Dan Ophir*

This study is concerned with the use of algorithmization of Calculus, in order to provide a more intuitive way for understanding of its various concepts.

The abstract Calculus concepts are given a dual algorithmic formulation. Some of the algorithms were inspired by the numerical analysis methods for solving Calculus problems and extended to treating Calculus primitives, such as terms and theorems. We consider convergence as a representative term, whereas the algorithmization of a theorem is demonstrated using Rolle's theorem.

Because of the dynamic nature of the algorithms, the dual equivalent objects can be investigated in slow motion, with appropriate zooming in on various key attributes.

The presented algorithms are less rigorous, in comparison to common conventions, but the proposed approach is expected to develop mathematical intuition and to give students deeper insight and inspiration for further study.

* Also a faculty member at the Department of Industrial and Management Engineering
E-LEARNING: DEVELOPING A DYNAMIC VISUAL APPROACH TO LEARNING
Dr. Dan Ophir* & Dr. Amos Gera

A new approach for studying theoretical formulas in Calculus is proposed. A dynamic visual description of the theory and its practical application is introduced. Transformation of mathematical operators, such as convergence to a limit in a number of time-varying situations, is proposed. It is shown how the methods and the software tools, which were developed for industrial purposes, serve to promote the development of the learning technology.

TERNARY TRACT FREQUENCIES IN GENETIC RESEARCH
Dr. Dan Ophir* & Dr. Amos Gera

In 1952, Erwin Chargaff published a paper, in which he brought evidence that certain binary tracts are highly over-represented in DNA sequences. Following the work of Chargaff and co-workers, there has been recently an increasing interest in the investigation of n-nary tracts. Consequently, in this research, we have investigated the frequencies of various ternary tracts in diverse gene locations and in various types of species.

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1 Elta

SIMULATION OF DIFFUSION PROCESSES - DEVELOPING A TOOL FOR INVESTIGATION AND PROGNOSIS
Dr. Dan Ophir*, Prof Michael Zinigrad** & Prof Dan Eliezer

The investigation of chemo-physical processes is often carried out in an interactive manner and includes several stages. The process begins with laboratory experiments that supply data for further analysis and synthesis. The synthesis stage includes development of mathematical models, typically based on Partial Differential Equations (PDE). These models may form a basis for simulation tools using computational methods such as Monte Carlo. The simulations allow further refinement of the corresponding partial differential equation system and take the place of the expensive laboratory experiments as tools for exploring the special cases of the chemo-physical processes. Another approach for obtaining the values of the PDE coefficients is by solving the PDE numerically using finite differences.

In this project, we develop a special Computer Aided Design (CAD) for treating a wide spectrum of aspects of one large family of chemo-physical process, namely diffusion processes.

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** Faculty member at the Department of Biological Chemistry and the Department of Chemical Engineering and Biotechnology
1 Beer-Sheva University
NEW METHOD FOR SOLVING PARTIAL DIFFERENTIAL EQUATION SYSTEMS DESCRIBING MULTI-SCALED PROCESSES
Dr. Dan Ophir*, Prof. Asher Yahalom** & Dr. Gadi Pinhasi***

A new approach for solving Partial Differential Equations problems is proposed. The method merges two existing methods:

1. The variation techniques for finding the Action Minimum
2. The Multi-Grid techniques, which reduce computational time on the finest grid by solving the equation on the coarse grid and interpolating the coarse-grid solution to the finer grids.

The proposed method simplifies the Multi-level adaptive techniques (MLAT) ideas. The experiments have shown that solving the variation problem on a grid with $n^2$ is much less expensive (more than factor 4) than that on a grid with $(2n)^2$ grid-points. Consequently, our method solves a problem on a coarse grid, interpolates it to a finer grid, and uses the interpolated values as improved initial values for the finer grid. This process was shown to substantially reduce the computer time needed to solve the problem. It should be noted that the computer work involved in interpolation can be carried out efficiently and need only be performed once and, therefore, the associated computational time is negligible compared to the time invested in the variation problem solution itself.

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** Faculty member at the Department of Electrical and Electronics Engineering
*** Faculty member at the Department of Chemical Engineering and Biotechnology and the Department of Mechatronics

MATHEMATICAL MODELING APPLIED TO BLADDER CANCER TREATMENT BY INJECTION OF BCG BACTERIA AND INTERLEUKIN-2
Prof. Israël Chaskalovic

This project is collaboration with the Biomathematics Department of Tel Aviv University directed by Prof. Louis Stone.

One of the treatments for bladder cancer consists of the injection of BCG bacteria to develop an immunological response from the body, which enables it to destroy the cancer tumor.

With the help of a nonlinear system of six differential equations in time, the purpose of this modeling is to describe the main features of the immunological response to control and to predict the influence of the addition of Interleukin-2, in relationship to a specific dose of the bacteria BCG.

The differential system takes into account the main components of the biological mechanisms participating in the response of bacteria BCG injection coupled with Interleukin-2.

We will then use mathematical analysis (focused on the stability of the solutions) and numerical approximations to define future treatments.

One of the principal objectives is to determine reasonable conditions of stability of the solutions that qualify the total destruction of the tumor cells.

Professor Jean Claude Gluckman, Chief of Immunological Service of Saint Louis Hospital in Paris is the expert who actively participated in the validation of the model.
DATA MINING METHOD APPLIED TO "SLEEP APNEA SYNDROME"
Prof. Israël Chaskalovic

The project consists of collaboration with a Unit of the Pneumology department of the Saint Antoine Hospital in Paris. There are no known reasons for the interruption of the respiration during sleep, sleep apnea. At this time, the only treatment patients receive is a mask of oxygen which forces them to breathe during their sleep.

Using the data collected by the machine that produces the positive pressure of air to the patient, the aim of our research was to explore the database of 150 patients. The main results, published in 2007 in the journal "Sleep Medicine", are dedicated to the segmentation of the global population of patients divided into three homogenous groups regarding the level of their disease. Data mining methods implemented under Clementine of SPSS Inc. produced these results. The features found that after three months of treatment for each group of patients produced by a decision tree the physician decided on how to improve the process.

Future explorations include the operational demand from the physicians to determine a typology of the treatment in relation with the discriminate features of each of the patients and to qualify the conditions of "success" or "failure" of the treatment.

Our research will allow for the obtaining of prediction models that will give the physician the ability to change the treatment as soon as possible.

THE CONSTRUCTION OF AN INTEGRAL VARIETY OF SOLUTIONS OF THE SYSTEM OF DIFFERENTIAL EQUATIONS IN THE NEIGHBORHOOD OF A SINGULAR POINT
Nisim Elnatanov

We show a way to build an integral variety of solutions of the quasi linear system of differential equations in the neighborhood of a singular point.

One of the most effective methods of studying the stability of solutions of the systems of differential equations is based on finding an integral variety of solutions and examining the stability on the variety. This is relatively easy since the dimension of the variety is smaller than the dimension of the initial system.

BUILDING CENTRAL INTEGRAL MANIFOLDS
Prof. Kim Valeev¹, Dr. Nisim Elnatanov, Dr. Efraim Shmerling

We consider a system of linear differential equations with deviating argument

$$\frac{dX(t)}{dt} = AX(t) + B_1X(t - \tau), \quad \tau > 0.$$ 

Sufficient conditions for existence of central integral manifolds are presented and iterative methods for building central integral manifolds are suggested for linear systems of differential and integro-differential equations with deviating arguments and quasi-linear systems of differential equations.

¹ Kiev National Economic University
SYMPLECTIC INTEGRATION TECHNIQUES
Dr. Nisim Elnatanov, Prof. Jeremy Schiff

The subjects of symplectic integration schemes, viz. difference equations preserving the standard symplectic structure on $\mathbb{R}^{2n}$ are relevant in numerical integration of Hamiltonian systems.

We intend to fully develop numerical methods for the integration of Hamiltonian systems based on the existing theoretical work we have done. Similar methods exist in the literature, but lack certain properties and we hope to expand further on this work. We hope to develop methods for handling Hamiltonian systems with singularities (including, for example, the many body problem), and Hamiltonian system relative to nonstandard symplectic structures on $\mathbb{R}^{2n}$.

SMOOTH INVARIANT CURVES OF NEAR-IDENTITY RECURSIONS
Dr. Nisim Elnatanov, Prof. Jeremy Schiff

Most numerical methods for the solution of ODEs give rise to near-identity recursions, i.e., recursions of the form $x_{n+1} = x_n + hF(x_n,h)$, where $x_0 \in \mathbb{R}^d$, $h$ is a small positive parameter and $\Phi : \mathbb{R}^d \times \mathbb{R} \to \mathbb{R}^d$ is smooth. A critical question in the study of numerical methods for ODEs is whether such recursions have smooth invariant curves, i.e., can we find a smooth function $x : \mathbb{R} \to \mathbb{R}^d$ such that $x(t + h) = x(t) + hF(x(t),h)$, $\forall t \geq 0$.

We show how smooth invariant curves can be constructed as the limit of the sequence of solutions in a sequence of integral equations. We further show that there is a specific invariant curve with the property that for any integer $p > 0$ the curve satisfies a differential equation, modulo terms of order $hp$, where the differential equation is a "deformation" of the equation for which the recursion is a numerical method.

DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

WEIGHTED ESTIMATES FOR SOLUTIONS OF A STURM-LIOUVILLE EQUATION IN THE SPACE $L_p(\mathbb{R})$
Nina Chernyavskaya, Nisim Elnatanov, Leonid Shuster

We consider an equation

$$(1) \quad -y''(x) + q(x)y(x) = f(x), \quad x \in \mathbb{R}$$

where $f \in L_p(\mathbb{R})$, $0 \leq q \in L^\infty_1(\mathbb{R})$ and $\inf_{x \in \mathbb{R}} \int_{x-a}^{x+a} q(t) dt > 0$ for some $a > 0$. Under these conditions, (1) is correctly solvable in $L_p(\mathbb{R})$.

1. for any function $f \in L_p$, there exists a unique solution of (1), $y \in L_p$;
2. there is an absolute constant $c \in (0, \infty)$ such that the solution of (1), $y \in L_p$, satisfies the inequality

$$(2) \quad \|y\| \leq c \|f\|, \quad \forall f \in L_p, (\|f\| := \|f\|_{L_p}).$$

In this work we strengthen the a priori inequality (2). We find minimal requirements for a given weight function $\theta \in L^\infty_1$ under which the solutions of (1), $y \in L_1$ satisfy the estimate $\|\Theta y\| \leq c_2 \|f\|$, $\forall f \in L_1$, where $c_2$ is some absolutely positive constant.

1 Department of Mathematics, Bar-Ilan University
2 Department of Mathematics and Computer Science, Ben-Gurion University
KINEMATIC PARAMETERS OF DRIVER BEHAVIOR
Dr. Tzila Shamir*

The purpose of this project is to extract driving behavior characteristics from the in-car GPS-based kinematic data provided by “Traffilog” company. The company gives services to other companies that own large vehicle fleets.

The main purpose of this study is to model “correct” driving behavior and to use these models to train drivers. During the present study phase, the company provides us with data collected from the vehicles of their clients. We carry out a thorough analysis of this data, including the extrapolation of the path traveled. Two final-project students from the Computer Science Department also participate in this project. Their main task is the preparation of animation simulations based on the analyzed data.

In a second study phase, we plan to perform controlled field experiments using this company’s instruments.

* Also a faculty member at the Department of Industrial and Management Engineering and the Department of Mechatronics

TERRAIN SIMPLIFICATION USING DIGITAL IMAGE PROCESSING FORMATS
Dr. Boaz Ben Moshe

The terrain surface simplification problem has been studied extensively, as it has important applications in geographic information systems and computer graphics. The goal is to obtain a new surface that is combinatorially as simple as possible, while maintaining a prescribed degree of similarity to the original input surface. Generally, the approximation error is measured by the distance (e.g., Hausdorff) from the original or using some visual similarity metric.

In this work, we use the well-known Digital Image Processing (DIP) tools (e.g., JPEG compression) to perform terrain simplification. We used several such formats and compared their results, in terms of compression size, quality and runtime, to other know terrain simplification methods (e.g., QsIm).

We performed a large-scale experiment comparing the different terrain simplification methods and concluded that the JPEG-based method achieves significantly better compression, has lower runtime, and most importantly, represents the original terrain more accurately than any other terrain simplification method.

ALLOCATION ALGORITHMS FOR WIMAX
Dr. Boaz Ben Moshe, Dr. Yehuda Ben Shimol1 & Dr. Michael Segal1

In this research, we address the problem of efficient resource allocation and its description for constant bitrate traffic (e.g., voice calls) in wireless OFDMA systems. In such systems, the users’ demands are allocated in a two-dimensional time-frequency map. The representations of the allocated resources have to be broadcast, thus generating a substantial amount of overhead transmission. Here we present an efficient mapping and allocation representation algorithm that increase the total resource utilization by reducing the mapping overhead of the uplink frame for constant bitrate voice sessions. We use a system model based on the IEEE802.16 standard and investigate by simulation the performance of the proposed solution. The results show that the required overhead can be reduced greatly.

1 Ben Gurion University
**APPROXIMATING RADIO MAPS PROPAGATION**

*Dr. Boaz Ben Moshe*

The rapid development in wireless communication technology has dramatically reduced costs and increased the number of users. This development has increased the demand for wireless communication while supporting better throughput and quality of service.

Several facility location algorithms, which involve locating large-scale wireless networks (WiMAX), use approximated Radio Map algorithms. In fact, computing Radio Map is often the runtime bottle-neck of such facility location algorithms.

Given a terrain (T) and an antenna (A) located on it, we would like to approximate the Radio Map of A over T, that is, the strength of the signal from A at each point on T.

In this research, a new radar-like algorithm for approximating Radio Map is suggested. The algorithm simulates a radar scanning scheme using an efficient pipeline technique to compute sample-points and signal strength along a radar ray that represents a cross-section of the terrain. For the regions between the two consecutive rays, an adaptive interpolation method is used, whenever the difference between the sets of signal segments along the cross sections is below some threshold. Thus, the density of the sampling is sensitive to the shape of the terrain.

During the research, a large-scale experiment was conducted to compare between the suggested new algorithm and other well-known methods. The main conclusion is that the new radar-like algorithm is significantly more efficient than the others, having considerably faster running time (by a factor of 3 to 15) for the same approximation accuracy.
Modern people live in a very intense electromagnetic environment. The electromagnetic radiation intensity grows continuously and causes various negative effects. WaveShield proposes a technology that deals with two aspects of electromagnetic radiation problem:

1. Protects electronic equipment against Electromagnetic Interference (EMI) in a noisy electromagnetic environment.
2. Prevents disturbances caused by equipment’s electromagnetic radiation.

WaveShield develops a low-cost effective polymer based material that will provide very effective EMI protection. The technology is based on the use of ultra-small metal particles uniformly dispersed in polymer matrix.

The proposed material is expected to be particularly useful in the following areas:

1. Electromagnetic protection of public, industrial, and civil buildings
2. Electromagnetic protection of health care units and medical devices
3. Various communication, computing, and industry devices
4. Stealth coatings for military and security applications.

* Also a faculty member at the Department of Chemical Engineering and Biotechnology
To assess the effect of antenna poloidal extension on fast waves–plasma interactions in pre-heated spherical tokamaks and, as a result, to assist the determination of optimal conditions for power deposition, we carried out a global, numerical investigation. Thus, we solved the steady-state full wave equations for Alfvénic modes in an inhomogeneous, non-uniformly magnetized, resistive, low aspect ratio tokamak plasma with appropriate consideration of boundary conditions; in this, processes such as wave propagation, reflection, transmission, absorption and mode conversion as well as mode-coupling(s) by plasma cross-section non-homogeneity generated waves were included. The results were analysed in terms of the directions of the current densities generated in the presence of up low field side or down high field side magnetic field gradient. Suitable antenna location and poloidal extension for maximum power deposition were determined.

The Crystal Growth Laboratory (CGL) of the Ariel University Center of Samaria is presently completing the development of a method for growing crystals of NaGd(WO$_4$)$_2$ (NGW), which is a very promising laser host material suitable for doping with Nd$^{3+}$ and Yb$^{3+}$ ions. The simple two-level electronic structure of the Yb$^{3+}$ ion avoids undesired loss processes, such as upconversion, excited state absorption, and concentration quenching. Compared with the conventional Nd:YAG, Nd:NGW crystals have much larger absorption bandwidths, a four times longer emission lifetime with enhanced storage capacity, and fewer quantum defects, and moreover are more suitable for diode pumping than the traditional Nd-doped systems.

An order of magnitude higher concentration of Nd can be introduced as compared with YAG (8 at% instead of 0.8 at%). With such performance advantages NGW is also useful for creating high power, short pulse duration femtosecond lasers and their broad applications. NGW can be grown by the Czochralski pulling technique at temperatures close to 1300°C instead of close to 2000°C (YAG).

Over a decade ago the CGL developed a new method for growing high quality KTP (KTiOPO$_4$) crystals and their isomorphs belonging to the KTP-family of high-temperature ferroelectric compounds, and it is still engaged in improving this method. All KTP-family crystals exhibit large optical nonlinearity, high laser damage thresholds, and excellent thermal stability. These properties make them an important class of materials for application in laser systems utilizing frequency conversion, such as SHG and optical parametric oscillations (OPO), including periodically poled structures. They also have high electro-optic coefficients that are suitable for electro-optic amplitude modulation and Q-switching. We have developed modified top-seeded solution growth techniques with pulling on oriented seeds below 1100°C that yield highly stoichiometric KTP crystals of exceptional optical uniformity for high-power applications. However, in terms of SHG, the relatively small birefringence allows only frequency doubling into green in a small spectral (phase-matching) range around the main 1064 nm line of the Nd-doped lasers. Doping of KTP with various substitutional ions has been shown to shift the phase-matching range to shorter wavelength, so as to allow for frequency doubling into the blue. We have already carried out preliminary growth experiments with niobium-doped KTP and proved the possibility of uniform dopant distribution in the crystal. Chemical, optical and nonlinear optical characterization of the processed crystals is underway in order to determine the optimal dopant concentration for frequency doubling into the blue.
THE INVESTIGATION OF CANCER CELL’S RESPONSE ON MICROWAVE IRRADIATION AND OF THE POSSIBILITY OF BRAIN CANCER TREATMENT

Prof. Yakov Levitan

This research aims to study the response of cancer cells under microwave irradiation in the range 75-110 GHz. We anticipate finding specific frequencies for energy absorption in cancer cells which is different from that of healthy cells. This will enable us to treat cancer tumors by use of microwave devices.

The successful differentiation between absorption frequencies for cancer cells and healthy cells will allow us to use frequencies which will kill cancer cells but do minor harm to healthy cells.

NON LINEAR TIME SERIES IN CARDIOLOGY

Prof. Yakov Levitan

We have developed a new method to describe time series with a highly complex of time evolution.

This time series is projected onto a two-dimensional phase-space plot which is quantified in terms of a multipole expansion. The multipoles provide an efficient characterization of the original time series. By using time series from EKG-recordings the method has been shown to predict mortality after an acute myocardial infarction.

CHAOS AND GEOMETRY

Prof. Yakov Levitan

We have recently shown that the possibility to define chaos in the Hamiltonian systems by a geometrical approach taking its point of origin in the curvature associated with the Riemann metric tensor and how this definition can be adapted to a large class of potential models.

We now are studying the possibility of extending the geometrical approach to contain dissipative systems and employing the tools developed from the Hamiltonian systems to find the instabilities in well known systems, such as the Lorentz and the Roessler models.

DEPARTMENT OF MEDICAL PHYSICS

DEVELOPMENT OF A NEW MRI TECHNIQUE FOR THE MUSCULOSKELETAL SYSTEM

Dr. Dan Gamliel*

In magnetic resonance imaging (MRI) scans certain tissues such as tendons, cartilage and bone cortices do not produce a signal. This limits the evaluation of these structures when using MRI scans. Utilizing ultrashort time to echo (TE) MRI sequences, it is possible to get a relatively strong signal from those tissues as well, and thus improve the diagnostic capability of MRI scans for these structures. According to our research there are presently no such sequences in clinical use. The purpose of our work is to construct a method of this type.

In this work we are developing a new MRI technique, of the innovative type described earlier. We are designing an appropriate pulse sequence, which will be applied to these diagnostic scans of the musculoskeletal system.

This research will enable the improvement of medical diagnostics of the musculoskeletal system. As a result of this improvement in diagnostics it will be possible to achieve accurate and possibly early diagnosis of disease and thus improve the treatment of various conditions. This can potentially save the costs of other diagnostic tests, and shorten the time needed by doctors to decide on an appropriate treatment.

* Also a faculty member at the Department of Applied Physics
Diabetes mellitus is a common metabolic disease, characterized by absolute or relative insulin deficiency. Type 1 diabetes mellitus, known also as Insulin-Dependent Diabetes Mellitus (IDDM) is an autoimmune disease, resulting in apoptosis of the insulin secreting cells, the pancreatic β-cells. Type II Diabetes Mellitus (NIDDM) develops as a result of reduced insulin sensitivity in several tissues, such as skeletal muscle, adipose tissue, and hepatocytes. Diabetes has reached epidemic proportions, affecting more than 170 million individuals worldwide. It is considered to be one of the major causes for premature illness and death resulting from the complications of the disease.

The natural medicine had been traditionally using several medicinal plants to treat diabetes. However, the efficacy of most of these folkloric medicinal plants for treating diseases such as diabetes has never been scientifically tested and validated. One of these herbs used by natural medicine is the *Sarcopoterium spinosum*. *Sarcopoterium spinosum*, which is abundant in Israel, especially in Semi-steppe shrublands (phrygana) of the Samaria, has been suggested to have a beneficial effect on diabetic patients. The aim of this study is to examine the effect of *Sarcopoterium spinosum* on diabetes mellitus in cell lines and animal models. Specific goals of the study are:

1. Finding the best method for extraction of active compounds of the plant.
2. Using *Sarcopoterium spinosum* extracts in vivo and in vitro, in order to study the physiological effects related to insulin secretion, sensitivity to insulin and glucose metabolism.
3. Studying the molecular (protein and RNA level) changes occurring in cells treated with *Sarcopoterium spinosum* and understanding its mechanism of act.
MESENCHYMAL STEM CELLS (MSCS) THERAPEUTIC APPLICATIONS AND BASIC BIOLOGY

Dr. Gadi Turgeman

The purpose of the study of Mesenchymal Stem Cells is to understand the molecular mechanisms underlying MDCs biology and their applications in therapy. In particular this research focuses on determining the differentiation pathways and the plasticity of bone marrow derived MSCs and the understanding of the migration of MSCs both as a phenomenon and as a tool for therapy.

It is the main interest of this study to suggest strategies for applying MSCs for therapy in both skeletal and non-skeletal tissues. The major concept of the study is that MSCs can be primed by proper molecular intervention to differentiate and migrate as desired for specific therapeutic purposes. Moreover, it is not only the differentiation of MSCs that mediate the therapeutic effect but also their interaction with the surrounding tissue. This is reflected by their migration and secretion of various factors. The aim of my study is to consider the overall aspects of MSCs behavior in order to successfully apply MSCs for therapy.

More specifically the research topics are:

- Mediating skeletal and neural differentiation of MSCs by manipulating the BMP and Wnt signaling pathways.
- Using PACAP neuropeptide as an enhancer for MSCs neurogenic potential.
- Manipulating the migration of MSCs in Cancer and brain tissues. Examining the role of CXCR4 and other chemokine and integrin receptors in the migration of MSCs.
- Applying the MSCs for targeting Cancer cells and for Cancer therapy.
- Applying the MSCs for bipolar disease (mainly depression) and for neurodegenerative disorders (e.g. ALS & Alzheimer).

THE ROLE OF PITUITARY ADENYLATE CYCLASE-ACTIVATING POLYPEPTIDE (PACAP) IN THE ETIOLOGY AND PATHOLOGY OF MOOD DISORDERS

Dr. Albert Pinhasov

PACAP is an endogenous neuropeptide that is widely expressed in the central and peripheral nervous system, showing wide profile of biological activities. It acts as a neurotransmitter, neuromodulator, and a neurotrophic factor, and its neuroprotective potential was revealed in numerous in vitro and in vivo models. The effect of PACAP is mediated through three types of receptors, denoted PAC1, VPAC1, and VPAC2, with PAC1 being the main receptor expressed in the brain.

Whereas previously most of the research has concentrated on the neuroprotective properties of PACAP, in the last several years there has been a growing body of evidence linking PACAP to the various mood disorders. Consequently, the aim of this study is to elucidate the role of PACAP and its receptors in mood disorders. The intention is to explore the therapeutic effect of PACAP in these disorders, as well as to investigate the signal transduction mechanism by which it exerts its effect.

The in vitro studies focus on investigating the effect of PACAP on the expression and activity of various target genes, which are key players in different signal transduction pathways. The in vivo studies aim to evaluate the molecular and pharmacological profile of PACAP and PAC1 receptor system in different animal models of acute and chronic depression and stress.

An additional line of research, in collaboration with Dr. Turgeman, includes exploring the role of PACAP and its receptors in mediating neurogenic differentiation of stem cells from various sources. Based on this approach, we aim to develop a combined gene and stem cell therapy model for mood disorders.

Thus, understanding the role of neuropeptides such as PACAP in etiology and pathogenesis of different psychiatric conditions may offer promising pharmacological research direction for discovery and development of drugs for the treatment of mood disorders.
**PREDICTIONS OF PROTEIN-PROTEIN INTERACTIONS**

Dr. Dror Tobi*

In our research, we develop a novel computational approach to analyzing protein-protein interactions. Protein-protein interactions mediate many of the cell functions, and the understanding of the nature of these interactions is a major challenge. The ability to block formation of a specific protein-protein interaction may offer a novel therapeutic approach and a new path for drug discovery.

Protein-protein interfaces are large and relatively flat, imposing a challenge for designing small molecule blockers. In our research, we develop a computational approach for analyzing the X-ray or NMR resolved structure of a complex of protein-protein interactions. This analysis will result in (1) Identification of the most important interactions between the interacting proteins and (2) Suggestions of ways to design small molecules that will bind to the interaction interface and consequently block these interactions.

Another aspect of this research is the computational prediction of protein-protein interactions. These areas remain problematic due to the inaccuracy of the scoring functions used in these calculations. We employ a linear programming (LP) technique in order to design such a functions. The technique enables training of the scoring function from a large set of non-native receptor-ligand bound conformations thereby allowing us to understand how the native conformation should look. The ability to generate a wealth of information on non-native receptor-ligand conformations results in improved functions for protein-protein docking predictions.

* Also a faculty member at the Department of Computer Sciences and Mathematics

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**MECHANISM OF REACTION OF ALKYL RADICALS WITH ((NIL)-L-II)(2+) COMPLEXES IN AQUEOUS SOLUTIONS**

Dr. Tamar Kurzion-Zilbermann¹, Dr. Alexandra Masarwa¹, Dr. Eric Maimon², Prof. Haim Cohen, Prof. Dan Meyerstein

The reactions of methyl radicals, (CH)·-C-center dot, with the macrocyclic complexes (NiL₁-₅)-L-II (L₁-₅ = cyclam derivatives, vide infra) and Ni(II)edta in aqueous solutions were studied. Methyl radicals react with all these nickel complexes, forming intermediates with Ni-III-C sigma-bonds. The LₙNi₃III-CH₃ complexes are formed in equilibria processes with relatively fast forward rate constants of $k(f) > 1 \times 10(8)$ M⁻¹ s⁻¹ (except in the case of NiL₂-trans I cyclam, where the reaction is slower). In all cases the decomposition of the transient complexes occurs via the homolytic cleavage of the metal-carbon a-bond. When the homolysis is relatively slow, an isomerisation process of the transient is also observed with the exception of NiL₂, where no isomerisation was observed. The results suggest that the strength of the Ni-III-CH₃ sigma-bond is mainly affected by steric hindrance.

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**EFFECT OF SILICA-SUPPORTED SILVER NANOPARTICLES ON THE DIHYDROGEN YIELDS FROM IRRADIATED AQUEOUS SOLUTIONS**

Tomer Zidki¹, Prof. Haim Cohen, Prof. Dan Meyerstein, Prof. Dan Meisel²

Metal nanoparticles (NPs) are used to catalyze the formation of molecular multielectron transfer products, for example, H₂, from single-electron reductants, such as radicals. Noble metals, like silver and gold, were very instrumental in unraveling the mechanism of this interfacial process. In this study, we explore the effect of the support, silica nanoparticles, on the catalytic production of H₂ on silver from radiolytically produced C-center dot CH₃OH radicals and water. We obtain very high concentrations of stable silica-supported silver nanoparticles that remain suspended in solution for long periods of time. The presence of metallic silver particles on the silica surface further induces a very effective deposition of silver particles on the same silica particle leading to cooperative deposition of the silver. The silica support changes appreciably the reactivity of the silver NPs, reducing the yield of the molecular hydrogen produced at the high concentrations of the supported NPs to that of the primary molecular hydrogen G(H₂) = 0.45 molecules/100 eV from water radiolysis indicating that H₂ production at the surface of the silver is inhibited. A possible explanation is that the catalyst (Ag on SiO₂) catalyzes the disproportionation of the reducing radicals or the reduction of acetone at the expense of the H₂ evolution catalysis.

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**A NOVEL TECHNIQUE FOR QUANTIFICATION OF ERYTHROCYTE AGGREGATION ABNORMALITIES IN PATHOPHYSIOLOGICAL SITUATION**

Dr. Alexander Pribush¹, Dr. Lev Hatzkelson¹, Prof. Dan Meyerstein, Prof. Naomi Meyerstein¹

Red blood cell (RBC) aggregation in blood samples taken from healthy volunteers and from multiple myeloma (MM), iron deficiency (IDA) and beta-minor thalassemia (T) patients was studied by a novel method based on electrical properties of colloidal systems. It was found that RBC aggregation changes in the following order: MM > IDA > control >= T. Comparison of aggregation data obtained by this and other techniques shows that the sensitivity of the proposed technique to detect abnormal changes in RBC aggregation is substantially higher. For example, the mean values of relative aggregation indices measured for MM by this method and that based on the phenomenon of light scattering are 13.0 and 4.2, respectively. The high sensitivity of this technique allows investigations of the effect of moderate aggregating agents (i.e., IgG) on RBC aggregation. It is assumed that the higher sensitivity of the proposed technique to abnormal changes in RBC aggregation may be helpful both in basic studies to improve the understanding of the reason(s) for these abnormal changes, and in clinical investigations for earlier diagnostics.

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PROTECTIVE EFFECT OF FREE–RADICAL SCAVENGERS ON CORNEAL ENDOTHELIAL DAMAGE IN FACOEMULSIFICATION

Dr. Arie Y. Nemet1, Dr. Ehud I. Assia1, Prof. Dan Meyerstein, Prof. Naomi Meyerstein1, Prof. Aharon Gedanken2, Dr. Morris Topaz3

PURPOSE: To examine the role of the water-soluble antioxidants glutathione and ascorbic acid in the irrigating solution on corneal endothelial cells following exposure to high-intensity ultrasound energy.

SETTING: Goldschleger Eye Research Institute, Sheba Medical Center, Tel-Aviv University, Tel Aviv, Israel.

METHODS: Thirty-two rabbit eyes were subjected to prolonged exposure to the phacoemulsification device in the anterior chamber. The eyes were divided into 4 groups that differed only in the composition of the irrigating solution applied to the eyes: balanced salt solution (BSS) BSS Plus BSS containing additional soluble components including glutathione, BSS with 10(-3) M of oxidized glutathione (GSSG), and BSS with 10(-2) M of ascorbic acid. Specular microscopy was performed preoperatively and 1 week after surgery.

RESULTS: The BSS group exhibited the highest endothelial cell loss (19.3%), followed by the BSS Plus group (10.6%), the GSSG group (5.2%), and the ascorbic acid group (0.9%). An overall difference was found between the groups (F = 11.046, P < .0001), and all groups demonstrated a statistically significant difference from the control BSS group (P < .02, P =.001, and P < .0001, respectively).

LIGAND EFFECTS ON THE CHEMICAL ACTIVITY OF COPPER [I] COMPLEXES: OUTER AND INNER–SPHERE OXIDATION OF [CuL]-L-I

Dr. Ariela Burg1, Dr. Eric Maimon2, Prof. Haim Cohen, Prof. Dan Meyerstein

The effect of the ligands acetonitrile (AN), fumaric acid (H(2)fum) and 2,5,8,11-tetramethyl-2,5,8,11-tetraazadodecane (L-I) on the kinetics of oxidation of Cu-I complexes by [(cyclam)Ni-III(SO4)2](-) and [(NH3)(5)(CoCl)-Cl-III]21 in aqueous solutions via an outer- and inner-sphere mechanism, respectively, has been studied. The effects of the ligands on the electron self-exchange rate constants have also been evaluated. All ligands studied stabilize Cu-I in aqueous solution but affect the redox potential of the (CuL)-L-II/I couple differently. The ligands decrease the rate of the redox reactions and the electron self-exchange rate constants. The results indicate that acetonitrile and alkenes should not be used as solvents for [(CuL)-L-I](+) catalyzed processes that involve redox steps. On the other hand, the results also suggest that [(CuL)-L-I](+) should be a good catalyst for such processes.

1Ben Gurion University
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ANTIOXIDANTS PROPERTIES OF BUCILLAMINE: POSSIBLE MODE OF ACTION
Dr. Dalia Mazor¹, Dr. Liya Greenberg¹, Dr. Dror Shamir², Prof. Dan Meyerstein, Prof. Naomi Meyerstein¹

The antioxidant properties of Bucillamine (BUC), a di-thiol compound used for treatment of rheumatoid arthritis (RA) and its possible mode of action, were investigated. BUC exhibits potent antioxidant activity similar to those of trolox and ascorbic acid. It reduces the stable free radical diphenyl-2-picrylhydrazyl (DPPH) with IC50 of 18.5 ± 0.1 μmol, its relative antioxidant activity by the ferric reducing ability (FRAP) is 2.07 ± 0.01 mM and by the trolox equivalent antioxidant capacity (TEAC), 1.46 ± 0.05 mM. However, its superoxide and apparent hydroxyl radical scavenging activities are low (IC50 at millimolar concentrations). We found that BUC is a strong iron (II) and copper (II) chelator. This finding is very important since these metal ions are significantly higher in RA patients and may be involved in oxidative stress-induced damage. Our study suggests that BUC is a potent antioxidant which exerts its beneficial therapeutic activities in RA patients by metal chelation rather than by scavenging free radical species.

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BETA-ELIMINATION IN REACTIONS OF [CRRCCRXX]-R-1-2-R-3-X-4 RADICALS
WITH METAL POWDERS IMMERSED IN AQUEOUS SOLUTION
Dr. Irena Rusonik¹, Prof. Haim Cohen, Prof. Dan Meyerstein

The reactions of several radicals of the type, center dot(CRRCCRXX)-R-1-C-2-R-3-X-4 (where X = OH or NH3+) with metal powders that have been immersed in aqueous solutions were studied. The radicals were formed by radiation chemical techniques. One of the products in all these reactions is the corresponding alkene, (RRC)-R-1-C-2=(CRR4)-R-3. The results are in accord with a mechanism in which the radicals react with the metals that are forming transients with metal-carbon sigma bonds. The latter transients decompose via two competing reactions: (a) heterolysis of the metal-carbon sigma bond and (b) beta-elimination of X-. Moreover, the dehalogenation of BrCH2CH2NH3+ and ClCH2(CH3)(2)COH by metal powders was studied. Also in these reactions, the corresponding alkene is one of the products. This result is consistent with the suggestion that, in the dehalogenation reaction, an alkyl radical is formed in the first step. This radical then reacts with the metal. Alternatively, the transients with metal-carbon sigma bonds in the dehalogenation processes might be formed via a concerted mechanism.

REACTIONS OF ALKYL – RADICALS
WITH GOLD SILVER NANO PARTICLES
Tomer Zidki², Prof. Haim Cohen, Prof. Dan Meyerstein

Silver and gold nanoparticles are very efficient catalysts for the dimerization of methyl-radicals in aqueous solutions. The rate constants for the reaction of methyl-radicals with the gold and silver nanoparticles were measured and found to be 3.7 x 10(8) M(-1) s(-1) and 1.4 x 10(9) M(-1) s(-1), respectively. The results thus suggest that alkyl-radicals, also not reducing ones, are scavenged by these nanoparticles. This might explain the role, if such a role exists, of these nanoparticles in medical applications.

¹ Prigo
² Ben Gurion University
PYROPHOSHATE AND ATP AS STABILIZING LIGANDS
FOR HIGH-VALENT NICKEL COMPLEXES
Dr. Dror Shamir¹, Dr. Israel Zilbermann¹, Dr. Eric Maimon¹,
Dr. Shames Al², Prof. Haim Cohen, Prof. Dan Meyerstein

ATP stabilizes trivalent nickel complexes which suggests that another plausible
role of ATP in biological systems is the stabilization of high-valent transition metal
complexes.

REDUCTION OF MALEAT AND FUNMARAT BY THE CO2 CENTER
DOT- ANION RADICAL
Dr. Osnat Schutz², Prof. Dan Meyerstein

The radical anion CO2.- reacts with fumarate and maleate at pH 5.3 mainly via
electron transfer. The final products are a mixture of (-O2CCH2-)(2), trans-(O2CCH=)(2)
and products with higher molecular weight. At higher pHs, the yield
of fumarate and succinate decreases. The results suggest that though the radical
ions formed by the reduction of fumarate and maleate have different structures,
the final products are probably the same.

SYNTHESIS OF COMPACT NANOCRYSTALINE LANTHANUM
MANGANITES BY THE SEVERE PLASTIC DEFORMATION METHOD.
INVESTIGATIONS OF THE STRUCTURE AND STABILITY OF THE
NANOSTATES IN DIFFERENT OXIDIZING MEDIA, ANALYSIS OF
ELECTRIC, MAGNETIC, AND DIFFUSION PROPERTIES
Prof. Michael Zinigrad*

This project addressed a fundamental scientific problem concerning the synthesis
of dense nanocrystalline oxide materials and the study of their structure, physical
and chemical properties.
The specific objectives of the project were:
• Obtaining nanocrystalline lanthanum manganites using various techniques, such
  as torsion dislocation under pressure, sono-chemistry, microwave radiation, and
  others;
• Detailed study of their phase composition and structure;
• Study of stability of the lanthanum manganite nanostates in the oxidizing /
  reducing gas phase atmosphere;
• Analysis of the non-stoichiometry of nanocrystalline manganites and the
diffusion kinetics of oxygen in their composition;
• Measurement of magnetic and electric properties of nanocrystalline lanthanum
  manganites.

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MATHEMATICAL MODELING IN THE DEVELOPMENT OF HIGH-TEMPERATURE WEAR RESISTANT METALLIC MATERIALS BASED ON NI-AL INTERMETALLICS

Prof. Michael Zinigrad*

The development of new electrode compositions, to be used for welding of special-purpose steels and alloys, built-up layers with special properties or special maintenance works, requires a considerable amount of experimental work. The amount of such work can be considerably reduced through the use of mathematical modeling.

In this research, we examined Ni-Al weld built-up layers with intermetallic and carbide hardening and described chemical reactions taking place on the metal-slag-gas boundary during welding (building up) of these melts. These reactions were studied by the kinetic analysis method. The analysis allowed to obtain a mathematical description of welding (building up) physico-chemical processes. A mathematical model was developed, providing the solution of some applied problems in the field of welding metallurgy and new welding materials construction. The developed algorithm performs calculations and forecasts regarding the chemical composition of the built up layer for the development of new electrode formulas. Application of the model to several applied problems allowed to produce a database of relevant physico-chemical parameters. The adequacy of the model for the real physico-chemical welding processes was confirmed by an experimental work.

DEVELOPMENT OF NANO-POWDER CONTAINING FLUX-CORED WIRES FOR PRODUCTION OF MATERIALS WITH REQUIRED STRUCTURE AND PROPERTIES

Prof. Michael Zinigrad*

Many of the current limitations of the flux-cored welding wires (most importantly, the need for expensive alloying components to be added to the batch composition) can be overcome by modifying the batch materials. In particular, adding to the batch mixture a small amount (0.01-0.05 weight percent) of refractory substances nano-powders specially prepared by mechanochemical techniques have a positive influence on the process of structurization of the coating and, therefore, on its quality and parameters.

Exogenic nuclei grains introduced into a metal melt have good wettability by the melt and have to be protected from dissolution and oxidation. A tendency toward oxidation and aggregation is typical of nano-powders, even at relatively moderate temperatures. In order to eliminate these negative processes, nano-particles can be clad with metal coating films.

In this research, the nano-powders will be prepared by mechano-chemical methods with simultaneous cladding. Such an alloying process results in formation of nucleation centers during the melt crystallization, which, in turn, leads to formation of microstructure with micro grains. The characteristics of the nano-powder alloying process will be calculated and, on the basis of previously developed models, a new phenomenological model describing the interaction between the phases will be built. This model will be based on the fundamental equations of the thermodynamics and kinetics of high-temperature metallurgical reactions. The model will be used for development of fundamentally new composition for flux-cored wire for the welding processes.

* Also a faculty member at the Department of Chemical Engineering and Biotechnology
SOLID PHASE THERAPEUTIC COSMETICS WITH DECORATIVE PROPERTIES

Prof. Michael Zinigrad*

An important feature of therapeutic cosmetic products is the presence of highly active chemical and biological agents in their composition. Since even a slight overdose of such agents can cause significant skin irritation, a high homogeneity of active components distribution in inert solvents such as oil or water is of great importance. Consequently, therapeutic cosmetology has been particularly successful in the field of liquid cosmetic materials like solutions (lotions, tonics) and emulsions (milks, creams, crèmes), because liquid phase allows to attain a molecular level of active components distribution.

The situation with solid (powder) cosmetics is quite different. Current grinding and mixing techniques do not attain the molecular level of homogeneity. The diameter of the solid particles produced even by most advanced grinding machines does not drop below 0.1 mm. Such particles typically contain millions of molecules and can cause local irritation of skin.

On the other hand, while the beneficial effect of liquid cosmetics is limited to a relatively short time-span after the morning or evening application, solid compositions with molecular level distribution of active components could heal, nourish, soften, and protect the skin during the whole day. A combination of therapeutic and decorative properties in solid cosmetic materials would allow using it as a daily therapeutic composition, gradually replacing the conventional decorative cosmetics. As a first step towards production of such cosmetic materials, we have studied the grinding process of various biologically active substances most frequently used for therapeutic applications.

DEVELOPMENT OF A NEW COMBINED TECHNOLOGY AS ALTERNATIVE TO CHROME COATING

Prof. Michael Zinigrad*

Chrome plating has been providing a surface treatment for the reduction of wear and, in some cases, corrosion for more than 70 years. However, there is an environmental issue with the hard chrome plating process. Chrome itself is essentially inert and can, in fact, be safely used in everyday items such as stainless steel cutlery. However, the hard chrome plating process uses a chromic acid solution, which enters the air in the form of a fine mist. This mist contains hexavalent chromium ions, which have long been known to be carcinogenic. As a result, under the authority of the Clean Air Act, the EPA has recently promulgated new and more stringent rules to limit hexavalent chrome releases to the environment. These rules have increased the cost and the complexity of the hard chrome plating. Many experts confirmed that their search for alternatives began out of concern for safety and the environment. However, having awakened to the superior performance of some alternatives, many users of alternatives now claim that even if all the health and environmental concerns about chromium could somehow be removed, there was no possibility of going back to their old coating processes.

The current proposal concerns a new environmentally friendly combined technology capable of substituting the traditional electroplating. This technology includes two subsequent processes:

HVAF pre-coating with a material to be oxidized;
micro-arc oxidation.

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**DESIGN AND SYNTHESIS OF NOVEL AND SELECTIVE α2-ADRENOCEPTOR ANTAGONISTS FOR MEDICINAL APPLICATIONS**

Dr. Gary Gellerman, Prof. Shimon Shatzmiller*, Prof. Ester Fride**, Prof. Amiram Goldblum¹ & Prof. Amnon Albeck²

Considerable experimental and clinical evidence supports the fundamental role of α2-adrenoceptors in the etiology of mental diseases. It is clear that blockade of the central α2-adrenoceptors by α2-adrenoceptor antagonists increases noradrenergic neuronal activity in the central nervous system (CNS) and peripheral tissues, and also influences the uptake of noradrenaline and serotonin in the brain. The selectivity/specificity of adrenergic inhibitors is crucial for better regulation of neurotransmitter-dependent pathways and the aim is thus to develop compounds, which have improved specificity and selectivity, reducing the likelihood of side effects.

In this research, we propose a new and previously unexplored direction for rational design of novel potent and selective α2-adrenoceptor inhibitory leads. The potentially selective α2- antagonists will be designed in silico by combining Ligand-Based Drug Design with novel cheminformatics methods, based on the comparison of experimental data on known α2-antagonists, as opposed to adrenergic non-selective α1- and α2-agonists and antagonists. Novel diverse scaffolds and substitution patterns proposed by us, together with negative computerized design, should contribute to achieving the selectivity.

Molecular cloning has already revealed four different subtypes of α2-receptors designated as α2A, α2B, α2C, and α2D. The α2A receptor appears to be more important in the brain than in the sympathetic nervous system. After obtaining enough experimental data, we aim to develop selective antagonists to the α2A subtype, based on reported subtype inhibitory leads. In addition to in vitro studies using radioactive binding assays, in vivo experiments will be carried out as well.

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** Faculty member at the Department of Behavioral Science and the Department of Molecular Biology
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**DESIGN OF NOVEL ANTIBACTERIAL PEPTIDE DERMASEPTIN S4 SURROGATES**

Dr. Gary Gellerman, Prof. Shimon Shatzmiller*, Dr. Erena Kostanovitch**, Prof. Amnon Albeck¹, Dr. Mastai Yitzhak¹ & Dr. Stella Gangrenovitch²

The linear polypeptide antibiotic agent Dermaseptin S4 is a natural product isolated from the skin of South American frogs. Intensive investigations by NMR and biological activity tests focused on a linear 16-mer substructure, ALWKTLLKKVKAAN-NH₂, as a major factor in the antibacterial activity. While the precise mechanism of action of antimicrobial peptides is yet to be better defined, the micbicidal effect is widely believed to result from their capacity to permeabilize the membrane of target cells. Such a mechanism of action endows the peptide-based antimicrobial system with attractive advantages over classical antibiotics, because it makes it extremely difficult for microbes to develop resistance. However, a major downside of such a mechanism is reflected in its unselective activity over a wide range of cell types, which could be problematic, for instance, in systemic routes of administration. Hence, ironically, a major challenge of this field of research is to endow specificity to a system that, by definition, is nonspecific. Altering the peptide’s structure by mimicking parts of it with organic units may produce the desired changes in selectivity of its antimicrobial activity.

Some of the more important tools presently employed by molecular biologists are the direct results of collaboration with organic chemists. Specific examples include chemical mutagens, oligonucleotide synthesis, protein/DNA sequencing, as well as the design and synthesis of peptide mimics as bioactive molecules. We wish to propose the establishment of a project. The goal of the project is to explore the design and synthesis of organo-peptide Dermaseptin S4 surrogates. These hybrids of organic molecules and peptides are expected to aid in the elucidation of peptide/receptor interactions and may furnish the basis for new classes of bioactive compounds and drugs.

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DESIGN AND SYNTHESIS OF NOVEL HYPOLIPIDEMIC-CALORIGENIC-ANTIDIABETOGENIC (SYNDROME X) LEADS

Dr. Gary Gellerman, Prof. Yakov Bar-Tana

Dyslipoproteinemia (combined hypertriglyceridemia-hypercholesterolemia), low HDL-cholesterol, upper body obesity, impaired glucose tolerance leading to noninsulin-dependent diabetes mellitus and essential hypertension are common diseases that afflict individuals living in Westernized/Westernizing societies. Being linked through hyperinsulinemia, these four diseases often coexist and precipitate atherosclerotic vascular disease, leading to coronary heart disease, peripheral- and cerebro-vascular disease. The incidence of the "Deadly Quartet" ("Syndrome-X", "Metabolic Syndrome", "Syndrome of insulin resistance") comprising the four diseases increases as the population ages and by 50 years of age reaches epidemic proportions. Combating the individual components of the Metabolic Syndrome as well as offering a comprehensive therapeutic approach to the Syndrome is considered one of the most important challenges facing medicine in affluent Westernized countries.

A family of new chemical entities designed to act as hypolipidemic-antiobesity-antidiabetogenic drugs has been developed by Syndrome X Ltd. These prospective drugs induce hypotriglyceridemia, hypocholesterolemia, increased HDL-cholesterol, and calorigenesis accompanied by weight reduction and increased sensitivity to insulin, with amelioration of diabetic (type II) status in animal models for the Metabolic Syndrome and its individual components. The overall effect of these drugs is a dramatic amelioration of coronary arteriosclerosis in animals prone to Syndrome-X-induced arteriosclerotic cardiovascular disease. The hypolipidemic and insulin-sensitizing effect of a prototype has already been verified in limited human clinical trials involving Metabolic Syndrome patients.

Based on stated above, Syndrome X Ltd. is planning to collaborate with us to develop second generation drug candidates. The optimization process from our side will involve the synthesis of potential active analogs, rationally modifying the existing bioactive molecules (prototypes) as well as designing novel leads. The rational design of novel leads will be assisted by Crystallography and Modeling.

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CATALYSTS FOR DIRECT OXIDATION OF METHANOL IN FUEL CELLS

Dr. Alex Shechter & Prof. Gedanken

Nano-size particles synthesis method developed by Prof. Gedanken is used to fabricate catalysts for the direct oxidation of methanol in fuel cells. The produced carbon-supported platinum and non-platinum based catalysts are being characterized by BET, DSC, SEM, HRTEM, XPS, and XRD to determine their surface area, crystalline structure, particle size, and composition. Methanol oxidation kinetics are measured by RDE, steady state polarization, and impedance spectroscopy. Methanol oxidation products are analyzed by on-line GC and in-situ surface electrode FTIR measurements.

Correlations among surface structure composition, reaction products, and electrochemical kinetics are being studied. The results are compared to the well-known methanol oxidation model of PtRu catalyst, which is the state of the art catalyst for this type of fuel cells. The outcomes of our research project in this area will help to identify new materials and new paths for methanol oxidation reactions. Similar catalysts may also be applicable to other small organic molecules (e.g. ethanol, ethylene glycol, formic acid etc.)

Micro fuel cells prototypes are used to test the catalysts activity in practical devices.

Throughout this research, we were able to identify certain catalyst alloy with activity that exceeds that of the best commercial PtRu product (from JM Co.) and it is now being considered for patenting.

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1 Faculty of Medicine, Hebrew University, Jerusalem

1 In collaboration with Fuel cell vision (FCV Ltd.).

1 Bar-Ilan University
METHANOL TRANSPORT THROUGH LAYERED ULTRATHIN POLYMER ELECTROLYTES IN FUEL CELLS
Dr. Alex Shechter

In fuel cells operating on liquid methanol, the anode (fuel electrode) and the cathode (oxygen reduction electrode) are separated by a thin polymeric electrolyte membrane. This membrane supports high proton conductivity, essential for high cell power delivery. However, in methanol type fuel cells, methanol crosses through the membrane and reduces the fuel cell’s performance due to the mixed potential effect. This phenomenon is known as the crossover effect in direct methanol fuel cells.

We investigate methanol transport through layered structure of alternating acid and base sub-micron layers. Specifically, Nafion® and polyvinylpyridine layers structures were selected to identify the main parameters influencing the fuel transport rate. The main parameters affecting this rate, including methanol concentration, layers thickness, current, temperature, and proton conductivity, have been examined in this study. In addition, selectivity coefficient, osmotic drag number, and methanol uptake as a function of membrane structure are of high interest.

Based on the understanding of methanol transport vis-à-vis proton conductivity and membrane structure, an optimized membrane only a few microns thick will be fabricated using layer-by-layer (LbL) deposition method. Such a thin selective membrane can improve the fuel cell performance significantly. Initial studies of the LbL method and the optimization of the fabricated membrane are currently being pursued in our lab.

METAL CHALCOGENIDES: A NON-PLATINUM CATALYST FOR OXYGEN REDUCTION IN FUEL CELLS
Dr. Alex Shechter & Prof. Gedanken

The search for non-platinum oxygen reduction catalysts draws increasing attention in relation to fuel cell technology. In particular, Chevrel Phase (C.P.) transition metal chalcogenides have been reported as interesting four-electron oxygen reduction catalysts. The members of this class, described by the formula Mo_{6-x}Ru_xX_8 (X=S, Se, Te), exhibit high catalytic activity (in some members approaching that of Pt) as well as good chemical resistance to acids. Most importantly, however, these C.P. materials have high tolerance to methanol, leading to selective reduction of oxygen in direct methanol fuel cells, thus, managing methanol crossover problem.

In our preliminary study, we target few of the challenges related to these catalysts. The stability of the surface is limited due to ligands exchange with oxygen and, consequently, electro-catalytic activity gradually decreases with time. In addition, the dispersion of the catalyst in all known preparation methods is rather poor, resulting in low current densities.

We examine a new synthesis method that can provide a stable surface and good particles dispersion. As a part of this project, we perform material and electrochemical characterization, similar to that employed in the direct methanol oxidation study. Some specific electrochemical analysis methods such as RRDE and short transients are also used. These materials have also showed exceptional selectivity towards oxygen reduction in the presence of methanol, which has important scientific and practical implications in Direct Methanol Fuel Cells (DMFC). This program has recently been awarded the infrastructure ministry support for 2007.

1 Bar-Ilan University
SHATTERING OF WATER CLUSTERS
Dr. Haya Kornweitz*, Prof. Raphy D. Levine¹,² and Prof. Uzi Even³

Generating controlled extreme conditions, long recognized as a primary goal for chemical science, continues to be a challenge for both experiment and theory. Clusters of water are of especial interest due to the strong forces of interaction inside them. We ran 3D classical trajectories to simulate the impact of water clusters moving at hypersonic velocity on a hard surface with the result that an ultrafast temperature rise occurs and the cluster is shattered. The yield and fragmentation of the cluster were studied, and the number of fragments and their sizes were calculated as a function of the size of the cluster and the impact energy. The data obtained from the calculations were quite similar to experimental results obtained at Tel Aviv University. The ultimate aim of this project was to explain the experimental results. In the experiment the water impacted a wet surface, whereas we simulated collision between two water clusters, one of them larger than the other and intended to resemble the wet surface. The differences between the results of the collision of two clusters and the results of the collision of a cluster with a hard surface should shed light on the experimental results and explain the differences between the experimental and the calculated results.

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FACULTY OF SOCIAL SCIENCE

PSYCHOLOGICAL STRESS DURING PREGNANCY IMPAIRS ATTENTIONAL PROCESSING IN THE OFFSPRING: MEDIATION BY THE 'ENDOCANNABINOId CB RECEPTOR' SYSTEM

Prof. Ester Fride*

Excessive stress during pregnancy is known to adversely affect psychological development of the offspring. We and others have shown previously that prenatally stressed rats are more vulnerable to stressful situations than control rats. The behavioral impairments were accompanied by biological and hormonal changes (in the dopamine system and corticosteroid systems, respectively). In our present work, we have hypothesized that the newly discovered 'Endocannabinoid CB Receptor System' is also impaired upon exposure to gestational stress. We have recently demonstrated that the offspring of prenatally stressed mice display signs of 'depression'. Currently, we are exploring whether this behavioral condition is accompanied by a change in the 'Endocannabinoid CB Receptor System'.

* Also a faculty member at the Department of Molecular Biology
THE DEVELOPMENT OF 'PERIPHERALLY RESTRICTED' CANNABIS-BASED MEDICINAL DRUGS
Prof. Ester Fride*

The major active compound of the marijuana plant (Delta-9-tetrahydrocannabinol, THC) possesses a variety of beneficial medical properties, including anti-inflammatory and pain-relieving effects, anti-osteoporotic potential and blood pressure-lowering activity. However, THC also affects the brain, as expressed in mood alteration, impairment of memory and attention and, possibly, a risk of addiction. Therefore, there is a need for cannabis-based medicines that do not act on the brain and thus will not display psychoactive side effects. Currently, none are available.

We have developed, in collaboration with Prof Raphael Mechoulam from the Hebrew University of Jerusalem, several newly-patented compounds that address specific medical concerns without acting on the brain, and thus do not cause the negative side-effects of other cannabis and cannabis-related drugs. Our compounds are effective as anti-inflammatory and analgesic agents and have the potential to improve bone density. We are now further improving these compounds as well as developing additional ones.

We hope that our findings will be used to help those suffering from Cystic Fibrosis, Crohn’s Disease, osteoporosis, and other conditions with similar symptoms.

* Also a faculty member at the Department of Molecular Biology

THE CANNABIS PLANT AND THE BODY'S INTERNAL CANNABIS-LIKE COMPOUNDS: DEVELOPMENT OF DISEASE MODELS AND CANNABIS-BASED MEDICINES – GENERAL BACKGROUND
Prof. Ester Fride*

Among researchers worldwide, the Cannabis sativa plant (more commonly known as marijuana) is known not only for its mind-altering effects, but also for its powerful medicinal properties. Many have discovered that it is an excellent pain-releasing and anti-inflammatory drug, and it is thought to help patients who suffer from Multiple Sclerosis and Crohn’s Disease. Due to the plant’s psychoactive effect and illegal status in many countries, administration of cannabis and cannabis derivatives to patients has been limited to a great extent.

An exciting new development in this area of research has been the discovery of an ‘internal cannabis system’ (the ‘Endocannabinoid CB Receptor System’). It was shown that animals as well as humans have cannabis-like compounds in the brain and many organs systems such as the immune, reproductive, and cardiovascular systems. Moreover, specific ‘CB, receptors’ convert the impact of the plant-derived as well as the internal compounds into highly important physiological activity.

Major research activities of the laboratory of ‘Behavioral Biology’ are presented on the following pages.

* Also a faculty member at the Department of Molecular Biology
DISCOVERY OF THE PUTATIVE BIOLOGICAL BASIS OF 'NON-ORGANIC FAILURE-TO-THRIVE' (NOFTT) IN INFANTS

Prof. Ester Fride*

Approximately 2-4% of newborn infants display, without any known organic cause, impaired feeding patterns and as a consequence, they develop very low body weight and a failure to thrive. No treatment is available for these infants and often they remain small and/or develop behavioral problems at later ages. We have discovered that blockade of cannabinoid (CB₁) receptors in newborn mice results in a developmental profile that is very similar to that of human infants with NOFTT. This includes defective oral-motor functioning and hence failure to properly ingest maternal milk. We are now further exploring this model in mice as well as human infants and we are developing strategies to improve the condition in humans.

UNDESIRABLE WEIGHT GAIN INDUCED BY PROLONGED ANTI-DEPRESSIVE TREATMENT: PREVENTION BY CO-ADMINISTRATION OF A CANNABINOID CB₁ RECEPTOR BLOCKER

Prof. Ester Fride*

Many people who suffer from clinical depression derive great benefit from antidepressant drugs (such as 'Prozac' or 'Seroxat'). However, prolonged use of these medicines often induces undesirable weight gain (of at least 7.5 %), which in turn leads to an enhanced risk of cardiovascular disease and treatment noncompliance. Over the last few years, it has become apparent that blocking the cannabinoid CB₁ receptor results in reduced food intake and body weight in laboratory animals as well as in humans. We have therefore hypothesized that co-treatment with a CB₁ receptor blocker ('antagonist') may prevent the antidepressant-induced weight gain. However, since the 'Endocannabinoid CB Receptor System' is also involved in mood regulation, we have also investigated whether the combined treatment would interfere with the effectiveness of the antidepressant alone. We have found that the CB₁ receptor antagonist, Rimonabant, prevented weight gain in long-term treatment with the antidepressant desipramine, while it did not interfere with its antidepressant effect, even over prolonged periods. Now, with the support of a drug company, we are exploring additional antidepressants and dose regimens, in order to further test our hypothesis that Rimonabant may be safely co-administered with antidepressant medications, without adverse effects.

* Also a faculty member at the Department of Molecular Biology

THE DISCOVERY OF A MOLECULAR LINK BETWEEN THE CFTR CHANNEL AND THE CANNABINOID CB₁ RECEPTOR IN A MOUSE MODEL FOR CYSTIC FIBROSIS

Prof Ester Fride*, Oded Edelheit and Prof. Israel Hanukoglu**
and Dr. Tatiana Bregman

Cystic fibrosis, the most common recessive fatal genetic disease, is characterized by a defective CFTR channel. A number of symptoms in cystic fibrosis, including recurrent lung inflammations, digestive pathophysiology, reproductive dysfunction and undernourishment, are reminiscent of decreased activity of the endocannabinoid system and suggest that activation of the endocannabinoid system may improve cystic fibrosis pathophysiology. We have now accumulated evidence that cannabinoid CB1 receptor and mRNA concentrations are reduced in the digestive system of cystic fibrosis (CFTR) mice. Moreover, juvenile treatment with the cannabinoid THC completely and permanently reverses infertility at adulthood. These findings support our hypothesis of a functional link between the CFTR and CB1 receptors.

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WHY BATTERED WOMEN REMAIN WITH VIOLENT HUSBANDS

Prof. Noach Milgram

Three studies examined differences between women who left or were prepared to leave abusive spouses and women who were not ready to do this. A total of 120 Israeli women, residing in municipal shelters at the time of the survey, completed the questionnaires. The answers that women gave to the following questions were good predictors of whether they would leave their husbands. Battered women who endorsed the following statements were more likely to remain:

1. She is responsible for his outbursts and deserves it;
2. His violence is not his fault;
3. He will change if she is more sensitive to his needs and/or if his work difficulties and other personal problems get resolved;
4. It is a woman's duty to maintain the home and family even if the man is abusive;
5. That is the way men are, they have a short fuse, not much can be done about it;
6. He needs her and she loves him;
7. She will suffer social humiliation if she goes public;
8. She cannot manage her own life without him;
9. She and her children cannot manage financially without him;
10. Children need their father even if he is violent;
11. Her family and the authorities are no help;
12. Women in general, and herself in particular, are not self assertive by nature and do not respond aggressively;

In short, these beliefs perpetuate the status quo and undermine interventions to empower these women to take control of their lives.

SOCIAL CONTACT BETWEEN ISRAELI JEWS AND ARABS: FUTURE PERSPECTIVES

Prof. Noach Milgram

Differences in readiness for social intimacy were examined in Israeli college students, half of them Jewish, half Muslim. As a measure of social intimacy, we used an adaptation of the Bogardus Social Distance Scale, assessing readiness for increasingly intimate social contact with members of the other group: to work side by side in the same place of employment, to invite members of the other group to one's home, to have members of the other group as neighbors, to have my [future] children or children of relatives become friends with children of the other group, to have my [future] children or children of relatives marry members of the other group.

Analysis was made of the relationship of these scores to the perceived readiness of the other group for social intimacy (reciprocity), cultural empathy toward the other group, frequency and importance of social contact with other group members, belief in a peaceful resolution of the Arab-Israeli conflict, political ideology, and readiness to drive the other group out of the country (Israel/Palestine), if future circumstances were conducive, along with the perceived intentions of the other group under the latter circumstances. Conclusions were that readiness for social contact with the other group was long-term and without reservation for the Israeli respondents, while the opposite was found for the Arab respondents.

BELIEFS UNDERLYINGIDEOLOGICAL CONFLICT IN THE WEST

Prof. Noach Milgram

Programmatic research currently underway on differences between liberal and conservative ideologies in Israel and other Western countries indicates group differences on the following issues: (1) patriotism versus alienation from one's country; (2) nationalist versus global or world citizen orientation; (3) adherence to versus rejection of traditional faith and religious institutions; (4) preservation of versus liberation from traditional mores and manners (e.g., recreational sex, recreational drugs, alternative family structure); (5) discipline versus laissez faire in the home, classroom, military; (6) belief in moral absolutes versus moral relativism; (7) civic duty versus individual rights; (8) collective responsibility versus self actualization; (9) use of force versus negotiation in resolving disputes between warring nations; (10) attribution of responsibility for what happens to oneself or others and circumstances; (11) intellectual defense of or attack upon Western civilization and culture; (12) adherence to single versus double standard for aggressive conflict between groups and nations; (12) skepticism about the possibility and pace of change versus belief in the plasticity of "human nature and nurture"; and (13) skepticism versus belief about achieving Utopia in our time. These beliefs are regarded as tenets of ideological faith and as tenacious as the tenets of formal religions.
Western society has undergone enormous changes in family structure in the latter half of the 20th century. One change has been an increase in the incidence of divorce in families with children. A second change has been in the attitudes and behaviors young people bring to marriage, with some opting never to marry and others opting to marry at a later age than their parents or grandparents. The present study is the fourth to examine effects of home- and family-centered atmosphere, and personal-social traits on readiness of adult children to marry. We investigate equal numbers of men and women, half of whom were reared in divorced homes and half of whom were raised in homes without divorce. Our previous research indicated that perception of how their parents related to one another and how the parents related to them during their childhood and adolescence were more strongly associated with their current readiness to get married than with the mere fact of divorce. Participants in this particular study were 121 adults studying at a large regional college in Israel. Findings were as follows:

1. Adult children of divorced parents and those in general who are not engaged in an ongoing relationship are more reluctant to marry than their counterparts.

2. Readiness for marriage was related to the following variables in declining order of magnitude: parents' interactions with one another (.39), mother's interaction with participant (.33), father's interaction with participant (.32), a difficult period of parental discord during their childhood or adolescence (.28), self esteem (.20), and anxious-ambivalent attachment style (.19).

3. Separate regression analyses for male and female children of divorced parents were carried out. For men, parents' interaction and mother's interaction with them accounted for 39% of the observed variance in readiness for marriage. For women, having a significant other and interaction with father accounted for 17%.

4. We conclude that conditions that lead to divorce and continue after divorce — the relations of the parents with one another and with their children — account for whether children of divorce are ready and willing to get married.

A democratic society permits free choice in a wide variety of areas. Some choices create new problems. In the past, adultery was condemned and an adulterer could be executed, jailed, or at the very least, ostracized by polite society. Today the sexual landscape is very different. Single people establish relationships without marriage and married people conduct sexual affairs outside of marriage. I have been investigating attitudes toward these practices for several years with an emphasis on the affective reaction and behavioral response of married and unmarried adults to a wide variety of sexual practices: (a) betrayal by a female partner or a spouse versus betrayal by a male; (b) betrayal with an extra-marital partner of the opposite sex versus betrayal with an extra-marital partner of the same sex; and (c) an affectionate attachment and loving relationship with an extra-marital partner versus a relationship based entirely on lust and sexual release. These reactions and responses were moderated by (a) three ideological measures: religious practices and beliefs, political affiliation, and a liberal-conservative orientation; and (b) two personal-social measures. The first, directly related to sexual betrayal, assesses the strength of a jealous, suspicious disposition about quasi-sexual and sexual liaisons; the second assesses one's characteristic social attachment style (detached, anxious, or socially competent-confident). These findings are considered in the context of the response of people who differ in demographic, gender-based, ideological, psychosocial characteristics, and life circumstances to changing legal structures and social and religious mores.
IDEOLOGY AND THE BEHAVIOR OF PERPETRATORS AND VICTIMS OF VIOLENCE

Prof. Noach Milgram

This research has investigated two general and two situation-specific assertions about ideology – defined as attitudes, beliefs, values, and assumptions about important issues in life: (a) Ideology is ubiquitous in all human deliberations and subsequent actions, and in the attributions of responsibility for actions by individuals and groups; (b) Ideology determines the personal and societal definition of victim and victimizer for both observers and participants in violent encounters; (c) Ideology affects the decision reached by victims of domestic violence, with some battered women choosing to remain with their abusive, unrepentant partners and others separating from their partners and even initiating legal procedures to prosecute them; (d) Ideology affects the response of Israeli victims of persistent, unpredictable terrorist attacks, with some attempting to mollify their attackers and others endorsing retaliation. Findings indicated that ideology – not poverty, racial discrimination, or exploitation – is a major cause of violence in the Israeli-Arab conflict. Ideology convinces Islamic homicide bombers that the indiscriminate killing of men, women, and children is justified, even meritorious. Another version of ideology convinces Left Wing Israelis that they have it coming. The research presents data on battered women (3 studies), Israeli combat and rear echelon soldiers (6 studies), and civilians living in Israel and in Judea and Samaria (6 studies) that reflect remarkable similarities. The readiness of the Left Wing Israeli to blame himself rather than the self proclaimed enemy for the violent conflict and loss of life is reminiscent of those who equate Cain and Abel as victims of human fate and circumstances, with the murderer no more guilty than his victim.

IDEOLOGY, INJURY AND INTENTIONS IN AN INTRACTABLE CONFLICT

Prof. Noach Milgram

Most research on protracted violent conflict focuses on the psychiatric fallout, PTSD, and psychological squeals in people exposed to the violence. A series of studies over a 10 year period approached conflict from a different perspective. We compared the response to protracted conflict and violence in soldiers as a function of two variables: (a) physical threat and physical damage to soldiers and civilians; and (b) threat and damage to soldiers' ideological assumptions, values, beliefs, and attitudes. We measured two antagonistic responses: readiness for conciliation with Israeli Arabs and readiness to endorse severe punishment, individual and collective, for Palestinian terrorists and apparent supporters of terrorist attacks. We found that both kinds of response were affected more by ideology, general as well as conflict-relevant, than by perceived threat and injuries incurred at the hands of their perceived adversaries. More specifically, self-assigned liberal (Left Wing) ideological membership and optimistic expectations of a peaceful resolution of the conflict was positively related to conciliatory intentions of Israeli soldiers toward Palestinian citizens of Israel and inversely related to severity of retaliation to be meted out to Palestinians responsible for threat, injury, and death of Israeli soldiers and civilians. By contrast, the perceived threat and reported injury and death incurred by the soldiers, their comrades in arms, their families, friends and acquaintances at the hands of Palestinians were unrelated to conciliation or retaliation. The effect of ideology on attitudes and intentions in ethno-national conflict situations suggests that it be considered in psychological research areas on context-specific coping in stressful situations.
CREATIVE THINKING AS A PREDICTOR OF TEACHER EFFECTIVENESS

Prof. Roberta M. Milgram & Dr. Nitza Davidovich

Creative thinking was investigated as a predictor of teacher effectiveness in a study carried out among 58 college instructors, 40 high school and 49 elementary school level teachers. Creative thinking was measured using the Tel Aviv Test of Creative Thinking and teacher effectiveness was evaluated using a psychometric measure of real-life problem solving in teaching. The correlations between creative thinking and teacher effectiveness were $r = .66, p < .0001$, $r = .59, p < .01$, and $r = .51, p < .0001$, for college, high school, and elementary school teachers, respectively. The findings indicated a very strong relationship between creative thinking outside and inside the classroom. In other words, the lecturer's ability to produce many ideas in response to a stimulus that has no direct application to the classroom and the practical ability to generate solutions to problems that do arise in the classroom are strongly related. The findings suggest that it would be worthwhile 1) To sponsor pre-service and in-service workshops to enhance creative thinking ability of teachers, and 2) to take creativity into account in the process of selection and evaluation of teachers at all levels.

CREATIVE THINKING AS AN EFFECTIVE TOOL IN REAL-LIFE PROBLEM-SOLVING

Prof. Roberta M. Milgram

Creative thinking is defined as the cognitive process of original problem-solving, by means of which original (i.e., unusual and of high quality) solutions are produced. This study contributes to the theoretical and empirical development of our current understanding of creativity as both a domain-specific and a general ability. Creativity, as understood today, goes far beyond art, music, and other aesthetic domains. In a large number of studies conducted in Israel, one measure of general original/creative thinking and one measure of creative problem-solving in real-life situations were administered to research participants across a wide age range from preschool to adult. In our research, we analyze data from studies of creative thinking in business, teaching, families, young couples, preschool children, and university students. The findings were consistent in that they demonstrated the relationship between the general creative thinking ability and the generation of creative solutions to real-world problems in a wide variety of situations. Finally, we also consider the contribution of creative thinking to solving professional, personal, and inter-personal problems.

TALENT LOSS: CAUSES AND SOLUTIONS

Prof. Roberta M. Milgram

Thousands of learners have been ‘identified’ as gifted and are receiving special education to enhance their abilities. At best, these children have the potential for extraordinary achievement. Unfortunately, however, the vast majority of gifted and talented young people, that is, those who have the potential for extraordinary achievement, are not identified and do not receive proper education; in other words their talent is lost. We offer three reasons. First, theorists in giftedness have developed broad, multi-dimensional definitions of giftedness that are widely accepted. Unfortunately, in the real-world field of education, identification of talent continues to be based on narrow, outdated theories. Second, we lack reliable and valid psychometric instruments to assess the wide variety of abilities postulated by modern theories. Third, the existing educational programs designed to provide special education for gifted and talented youngsters have failed – some more, some less.

We should certainly use broader theories in our efforts to prevent talent loss. We should also develop and use better instruments to identify talent. However, the most pressing task is to drastically change the special education that we provide to develop and enhance the abilities of the gifted and talented. Individualization of the teaching-learning processes and differentiation of the curriculum according to the needs of the potentially gifted learner within the regular classroom would have a powerful impact on preventing talent loss. What was an ‘impossible dream’ only a few years ago is today a realistic possibility. With the enormous growth and development of technology it is now possible to individualize curriculum and instruction within the regular classroom. Of course, this will require nothing short of a revolution in school policy and in teacher training.

A comprehensive model of giftedness and talent developed by Hong and Milgram (see ‘Preventing Talent Loss’, by E. Hong & R. M. Milgram, to be published by Routledge, New York) describes various types of giftedness and talent as well as the factors to be considered to prevent talent loss.
ACADEMIC VERSUS CREATIVE ABILITIES IN MATHEMATICS: TWO COMPONENTS OF THE SAME CONSTRUCT?
Dr. Nava L. Livne¹ and Prof. Roberta M. Milgram

Structural Equation Modeling, hitherto used to examine unidimensional theoretical models only, was used to investigate two dimensions, abilities and levels, simultaneously. Good evidence for the validity of conceptualizing two types of mathematical ability, one academic and one creative, each at four hierarchical levels, was established in 10th and 11th grade students (N = 1,090). IQ scores, which represent general academic ability, predicted academic, but not creative, ability in mathematics. Creative thinking predicted creative, but not academic, ability in mathematics. These findings led to an innovative approach to identifying mathematical abilities and provided reliable and valid psychometric tools for the implementation of this approach. Based on two new instruments, teachers can differentiate curricula and individualize instructional strategies to match each student’s needs.

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FACULTY PERFORMANCE AND GENDER
THE CASE STUDY OF THE ARIEL UNIVERSITY CENTER OF SAMARIA
Dr. Nitza Davidovich and Prof. Zila Sinuany-Stern*

This case study focuses on faculty performance quality from a gender perspective, of senior faculty members at the Ariel University Center of Samaria who received financial remuneration in 2006 for their academic excellence in research and teaching, as measured by several criteria. The University Center, as a higher proportion of high ranking male faculty exceeds than female faculty. This study examines the relationship between these performance criteria and gender of faculty. We also examined the connections between faculty achievements and the advance in academic ranking, award of tenure, representation in the Senate Committee of the University Center, in the context of the higher education system in Israel and in western countries.

The main finding of this study points to an absence of statistically significant correlations between excellence in research and gender. In contrast, gender was found to be statistically correlated with excellence in teaching, as measured by student evaluations of faculty effectiveness, wherein female faculty were awarded consistently higher evaluations than male faculty. Although a correlation was found between research excellence and male faculty members, this relationship failed to achieve statistical significance.

This is the first case study of its kind to compare performance quality evaluations of faculty based on two evaluation instruments from a gender perspective. The researchers believe that recognition of female faculty as role model has an important impact and implications for closing the gap between male and female in other prestigious professions.

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COURSE WEBSITES AS DRIVERS OF COURSE ORGANIZATION AND STRUCTURE
Dr. Nitza Davidovich and Dr. Michael Wagner*

Although many questions remain unanswered regarding the contribution of course-specific websites, many higher education institutions expect faculty to develop and maintain sites with a minimum of pedagogical or administrative support. For this policy to change, administrators require additional evidence of how course websites can enhance teaching and learning. The central purpose of this study was to inform and improve website construction by examining students’ evaluations of course website features and students’ self-reported usage rates of the same features. In the first stage of this study, we analyzed students’ evaluations of over seven hundred courses to establish whether websites had a differential effect on students’ course evaluations across disciplines. During the second stage, we examined a range of student-related factors to establish which factors correlate with positive student evaluations of CSWs and the courses they are designed to support. In the third and final stage, we examined students’ views regarding the relative contribution of different aspects of websites. The findings of this study confirm that the perceived major benefit of course websites, based on student evaluations, is the organization of course materials. Results of this study indicate that institutions should train and instructors in online pedagogies that enhance effective learning on course websites.

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COURSE WEBSITES AND THEIR CONTRIBUTION TO STUDENTS’ EVALUATION OF INSTRUCTORS AND THEIR COURSES
Dr. Nitza Davidovich, Dr. Ingrid Barth* & Roman Yavich**

In this study we examined how course-specific websites (CSWs) that accompanied mathematics and statistics courses affected students’ evaluation of these courses and their instructors. The central purpose of this study was to identify how specific elements of CSWs contribute to students’ ratings of (1) their success in the course and (2) faculty effectiveness. First we designed a student questionnaire to determine to what extent specific elements of the websites were perceived as contributing positively towards student success in mathematics and statistics courses. These questionnaires were administered to over five hundred students who enrolled in 29 courses taught by 13 lecturers. We then collated website evaluation data with student ratings of the instructors who had designed and maintained the CSWs to identify how student ratings of websites affect faculty effectiveness ratings. Our data indicate that although CSW represent a potentially significant means of helping students to cope with the challenges of mathematics and statistics courses, not all instructors were able to utilize this potential. These results suggest that the instructor’s subject expertise represents a necessary but not sufficient condition for effective CSW construction. Unless instructors receive detailed guidance regarding "best practices" in website construction, they will continue to build sites that under-utilize the potential of web technology and make a limited contribution to student learning.

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IMPROVING EXAM QUALITY THROUGH A NEW COMPUTERIZED MARKING SYSTEM FOR MULTIPLE-CHOICE EXAMS (MQES)

Dr. Nitza Davidovich & Dr. Netta Notzer

In 2003, the Commission of Higher Education in Israel initiated the use of a quality assurance (QA) system to assess and ensure quality, as a catalyst to generate conditions for a continuous improvement process in institutions of higher education in Israel. One quality index was defined as exam quality. Although many academic institutions are sensitive to the role of objectivity and transparency of exam marking in preventing unequal treatment of students, recent emphasis has been placed on enhancing exam quality through the validity and reliability of exams.

The Ariel University Center of Samaria implemented an innovative computerized system to mark multiple-choice exams (MQE). The computerized marking system defines indices of exam objectivity and offers statistical tools to improve exam reliability and validity, and enhance the quality of the student evaluation process.

In this study, we tracked the initial stages of the assimilation process of the computerized exam evaluation system, in the context of organizational change at the University Center. We analyzed the exam results and instructor assessments of 176 courses in Social Sciences and Humanities, Engineering and Health Sciences, with a view to examine differences between faculties in various quality measures of MQEs. In addition, instructors’ involvement in improving the exam, reflected in a second run, was also examined. Finally, the present study compared the MQE reliability and validity by instructor, to student evaluations of instructors’ quality of teaching, as reflected in an annual Student Evaluation of Faculty Effectiveness (SEFE) survey.

INSTITUTE FOR HIGH LEARNING AS A LEVER FOR GRADUATES SETTLING IN THE REGION ~ A CASE STUDY OF ARIEL UNIVERSITY CENTER OF SAMARIA

Dr. Nitza Davidovich, Prof. Dan Soen*, Prof. Shlomo Sharlin**

This case study focused on the Ariel University Center of Samaria (AUC). According to existing information, about 5%-6% of the graduates of AUC who were not resided in the region at the start of their studies settled there upon completion. The question examined in this study relates to whether and to what degree the AUC influenced the graduates’ decision to settle in the Samaria region. In addition, the main motive inducing graduates to settle in Samaria was investigated. The study also sought to determine the various factors that influenced the perceptions and attitudes of graduates toward the region.

The findings point to a rather complex conclusion. On the one hand, they show that over half the AUC graduates knew very little about the region before they began their studies at the University Center, and the AUC was an influential factor in their exposure to the region through direct contact. On the other hand, the findings show that only 15% of the graduates who settled in the region noted that the atmosphere at the school had played a role in their decision to settle in Samaria.

These findings have both theoretical and practical implications. On the one hand, they contribute to the existing Israeli literature regarding place attachment among academic institution graduates. On the other, they may help determine directions of action for those academic institutions wishing to attract graduates to settle in their region.

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THE ROLE OF THE INTRODUCTORY PHYSICS LABORATORY IN HIGHER EDUCATION

Dr. Yosef Raichlin* and Dr. Nitza Davidovich

In this study, the main goals and structure of the introductory physics laboratory are presented. The analysis of students' feedback sheds some light on the role of the laboratory in the educational process. It is argued that the central function of the introductory physics laboratory is to acquaint the student with various aspects of the relation of physics to reality.

The findings of this study highlight the need to develop additional, more advanced laboratory courses for undergraduate students of engineering and natural sciences. Curriculum developers are also called to adopt a more comprehensive approach to laboratory studies and to view laboratories as uniquely effective means of training science graduates to have a strong orientation towards and to be highly skilled in scientific analysis and research.

THE RELATIONSHIP BETWEEN HUMANISTIC SPIRITUALITY AND PSYCHOLOGICAL FUNCTIONING

Dr. Aryeh Lazar

Many studies have demonstrated that religion has a positive contribution to various aspects of psychological functioning. In recent years, the literature has begun to distinguish between religion and spirituality. Although the two concepts are related, spirituality is not necessarily dependent upon an individual's religion. However, the research concerning the contribution of non-religious spirituality to psychological functioning is still rather scant. This study attempts to further our knowledge of the relationship between non-religious spirituality and psychological functioning.

In this study, 120 Israeli Jews who identified themselves as secular or non-religious filled out a survey measuring both spirituality and psychological functioning such as depression and life-satisfaction. We used a humanistic multi-dimensional conceptualization of spirituality to measure spirituality.

We will examine the unique contributions of various components of this type of humanistic spirituality using multiple regression analysis and partial correlations.

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RELIGIOUS SUPPORT, MOTIVES FOR HAVING LARGE FAMILIES AND PSYCHOLOGICAL FUNCTIONING AMONG RELIGIOUS JEWISH MOTHERS

Prof. Jeffery Bjorck¹ and Dr. Aryeh Lazar

This study focuses on the assumption that a large number of children are a source of stress and will therefore contribute negatively to the psychological well-being of mother. We hypothesized that different orientations to motherhood may moderate the relation between this source of stress and outcome measured such as life satisfaction and depression.

The populations used in this study were religious mothers of large families (6-12 children). Based on in-depth interviews, we developed two orientations towards motherhood. One scale represents an ideological orientation to motherhood that related to motherhood as a calling and as a religious mission. The other scale represents the instrumental orientation to motherhood, which relates the benefits of motherhood to the mother.

Research participants also responded to measures of social support and religious support they received in their communities. Outcome measures included depression and life-satisfaction.

Preliminary analysis of the data indicates a positive contribution of an ideological motherhood orientation to the outcome measures, even after controlling for levels of both social and religious support.

SPIRITUALITY AND WORK SATISFACTION AMONG HOSPITAL NURSES

Dr. Aryeh Lazar

A large number of investigations have focused on work satisfaction among hospital nurses. The nursing profession is a high stress job with many demands both physical as well as emotional. In addition, the burnout rate among nurses is among the highest of various professions.

This study examined the contributions of spirituality to the work satisfaction of hospital nurses. We collected data from over 100 hospital nurses concerning their job satisfaction as well as their humanistic spiritual orientation to life.

Preliminary analysis has indicated that a differential contribution exists as to the dimensions of the effects of spirituality on a nurses' work satisfaction.

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THE NEGATIVE AND POSITIVE CONTRIBUTIONS OF SPIRITUALITY TO DEPRESSION
Dr. Aryeh Lazar

Many studies have demonstrated a negative relationship between religion and spirituality in relationship to depression. These studies hypothesize that individuals who are more religious / spiritual have lower levels of depression than do individuals who are less religious / spiritual. However, there are a small number of studies that have indicated that religion / spirituality may also have a positive contribution to depression.

In order to examine the possibility of both positive as well as negative relations between spirituality and depression, 110 research participants filled out surveys measuring spirituality and depression.

Partial correlation analysis indicates that there is indeed a positive relationship between some components of spirituality, in particular those related to a transcendental orientation to life and depression.

SPIRITUALITY AND RELIGION AS BUFFERS OF WORK RELATED STRESS
Dr. Aryeh Lazar

Many studies have demonstrated a positive relationship between religion and spirituality and a quality of life. Our assumption is that religion and spirituality are a coping resource and therefore help to cope with life's stressors that result in a higher quality of life. However, most studies did not directly measure life stressors, and thus did not examine the buffering function directly.

We planned the present study to enable a direct examination of the purported buffering effect itself. In this study, more than one hundred workers responded to measures of religiosity and of spirituality as well as to an objective measure of work stressors. We entered these measures in hierarchal regression analysis in order to uncover the direct contributions to various quality of life measures as well as the purported buffering effect.

Preliminary analysis indicates that while work stress has a negative contribution to quality of life and that spirituality has a direct contribution on the quality of life, this spirituality did not affect the relationship between stress and quality of life.

WHY “INNOCENCE MAY PUT INNOCENTS AT RISK”?
Prof. Eitan Elaad

Kassin (2005) argued that: “innocence may put innocents at risk”. Kassin explained that people who are falsely accused believe that truth and justice will prevail. Hence, they tend to cooperate with the police, not realizing that they are suspects, not witnesses. This facilitates the task of interrogators who presume guilt. In response, innocent suspects become anxious and defensive. The interrogators turn to be more aggressive and press the suspect to confess.

Kassin's view can be explained in terms of self-assessed abilities to tell and detect lies and truths. Hence, lay people tend to evaluate their truth-telling abilities higher than their lie-telling abilities. This implies that innocent suspects are confident of their ability to convince the interrogators of their innocence. They become frustrated when this belief is threatened by the interrogators' presumption of guilt and by the interrogators' confidence in their ability to detect lies, which is demonstrated by catching the suspect in small lies.

To corroborate this explanation, we examined the beliefs of 45 undergraduate students about their ability to detect lies and truths in others, and to tell lies and truths convincingly. As expected, students rated their perceived truth-telling abilities higher than their perceived lying abilities. These abilities were put to a test in a lie-telling task, in which participants received false feedback about the detection of their lies. When the feedback implied that they had avoided detection, students' perceptions of their lie-telling and truth-telling capacities increased. When the feedback suggested that their lies had been detected, self-rated lie-telling and truth-telling abilities declined. Feedback did not affect students' perceived lie-detection and truth-detection abilities. We also make some suggestions as to how to avoid subscribing to the belief that the lies are detectable and truths are not convincing.
ACTIVE PROCESSING OF CONCEALED INFORMATION: NEW PERSPECTIVES
Prof. Eitan Elaad

The concealed information test (CIT) relies on several multiple-choice questions, each having one relevant (e.g., a feature of the crime under investigation) and several neutral (control) alternatives. It is assumed that an innocent suspect would not be able to discriminate between them, whereas a guilty suspect will identify the crime related details and will respond to them more than to the neutral alternatives. This assumption does not apply to innocent suspects who were exposed to the relevant information by accident. Research on informed innocent participants reveals that the knowledge of the relevant information is not the only factor that affects CIT detection. The perceived state of guilt and the context in which the information is gathered affect CIT detection efficiency as well. The present study examines how these factors affect the detection efficiency in the CIT.

Furthermore, one cannot guarantee that the information that is presented to the examinee in the test is exactly the same information that the examinee remembers from the criminal event. The present study is designed to look at the relation between the presented and the remembered details of information. It is suggested that generalization and decision making process are applied in the CIT. It is further hypothesized that active processing of concealed information is typical to the examinees that perceive guilt and have confidence in the accuracy of the information, because it was gathered in the crime context.

FINGER PULSE WAVEFORM LENGTH IN THE DETECTION OF CONCEALED INFORMATION
Prof. Eitan Elaad, Gershon Ben-Shakhar

An attempt was made to assess the efficiency of the finger pulse waveform length (FPWL) in detection of concealed information. For this purpose, two mock-theft experiments were designed. In the first, 40 guilty participants were examined while electrodermal, respiration and finger pulse volume were recorded. Results showed that detection accuracy with FPWL was at least as good as the accuracy obtained with the other two measures (respiration changes and skin conductance responses). Detection efficiency was further improved when a combination of FPWL with the other two measures was used. In the second experiment, 39 guilty and 23 innocent participants were instructed to deny knowledge while the transducers were not attached to them. Then, the same questions were repeated while electrodermal, respiration and finger pulse volume were recorded. Results showed reduced rates of identification compared with the first experiment, which were explained by habituation. However, finger pulse was less affected by habituation than both respiration and skin conductance. Results suggested that FPWL might be a useful addition to the existing measures in the detection of concealed information.

COVERT RESPIRATION MEASURES FOR THE DETECTION OF CONCEALED INFORMATION
Prof. Eitan Elaad, Gershon Ben-Shakhar

A mock-theft experiment was designed to assess the efficiency of two covert respiration measures in detection of concealed information. The covert measures were further compared with three standard measures typically used for the detection of concealed knowledge (electrodermal, respiration, and finger pulse measures). Results revealed that the covert respiration measures produced good discrimination between 'guilty' participants (possessing concealed knowledge) and 'innocent' participants. One of the covert measures produced detection efficiency that was similar to that of the standard respiration and finger pulse measures, but lower than that of the electrodermal measure.

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THE CORRELATION BETWEEN PERSONALITY AND SITUATIONAL VARIABLES AND STRESS REACTION AMONG GUSH KATIF EVACUEES

Dr. Lior Oren* & Dr. Sigal Ronen

Posttraumatic Stress Disorder, or PTSD, is a reaction following the experience of an unusually traumatic event that involved the threat of death or serious injury to the person or to others, and in which the person felt intense fear, horror, and helplessness. It is characterized by three main types of symptoms that cause clinical distress or impair functioning: (a) intrusion — re-experiencing the traumatic event after battles have ended; (b) avoidance — numbing of responsiveness to, or reduced involvement with, the external world; and (c) signs of hyper arousal. In recent years, there is increasing acceptance of the idea that exposure to trauma may not always be sufficient to explain the development of PTSD, and that individual vulnerability factors have a role to play in understanding this condition.

In this study, we analyze the stress levels and PTSD data collected among the settlers that were removed from the Gaza strip and northern Samaria in a process known as “disengagement”. We hypothesize that higher stress levels and PTSD will be found among respondents showing low levels of hardiness and of social or religious support and using passive ways of coping. Concerning situational variables, we hypothesize that higher amount of stress levels and PTSD will be found among respondents who objected the disengagement process and did not anticipate it, lived many years in the evacuated settlement or faced terror.

PERSONALITY TRAITS AS DETERMINANT OF OCCUPATIONAL STATUS AMONG STUDENTS

Dr. Lior Oren*

In recent years, there has been an increase in the number of workers, including women and seniors, who choose to be self-employed. It has been estimated that approximately 16% of full-time workers in the United States are self-employed (Jamal, 1997), and there are indications that this number will grow in the future (Feldman & Bolino, 2000; Hundley, 2001a).

Studies demonstrated differences in personality between self-employed and organization employed workers. Self-employed workers were found to have an internal locus of control, greater willingness to take risks, assertiveness (Mueller, 2000), optimism (Hatten, 1997), high self-efficacy (Scherer, Adams, Carley, & Wiebe, 1989), regulatory focus of promotion (Oren, 2004) and need for success, achievement, autonomy, and control (Beugelsdijk & Noorderhaven, 2005; Kolvereid, 1996b).

In this research we are trying to identify personality traits that are related to preference to work as self-employed.

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1 Bar Ilan University
TWO DIFFERENT STRATEGIES TO ACCESS SEMANTIC KNOWLEDGE
Dr. Ariela Gigi

The sensory/functional theory, which was originally proposed by Warrington and Shallice (1984), makes two crucial assumptions about the organization of the semantic system and the structure of semantic categories. The first assumption is that the semantic system is organized into modality-specific components, of which the most important are the visual and the functional/associative components. The second is that activation of either the visual or functional properties of an object will result in the activation of that object's properties in the other network. This means that independently of whether questions are asked about the visual or the functional attributes of an object, all of the semantic attributes of the object will be activated.

On the other hand, people are known to differ in their cognitive style. The current research assumes two cognitive style groups (visual/functional), and explores whether these two groups use different approaches in retrieving information from semantic knowledge.

SEMANTIC MEMORY IN NORMAL AGING
Dr. Ariela Gigi

Semantic memory is the basis for organizing our interaction with the world. This memory is known to be affected in normal aging, manifesting primarily in naming problems, probably because naming places a critical and heavy load on semantic processing. A computerized naming test was designed to study the semantic memory decline in normal aging and to detect brain areas and activation patterns associated with object naming performance during functional neuroimaging (fMRI). The test includes two conditions with different difficulty levels.

The brain patterns detected suggest an important role of the prefrontal cortex (PFC) in naming of objects seen from unusual viewpoints. Since there is a loss of frontal grey matter with age, this might explain (at least in part) the observed age-related decline in naming performance. According to the recent results, a new test is being developed, trying to address the question of whether different strategies are used during normal aging.

SEMANTIC MEMORY IN MCI*
Dr. Ariela Gigi

Mild cognitive impairment (MCI) is considered to be a potential transitional state between normal aging and dementia. Studies addressing semantic memory in patients with incipient dementia and MCI show inconsistent results.

In the current study, we examine memory performance (semantic, episodic and working memory) using functional MRI (fMRI) and compare the results with the behavioral findings. In a recent preliminary study, we showed that, although MCI participants perform behaviorally as well as controls in semantic task, the fMRI examinations revealed that their performance was achieved by a distinct pattern of activation, different from that found for the controls. Significantly higher activation as well as higher number of active voxels were observed in the dorsolateral prefrontal cortex (DLPFC) of MCI subjects, bilaterally. The overactivity seen in the DLPFC of the MCI subjects may represent a compensatory mechanism, which enables them to perform as well as the controls during the naming task.

COGNITIVE FUNCTIONING FOLLOWING TERROR ATTACK
Dr. Ariela Gigi

The exposure of innocent citizens to terror attack is a familiar experience for people almost all over the world. Exposure to a terrorist attack is a traumatic experience that may result in elevated anxiety levels.

Many studies have found that religious beliefs may contribute to the most frequent forms of coping utilized by individuals in time of stress. Others have found a correlation between increased religiousness and mental health. Those studies have shown that involvement in religious practices generally has a positive association with both mental and physical health.

In the current study, participants were Israeli citizens who had been exposed to a terror attack. The study aims to evaluate the effect of the terror attack experience in this population on anxiety levels and memory functioning, and to correlate these factors with religious faith.

* The project is collaborated with Prof. Amos D Korczyn, Sieratzki Chair of Neurology, Tel Aviv University & Sourasky Medical Center
MALICE AND THE LAW OF NUISANCE FROM AN ISRAELI PERSPECTIVE

Prof. Abraham Sion

The purpose of this research is to define whether malice should play a role in the Law of Nuisance in Israel.

It is obvious that an individual that lives in the hub of a city cannot expect silence and quiet throughout the day and that every person should expect some sort of daily nuisance.

In Israel, two acts govern this issue. The first is the Tort Ordinance [New Version], which provides, inter alia, that a person who uses his land in a way that causes substantial disturbance to the reasonable use of the land of his neighbor is liable in tort for nuisance (sec.44).

The second act relevant to the issue is The Prevention of Obstacles Act (1961), also known as the Law of Kanowitch, which similarly provides that a person should refrain from causing strong or unreasonable noise, smell or air pollution; otherwise, he may be liable in tort. In both cases, emphasis lay on the terms “strong”, “substantial” and “unreasonable”.

This being so, the question arises as to whether malice is material in nuisance? To put it bluntly, the question is: if an annoyance is committed by A towards B in the use of his own property, which does not amount to nuisance, will that same act be considered a nuisance if it is committed solely for the purpose of annoying B?

In Israel, one can hardly find a case in the lower courts on this issue. This question, however, has been discussed by some law experts on tort, such as Prof. David Kretzmer in his book on “Nuisance” (Institute of Legal Research, the Hebrew University of Jerusalem), and Prof. Y. Engelard in his essay on The Law of Tort (Magnes, Hebrew University, 1970). The question has never been decided by the Supreme Court of Israel, and therefore has never been settled.

In contrast, a number of courts have dealt with this question in countries where the Anglo-Saxon legal system prevails, such as in England, the United States, Australia etc. (herein mentioned as the foreign concept). This foreign concept accepts that when the defendant is motivated by malice, the interference is automatically substantial, even in cases of minimal discomfort or inconvenience since the nuisance results from conduct solely intended to cause harm.

The purpose of this research is to present a comparative study on the issue, in order to change the law in the State of Israel. We hope that this research will result in the adoption of the foreign concept in the courts or through legislation.

THE REASONABILITY OF THE DEFINITION OF THE TERM "BUILDING" IN "THE TOWN PLANNING AND BUILDING ACT" 1965

Prof. Abraham Sion

The purpose of this research is to examine the definition of the term “building” and the requirement of applying for a building license for every act of change done to an already existing structure.

Section 145(a) of the Town Planning and Building Act 1965, forbids any person to erect a “building” without a proper license from the Town Planning Commission. This law also forbids an individual to make any changes, repairs or corrections to any existing building, except if the repair is internal thereby not affecting the façade of the building, without a license.

Furthermore, the term building is widely defined in section 1 of the Act as to include any structure whether made of stone, concrete, clay, iron, wood or any other substance including any part of a building, and anything connected to the building in a permanent way. The term building also includes a wall, soil, a fence etc.

The effect of this wide definition leads to the conclusion that if a person desires to change the broken glass in a window, or replace a nail in the facade wall of a building, or change the front door of his house, he needs to apply for a building license.

While taking into consideration that each license requires the submission of an application, supported by drawings and approved by the neighbors who can otherwise object to the change, suggests that these trivial changes might last many months and perhaps years. This suggestion is absurd.

The Supreme Court found that it was sometimes bewildered and embarrassed when required to apply the law on such trivial matters, and occasionally it suggested that one should use common sense when applying the law to awkward cases. Nevertheless, the Supreme Court did not hesitate to decide that the change of a front door required a license, as did the erection of a tent for an unlimited time.

The purpose of this research is to propose a different view on this matter. We hope to reduce bureaucracy, and to suggest changes in the law allowing for a more liberal approach to the issuance of building licenses.
Israel's economic growth is mainly export-driven. In order to increase the competitiveness of our economy, the tools of TQM could be used to increase productivity and improve the quality of the products. In this study, we examine two basic hypotheses about the Israeli economy, addressing demand- and supply-side issues, respectively:

1. In the global market, there is an increased demand for quality products and production factors, with a demand elasticity to income greater than 1. One important consequence is that the share of quality products in the consumption basket is constantly increasing.

2. Market forces reward the manufacturer with higher profit, which overrides the increased marginal costs due to quality improvement. Consequently, it is worthwhile for the manufacturer to invest in R&D and technological improvements, as well as hire higher quality manpower and invest in human capital. These two hypotheses are particularly relevant for export-oriented sectors of Israeli economy, hence it would be beneficial to investigate the efficiency of State incentives in this context. We will examine the changes occurring in TQM firms and the impact these changes have on profitability. For this purpose, we prepare a comprehensive survey, based on TQM studies carried out abroad, to be distributed to hundreds of Israeli companies in various sectors. We would like to point out that it will be the first systematic survey in Israel to examine the quality of products and production factors. The survey will examine temporal development as well as cross-section data. It will include eight chapters investigating various economical and technological aspects of quality management.

During 1585-1690, the Ottoman Empire suffered from severe monetary instability. The silver akce was repeatedly debased, and it consequently depreciated against the gold sultani. Periodically, the authorities attempted to restore the value of the akce by increasing its silver content (increasing the intrinsic value), or, alternatively, by decreeing a new, lower akce/sultani exchange rate (increasing the extrinsic value). Such decrees caused major disputes between borrowers and lenders.

For the leading rabbis in Ottoman areas, such disputes created both a challenge and an opportunity. By tradition, they were bound by the legal precedents of the Babylonian Talmud, which is the canonical text of Jewish Law. Although the Talmud prescribes a rule for repayment following reinforcement or debasement, it does not discuss repayment following revaluation or devaluation. Therefore, the rabbis had to create their own precedents by significantly reinterpreting the Talmud and the works of medieval rabbis.

The responsa (Jewish legal opinions) of the period contain much interesting historical data.

In this study, we attempt to place these data within their historical context, using previous work on the economic history of the Ottoman Empire. In addition, we also study the impact of these developments on subsequent rabbinic economic thought.
A COMPREHENSIVE MODEL OF INCOME AND ALIENATION

Dr. Yael Brender-Ilan

The negative effects of employee alienation on the performance of organizations have been noted in several studies. In light of findings that individuals' well-being is positively related to income, one way in which organizations could tackle alienation is to increase employee income. However, this may not be very cost-effective, especially because the influence of individual psychological characteristics and values on the perception of income makes the effect of income increase less predictable for organizations.

This study develops and empirically examines a comprehensive model of the relationship between income and alienation. A sample of 311 full-time employees completed a questionnaire and the data were analyzed using hierarchical regression. It is found that a substantial part of the variance in alienation is explained by income-related variables. An inverse relationship between income and alienation, beyond the effect of demographic characteristics, is identified, but this relation is moderated by the value that individuals attribute to money and intermediated by their perception of income, which affects their pay satisfaction. It is also found that pay composition has an independent effect on alienation: higher control over the amount of income and having a recent increase in income are related to lower levels of alienation, beyond the effect of the level of income. The model portrays a picture of the effect of one's financial reality (objective and subjective) on one's feelings of alienation. We also consider theoretical and organizational implications of these findings.

THE RELATIONSHIP BETWEEN DIABETES, STRESS, AND PERSONALITY CHARACTERISTICS

Dr. Yael Brender-Ilan & Dr. Alexander Meirovich

Stress has been extensively studied as a factor of diabetes. In this research, we show that, in fact, diabetes is weakly related to stress, but is significantly related to the differences in personality types measured by the MBTI personality test. The sample included 569 out-patients of a hospital diabetes clinic, who completed a questionnaire that included 4 stress scales: Cooper's scale of psychological and physiological symptoms; An index of sources of stress; Holms and Rahe's Stressful life events scale; and the MBTI personality type test.

THE RELATIONSHIP BETWEEN INCOME AND PERSONAL ALIENATION

Dr. Yael Brender-Ilan, Dr. A.K. Korman & Mr. L. Monck

A common perception among managers and HR practitioners is that there is a consistent relationship between income and personal outcomes. High levels of income are believed to be associated with positive outcomes (life satisfaction, self-fulfillment, etc.), and low levels with negative outcomes (dissatisfaction, alienation, etc.). A review of the literature, however, suggests a more complex relationship, one that indicates the need for understanding the different conditions that might affect this relationship.

The current investigation explores the relationship between income level and one example of a negative personal outcome - personal alienation (PA) - a construct characterized by a sense of self-estrangement and isolation. We have conducted two studies on this topic. Study 1 found a negative, albeit weak, relationship between income and PA, one moderated by two psychological variables (Sense of External Control and Perceived Affiliative Cost of Success) and one demographic variable (gender). Study 2 extended these findings and also indicated that, in terms of variance of PA accounted for, psychologically relevant variables greatly increased the predictive ability of the model, in comparison to that of income alone.

PERSONAL AND SOCIAL ALIENATION: A CONSTRUCT VALIDITY STUDY

Dr. Yael Brender-Ilan, Dr. A.K. Korman & Mr. L. Monck

In this study, we have two concerns. One is to develop an overall definition and conceptualization of alienation, which we can then use as a basis of understanding in our later discussions. In this aspect of our discussion, we focus on two types of alienation. The first is personal alienation, which we view as a sense of estrangement from the self. The second is social alienation, which we define as a sense of estrangement from the social world in general as well as its specific manifestations (e.g., work, family, social institutions). Following these definitions and clarifications, we proceed to our second concern, which is to provide evidence for the construct validity of personal and social alienation, as we assess it in our research.

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PERSUASION STRATEGIES AND MARITAL POWER IN FAMILY CONSUMPTION DECISIONS, WITHIN AND OUTSIDE THE OCCUPIED TERRITORIES
Dr. Ya’arit Bokek Cohen*

Each spouse will often try to persuade the other in various ways that are part of a repertoire of influence tactics. Six influence strategies were described by French & Raven (1959): Expert, Legitimate, Bargaining, Reward/Referent, Emotional, and Impression Management. Expert influence is reflected in the spouse’s enumeration of specific information concerning the various alternatives. Legitimate influence deals with one spouse’s attempts to draw upon the other’s feelings of shared values concerning their role expectations. Bargaining involves attempts by one spouse to turn the joint decision into an autonomous one in return for some favor granted to the other spouse. Reward/Referent influence is based on the reward that the influencer can give the influenced, combined with the identification or feeling of oneness of one person with another. Emotional influence involves displaying some emotion-based reaction. Impression Management includes premeditated persuasive attempts to enhance one’s influence differential in a dyadic relationship. The conflict between the spouses is a reflection of the power balance between them and the persuasion is one manifestation of the power processes.

This study attempts to assess the power bases, which form the resource balance. Power bases are the personal resources that form the partner’s control over another. Such resources include education, income, occupational prestige, knowledge, skills or rewards. The main question of this study is whether and how the resources of each marital partner affect the power process, that is, the choice of the persuasion tactic during marital consumption conflict. The study focuses on four product categories: vacation (found in previous Israeli study to be equally dominated by wife and husband), living room furniture (found to be wife dominant), TV (found to be husband dominant), and housing decisions (decision to move to the occupied territories across the ‘green line’, never studied in Israel). The purpose of the study is to examine the persuasion strategies individuals use in family decisions and to compare them among the four product categories. The main goal is to explore the relationship between the by socio-demographic characteristics and the persuasion strategy employed and to describe the power balance between the partners.

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THE RELATIONSHIP BETWEEN PROFESSORS’ PHYSICAL ATTRACTIVENESS AND THEIR TEACHING RATINGS
Dr. Ya’arit Bokek Cohen* & Dr. Nitza Davidovich**

The effects of faculty’s beauty on teaching ratings in academic institutions have been rarely studied. The purpose of this study is to examine this effect and to explore sex differences of the raters and the ratees. The physical attractiveness of fifty five Professors was rated by their students and then correlated with their teaching ratings that were collected at the same course in the previous semester. The more attractive male Professors received higher ratings, only from female students. The more attractive female Professors did not receive better ratings, neither from male nor from female students. The main conclusion of the study is that men in academy benefit from a ‘beauty premium’, while women do not. This ‘discrimination’ stems from the contradiction between two types of images: role images and gender images. Since beautiful people are perceived as more characteristic of their gender, (i.e. a beautiful woman is perceives as more feminine and a man as more masculine) when the role image corresponds to the gender image, the ‘beauty effect’ benefit beautiful people. However, when there is a contradiction between them, as is the case with female Professors, the beautiful person does not merit the ‘beauty premium’.

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THE RELATIONSHIP BETWEEN SOCIO-DEMOGRAPHIC AND MORAL PERCEPTIONS OF INSTITUTIONAL INVESTORS AND THEIR ATTITUDES TOWARDS IMPLEMENTATION OF CODE OF CONDUCT

Dr. Ya’arit Bokek Cohen* & Dr. Doron Greenberg**

We developed a questionnaire aimed to examine institutional investors' attitudes towards various aspects of code of conduct, which is being suggested these days to directors of institutional investors. The goal of this research is to find out, whether socio-demographic and moral managerial perceptions are correlated with positive attitudes towards this code. 140 managers of institutional investors and investing counselors answered this survey. We found that managers that are more concerned with moral issues, have a longer tenure in the financial area, and have positive attitudes towards the suggested rules, have a higher tendency to support a mandatory code of conduct.

THE MARKET RESPONSE TO INFORMATION QUALITY SHOCKS: THE CASE OF ENRON

Peter G. Dunne¹, Prof. Haim Falk, John Forkera & Ronan Powel²

Relying on the market to provide incentives that would bring about optimal information quality is potentially a cost effective alternative to regulatory oversight. However, this depends on the ability of the market to recognize and price this attribute. In this research, we gain insights into the disciplinary role of the market by examining its response to Enron-related accounting scandals. We report evidence that information quality was in decline, leading up to the Enron-related scandals, but that the market was not sensitive to this decline. We confirm, however, that there was an abrupt decline in perceived information quality post-Enron. Furthermore, using an ex-ante methodology we provide strong evidence that auditor reputations were differentially affected by the scandals. We also find evidence that the Enron-related scandals adversely affected the market risk premium, implying that information quality is part of systematic risk. Our results indicate that the market was operating effectively in recognizing lower quality information through an auditor reputation effect prior to the Sarbanes-Oxley Act. This calls into question the need for regulation to address the perceived deficit in information quality.

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SOCIAL WORK IN ACADEMIC INSTITUTIONS IN ISRAEL – A COMPARATIVE STUDY

Prof. Shlomo Sharlin, Dr. Nitzah Davidovich* & Dr. Liora Birnbaum

This study was designed to gain insights into the characteristics of undergraduate social work students at the AUC as compared with their counterparts at Israeli universities. It was also designed to determine the correlation between several variables relating to the students (such as their personal, family and academic backgrounds, motives for enrolment in the program, and perceptions of the social-academic climate and spirituality) as well as the effects of these variables on their achievements. The research questions attempt to examine whether the variables that affect the students at the AUC affect students studying at other participating universities equally and what, if at all, is the correlation between the various variables. A comparative analysis of the two types of institutions of higher learning is an important key to understanding major developmental trends currently occurring in social work programs in Israel. The findings of the study confirm our hypothesis that the Israeli system of higher education is fundamentally a monistic system that is moving toward uniformity of institutions, while maintaining the unique character of each institution.

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ACADEMIC-SOCIAL CLIMATE IN SOCIAL WORK DEPARTMENTS – THE CASE OF ISRAEL
Dr. Nitza Davidovich*, Prof. Shlomo Sharlin and Dr. Liora Birnbaum

This study focuses on the academic and social climates in departments or schools of social work in academic institutions in Israel. In particular, the study examines the effect of student attributes (individual demographic and academic variables) on the academic and social climates in these departments through a comparison of social work departments in four academic institutions in Israel. There is much to be learned by looking at the academic and social climate in social work departments that are characterized by a unique organizational structure and provide practical training to students.

The present study also examines which of the variables under investigation constitute criteria for discriminating between the academic institutions. On the whole, do the academic and social climates in these departments, as a function of student profiles, reflect a binary system of higher education characterized by a clear division of labor between the various institutions that target different audiences, or do the data on academic and social climates point to a monistic system characterized by a similarity between academic institutions?

THE NON-CUSTODIAL FATHER’S INVOLVEMENT WITH HIS CHILDREN
Dr. Sharona Mandel and Prof. Shlomo A. Sharlin

This research focused on the nature and frequency of the non-custodial father’s (NCF) involvement in his children’s lives. The study also examined how this involvement was perceived by the non-custodial father himself, by the ex-wife, and by one of their children (10-16 years old), and showed how these perceptions influenced actual involvement. The sample included 102 families who had been divorced for at least two years. The findings indicate that most non-custodial fathers meet their children. Similarly, a positive correlation was found between NCF involvement as perceived by the father, the ex-wife and the child, and the father’s actual involvement. The findings are of relevance for the formulation of therapeutic applications in the divorced family, as well as changes in policy and awareness regarding the NCF’s role in the family.

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WHEN DISASTER BECOMES COMMONPLACE: REACTION OF CHILDREN AND ADOLESCENTS TO THE PROLONGED SUCCESSION OF TERRORIST ATTACKS IN ISRAEL
Prof. Shlomo A. Sharlin, Dr. Victor Moin1 and Rivka Yahav1

The aim of this study is to examine, in conditions of prolonged terror, the possible influence on children's reactions of yet another terrorist attack as an additional traumatic event, as well as to identify any mediating factors. The sample included 7+7 students in junior high schools in three Israeli cities. None of the participants were directly exposed to terrorist attacks, but they all lived with the possibility of daily terror.

The research focuses on fear as the most common and widespread reaction to terror and war. Short- and long-term symptoms of fear were studied. It was found that an additional terrorist attack had no significant influence on children's emotional, cognitive, or behavioral spheres. Terror that has become habitual becomes negligible. Children learn to adjust to loss without experiencing grief.

MULTIFACETED FEARS: REACTIONS OF CHILDREN AND ADOLESCENTS TO TERRORIST ATTACKS IN ISRAEL
Prof. Shlomo A. Sharlin, Dr. Victor Moin1 and Rivka Yahav1

The aim of this study was to examine adolescents' reactions to life under prolonged terror and the representation of these reactions in the various spheres of personality (emotional, behavioral, and cognitive), as well as the additive traumatic effect on children's fears of recent and concrete events of terror and the factors impacting adolescents' reactions to terrorist attacks.

The research consisted of four studies. Three studies, corresponding to three specific terrorist attacks, were conducted among pupils aged 10 to 15 in Israel. In each of the three studies, data were collected in two stages: shortly after the terrorist attack occurred, and one month following the terrorist attack. The fourth study was conducted among experts (psychologists, social workers, and students of social work). The experts were asked to predict the potential traumatic effect of various factors related to terrorist attacks on adolescents.

The research model included three groups of measures. The first characterized the level of indirect exposure to terror on various levels (country, community, group). The second group of variables measured the perceived reaction to terror of significant others (parents and friends). The third group measured the reaction to terror of the adolescents themselves (their fears, their behavioral and emotional problems, and changes they perceived in their own reactions to terror).

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GRANDCHILDHOOD - ADULT GRANDCHILDREN'S PERCEPTION OF THEIR ROLE TOWARDS THEIR GRANDPARENTS FROM AN INTERGENERATIONAL PERSPECTIVE

Dr. Ahuva Even-Zohar & Prof. Shlomo Sharlin

The study focuses on adult grandchildren's role towards their grandparents as perceived by both generations, grandchildren and grandparents. A definition of the role of the adult grandchild is proposed which includes expectations and obligations deriving from that role. The main theories that provide the conceptual framework for this study are symbolic interaction theory, exchange theory, and the intergenerational solidarity model.

The sample included 216 pairs of adult grandchildren and their grandparents, all Jewish residents in the central region of Israel, who responded to closed questionnaires. The main findings demonstrate that grandchildren definitely possess a perception of filial obligation and responsibility toward grandparents, and in fact they express more positive opinions than the grandparent regarding this responsibility. As expected, it was found that perception of the grandchild's role is more positive among grandchildren who experienced their grandparents as caregivers during childhood than among grandchildren who did not. Additionally, the role perception of adult grandchildren is shaped by intergenerational transfer and internalization of the norms and behavior patterns of their parents.

The practical significance of the research results relate to the clinical field of social work. The view that adult grandchildren are an integral part of the grandparent's total support network will contribute to comprehensive psycho-social evaluation and to the development of family treatment programs that include the third generation.

THE INTERACTION BETWEEN ADULT GRANDCHILDREN AND THEIR GRANDPARENTS IN DIFFERENTIAL SITUATIONS OF GRANDPARENTAL FUNCTIONING FROM THE PERSPECTIVE OF THE TWO GENERATIONS

Dr. Ahuva Even-Zohar

This study examines the interactions that take place between grandchildren and grandparents – as perceived by both generations – in three groups differentiated by level of functioning: independent grandparents; physically frail grandparents requiring partial assistance; and dependent grandparents needing full assistance in all aspects of the activities of daily life. The intergenerational solidarity model provided operative dimensions that helped explain and measure the quality and characteristics of these relations. The sample included 216 pairs of adult grandchildren and their grandparents, Jewish residents in the central region of Israel, who responded to closed questionnaires. The main finding was that the frequency of telephone contact between grandchildren and grandparents is higher in the independent grandparent group than in the other groups. In addition, it was found that the factor of geographic proximity to the grandparent is a predictor for the dimension of contact between the two generations. About the functional dimension, the research results indicated greater assistance by grandchildren to the group of grandparents who need partial and full help. For all grandparents there was a positive correlation between emotional levels on the one hand and contact frequency between grandchildren and grandparents as well as provision of actual assistance by grandchildren to grandparents on the other. It appears that the affectional dimension is a necessary condition and suffices for contact and functionality, whereas the consensual dimension is not crucial.
RECONSTRUCTING THE LOSS: HANTZACHA – COMMEMORATION FOLLOWING THE DEATH OF A SPOUSE IN A TERRORIST ATTACK

Dr. Chaya Possick

One of the ways that family members cope with the deep sense of emptiness and the severance of continuity following the loss of a loved one in a terror attack is through commemoration. This qualitative study examined the process and products of commemoration by Israeli adults whose spouses were killed in terrorist attacks on the West Bank. The analysis of in-depth interviews revealed four different types of commemoration: tangible-private, tangible-public, intangible-private, and intangible-public. The study describes and analyzes the ways in which spouses of terror victims negotiate between the personal and collective aspects of the loss and bereavement via commemoration within the context of the Jewish-Israeli culture.

THE FAMILY MEAL: AN EXPLORATION OF NORMATIVE AND THERAPEUTIC RITUAL FROM AN ETHNIC PERSPECTIVE

Dr. Chaya Possick

Family rituals are a rich source of meaning on behavioral, cognitive, and emotional levels. This study explores the meaning of a particular type of family ritual, the family meal, within a particular cultural context, the Jewish/Israeli ethnic perspective. The use of normative, mealtime rituals to help families change and heal is described. Mealtime rituals enable the therapist and the family to construct universal family processes, while at the same time allowing for a contextual assessment of the particular cultural and historical meanings and resources of the family in therapy. Two case examples illustrate the use of the family meal as the basis of therapeutic interventions.

MOTHERS’ HEALING RETREATS: A MULTI-MODAL INTERVENTION WITH BEREAVED MOTHERS OF TERROR VICTIMS

Dr. Chaya Possick

One aspect of the Israeli experience of traumatic loss as a result of terror attacks is the process of bereavement undergone by the victims’ families. In the aftermath of these traumatic losses, a wide range of concrete and psychosocial services have been developed to meet the needs of these families. This study examines one such program, namely healing retreats for bereaved mothers. The retreat is designed as a holistic program that integrates various therapeutic approaches in a total group environment based on Lazarus’s multi-modal approach to brief psychotherapy. We show how the program operationalizes the theoretical principles of the integrative treatment of traumatic loss.

REFLEXIVE POSITIONING IN A POLITICALLY SENSITIVE SITUATION: DEALING WITH THE THREATS ASSOCIATED WITH RESEARCHING THE WEST BANK SETTLER EXPERIENCE

Dr. Chaya Possick

For the past seven years I have conducted qualitative research projects revolving around the experiences of West Bank settlers. The political situation in Israel in general, and the West Bank in particular, has undergone rapid and dramatic political, military, and social changes during this period. In highly politically sensitive situations such as this, the researcher is faced with physical, professional, emotional, and ethical threats. This study focused on a conceptual discussion and case illustration of the use of four types of reflexive positioning – identification with respondents, emotional enmeshment, personal associations, and auto-ethnography. These reflexive positions reduce risk to the trustworthiness of the research and transform threats into opportunities to enrich qualitative data analysis.

COPING WITH THE THREAT OF PLACE DISRUPTION AMONG LONG-TERM JEWISH SETTLERS ON THE WEST BANK

Dr. Chaya Possick

This research presents a qualitative analysis of place disruption as experienced by settlers on the West Bank during the Oslo Peace Process. The findings demonstrate that place ideology develops and persists as a response to stress. The research concludes with the importance of addressing ideological issues in social work interventions.

PARENTS’ EXPERIENCE AND MEANING CONSTRUCTION IN THE LOSS OF A CHILD IN A NATIONAL TERROR ATTACK

Dr. Chaya Possick

We have undertaken a qualitative study aimed at exploring the meanings that are given by parents to the loss of their children in terror attacks in Israel and examining how specific aspects of these meanings help or hinder them in coping with the loss. The focus is on one main theme – the collective context of loss – that emerged from in-depth interviews with 16 bereaved parents who lost their children in different terror attacks. The collective context of loss includes three sub-themes: a) the loss in the context of Jewish and Israeli history; b) assigning responsibility for the loss; c) using the collective meaning in the process of coping. Overall, the findings highlight the role of the socio-cultural context in the bereavement process, which involves both the bereaved parents and the traumatized society. The discussion raises possible explanations for the significance of this role, focusing on the reciprocal processes between the bereaved parents and society, which are functional and effective for both.
ABUSED HAREDI WOMEN
Dr. Nicole Dehan & Prof. Muhamad Hajyah

Now more than ever, domestic violence is recognized as a serious social problem. This phenomenon exists in most societies and Haredi society is not an exception. Although research on abused women has shed some light on this phenomenon, almost no one has investigated the cultural particularities of the phenomenon in Haredi communities. It would be important to investigate how domestic violence evolves and develops in this milieu, as well as how abused Haredi women interpret their experiences and cope with them. Moreover, the exploration of the reactions of their families, communities, and religious authorities would be especially significant.

The study is a qualitative research based on semi-opened face to face interviews with abused Haredi women. The main focus of this study is to explore the women’s stories, to emphasize what is unique about the domestic violence in this particular social context and to identify the factors, people, and services facilitating their rescue from the violence and those hindering it.

This research will help to promote the acknowledgement of this phenomenon in Haredi communities, recognize its unique cultural particularities, and understand the coping strategies of abused Haredi women. In addition, it should also provide indicators towards developing culturally sensitive ways of intervention adapted to the Haredi population.

CAREER FOLLOW-UP OF THE GRADUATES OF SOCIAL WORK PROGRAMS FOR HAREDI STUDENTS
Dr. Nicole Dehan

The Hebrew University of Jerusalem was the first academic institution to provide a special off-campus program for the retraining of Haredi women in social work. This initiative began seven years ago and lasted two cycles. Bar-Ilan University opened a program for Haredi men six years ago, which lasted one cycle, and then a program for women was opened, which is meanwhile still running.

What happened to these Haredi graduates? Are they employed in the field of social work? Do they work exclusively with Haredi population or serve diverse sectors of the Israeli society? How do they look back at the programs and their contents?

In this research project, we will attempt to do a follow-up on those students and their professional track. Questionnaires and open-interviews, using both the graduates and their employers as informants, will be the main data collection methods.

A research of this kind is expected to contribute to a better understanding of the impact of such programs on the engagement of Haredim in the social work profession and the provision of culturally sensitive social services.

THE REORGANIZATION OF MENTAL HEALTH SERVICE SYSTEM IN ISRAEL, 1972: FACTORS FACILITATING AND HINDERING REFORMS TOWARDS A COMMUNITY MENTAL HEALTH SERVICE SYSTEM
Dr. Uri Aviram1 and Dr. Nicole Dehan

The present study uses the reorganization of mental health service system program of 1972 as a case study. This program aimed transferring the locus of the mental health services from psychiatric hospitals to the community. The study surveys the events that took place around the reform efforts, identify and discusses the interest groups, main issues and points of conflict. It especially tries to understand why the efforts to implement that reform failed, identifying factors that hindered the change of policy and those that could have facilitated it. The analysis helps assess mental health policy trends in Israel and suggests ways to promote the desired reform of the mental health service system which was first suggested in the early 1970s.

1 Hebrew University
ISRAELI YOUTH REACTIONS TO POLITICAL VIOLENCE
Dr. Yaira Hamama-Raz & Prof. Zahava Solomon

This study examined the psychological responses of two groups of adolescents – Jewish Israeli and Palestinian Israeli - to the violence that raged in both the Israeli and Palestinian communities in the wake of the second Intifada that erupted in September 2000.

The study sample consisted of 1,758 adolescents aged 16 years - 1482 Jewish Israelis and 276 Palestinian Israelis. All participants were drawn from schools in several areas, which differ in their level of exposure to terror. The reason for this spread was our wish to address the question of how and whether differences in the day-to-day manifestations, degrees, and contexts of political violence affect the adolescents' psychological responses to it.

The study participants were asked to fill out seven self-report questionnaires tapping the issues under investigation. In addition to personal data, the questionnaires examined PTSD, posttraumatic growth, distress, attitudes towards peace, along with objective and subjective exposure to political violence and willingness to forgive. The questionnaires were administered in schools in Israel, after the required permission was obtained from the relevant ministries and school principals, and after informed consent was obtained from the study participants.

The relevance of the study is anchored in the fact that the study was carried out among adolescents, who are the people that will make war or peace in the future. There are grounds for believing that less traumatization, more posttraumatic growth, and, in particular, the readiness to forgive may reduce aggression and help to facilitate the process of reconciliation between groups that have suffered violence. Our expectation is that the study will yield a better understanding of factors that may help to ameliorate the psychological damage of violent conflicts, to facilitate posttraumatic growth in the wake of such conflicts and to promote positive attitudes towards peace and peace talks.

1 Tel Aviv University

PSYCHOLOGICAL ADJUSTMENT OF MELANOMA SURVIVORS: THE CONTRIBUTION OF HARDINESS, ATTACHMENT, AND COGNITIVE APPRAISAL
Dr. Yaira Hamama Raz, Dr. Zahava Solomon

The study examines the contributions of hardiness, attachment style, and cognitive appraisal to the psychological adjustment of 300 survivors of malignant melanoma. The findings show that the survivors' adjustment is far better predicted by their personal resources and cognitive appraisal than by their socio-demographic features (with the exception of marital status) and features of their illness. Of all the variables, their adjustment was best predicted by their attachment style, with secure attachment making for greater well being and less distress. These findings add to the ample evidence that personal resources help persons to cope with stressful or traumatic events.

OBJECTIVE AND SUBJECTIVE STRESSORS AND THE PSYCHOLOGICAL ADJUSTMENT OF MELANOMA SURVIVORS
Dr. Yaira Hamama Raz, Dr. Zahava Solomon, Jakob Schachter, Ester Azizi

This study of 300 melanoma survivors examines the relative contributions of objective illness related factors (stage of illness at diagnosis, time since diagnosis, and change in physical condition) and of subjective factors (cognitive appraisal) to their psychological adjustment. The findings show that lower appraisal of their situation as a threat, higher appraisal of it as a challenge, and higher appraisal of their subjective ability to cope with it all increased their well being, while lower threat appraisal and higher appraisal of subjective ability to cope also reduced their distress. These findings, which are consistent with Lazarus and Folkman's stress coping theory, suggest that subjective factors may be more important than objective medical factors in predicting patients' adjustment. With this, more advanced stage at diagnosis contributed to reducing distress, while being married contributed both to higher well being and reduced distress.

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2 Division of Oncology, Sheba Medical Center, Tel-Hashomer, Israel
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PERITRAUMATIC DISSOCIATION AND POST-TRAUMATIC REACTIONS AMONG RESCUE PERSONNEL AFTER EXPOSURE TO A TRAUMATIC EVENT

Dr. Menachem Ben-Ezra, Dr. Nir Essar¹ and Ronen Saar²

A. Post-traumatic reactions among rescue personnel before and after exposure to trauma

Few studies have focused on rescue personnel before and after exposure to trauma. We examined peritraumatic dissociation and post-traumatic reactions among rescue personnel in a rescue course as well as 36–48 h after exposure to a gas pipe explosion in Tel Aviv. All the rescue personnel were examined for peritraumatic dissociation and post-traumatic reactions. Only those for whom there were prior measurements of peritraumatic dissociation and post-traumatic reactions were considered eligible for analysis. The results showed that the only significant increase among rescue personnel was in peritraumatic dissociation after exposure to trauma as compared with before. No significant change was found in avoidance, intrusion, and post-traumatic symptoms. These results agree with previous studies that found increased peritraumatic dissociation among rescue personnel as a function of exposure severity. Possible explanations for these results were explored.

B. Gender differences and acute stress reactions

The immediate impact of exposure to dead and mutilated bodies was assessed among rescue personnel 36 to 48 h after a collapsed building disaster in Tel Aviv. Twenty-five rescue personnel, 9 men and 16 women, completed a battery of questionnaires that included the Dissociative Experience Scale and the Impact of Event Scale, which are designed to detect acute stress reactions. The authors compared gender differences in the severity of the acute stress reactions. These comparisons revealed no difference between male and female rescue personnel. The implications of these results for acute stress reactions and gender differences among rescue personnel were examined.

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2 Israel Defense Forces, Israel

C. The association between peritraumatic dissociation and acute stress reactions

The association between peritraumatic dissociation and acute stress reactions was assessed among rescue personnel 36–48 h after exposure to a gas pipe explosion resulting in a collapsed building in Tel Aviv. All the rescue personnel were examined for peritraumatic dissociation and acute stress reactions. The results showed that among men there was a negative association between peritraumatic dissociation and acute stress reactions. Among women, there was a positive association between peritraumatic dissociation and acute stress reactions. These results correspond with previous studies that found an association between peritraumatic dissociation and acute stress reactions. Possible explanations for these results were explored.

PREDICTORS OF MORTALITY IN THE OLD-OLD IN ISRAEL: A CROSS-SECTIONAL AND LONGITUDINAL AGING STUDY

Dr. Menachem Ben-Ezra and Prof. Dov Shmotkin¹

In order to examine whether well-known predictors of mortality change their predictive power over time, being reduced or even reversed in the old-old, we carried out a multidimensional survey of the Cross-Sectional and Longitudinal Aging Study conducted in Israel from 1989 to 1992, with follow-up of mortality after 6, 8, 10, and 12 years since 1989. The participants (N=1,369) were drawn from a national sample of the Jewish Israeli population aged 75 to 94. Data included sociodemographic factors and measures of health, physical condition, cognitive performance, and depression. The results showed that age, sex, disability, self rated health, and marital status predicted mortality, and that the predictive power of these parameters changed over 9 years. In the old-old, predictors of mortality changed over time, and their predictive effect eventually diminished. The predictors found to be most significant (age, sex, disability, and self-rated health) support the common cause theory.

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IMPACT OF PROLONGED WAR STRESS ON POST-TRAUMATIC STRESS SYMPTOMS AMONG HOSPITAL PERSONNEL
Dr. Menachem Ben-Ezra, Dr. Yuval Palgi, Dr. Nir Essar

This study examines the relationship between exposure to war stress and post-traumatic symptoms among nurses and physicians in a general hospital targeted by missiles. Hospital staff who were exposed to missile attacks and casualties of war, both military and civilian (n = 80), were assessed for post-traumatic stress disorder (PTSD) symptoms a month after the war between Lebanon and Israel erupted (during the last days of the war). High levels of PTSD symptoms were found in 10.5% of physicians and 35.7% of nurses. Logistic regression analysis showed that nurses had an increased risk for PTSD as compared with physicians. These findings show that nurses suffered from more severe post-traumatic symptoms than did physicians after exposure to prolonged war stress. The gap between physicians and nurses warrants further study.

THE ASSOCIATION BETWEEN PERitraUMAtIC dISSooCIAtIoN AND ACuTE StreSS reACtIoNS AMOnG reSCuE PerSonneL 96 HOuRS AFter tHe HiLTON HOTel BOmBiNg iN SiNAI
Dr. Nir Essar, Dr. Yuval Palgi, Dr. Menachem Ben-Ezra and Ronen Saar

The association between post-traumatic stress symptoms and dissociative symptoms was examined among the entire team of 26 rescue personnel 96 hours after exposure to the Hilton hotel bombing in Sinai, Egypt. The results showed that even after controlling for age and previous exposure, the correlations between both intrusive and avoidant symptoms with dissociation remained significant. This study is in line with earlier studies that have revealed a significant association between post-traumatic stress symptoms and dissociation. The study extends the timeline of the relationship found. In addition, this field study extends the relationship between both intrusion and avoidance symptoms with dissociation beyond the medical setting.

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THE JEWISH PeOPEl AND ItS AFFInItY To tHE PROMiSED LAND ACCORDInG tO tHE QUr’AN And ItS exeGeTEs
Dr. Nissim Dana*

In the Islamic world, deep faith is placed in the hierarchy of sacred literature: the Qur'an, the Hadith (oral law), and the exegetes of the Qur'an, who constitute a very important source of the crystallization of the faith and the way of life of the average Muslim.

Even the bitter Jewish-Arab political struggle, which has gone on for more than one hundred years, is nurtured by religious motifs. More and more, one hears Islamic religious statements that deny any affinity between the Jews and the land of Israel, Jerusalem, and the Temple Mount. On the other hand, these statements claim Islam's exclusive connection to these locations. References to this religious-political confrontation are typically accompanied by a negative attitude toward the Jewish people, its relationship to the land of Israel, and even toward the Torah of Israel.

However, a close reading of the Qur'an and of its exegetes, as well of the Hadiths, leaves no doubt that the above statements do not accord with the classic Islamic sources.

The aim of this research is to collect everything that is written in the Qur'an, by its exegetes, and in the oral law of Islam about the people of Israel, its land, and its Torah, in order to draw a comprehensive picture of the opinion of Islam and its sects throughout he history in regard to these issues. The research will similarly relate to scores of other Islamic sources that can contribute to clarifying this important aspect of relations between Israel and Ishmael.

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EDITION OF THE RESPONSAS "BET DINO SHEL SHEMUEL"
Dr. Leah Makovetsky

A Respona Book from Aleppo from the 18th Century by Rabbi Shemuel Laniado. The Manuscript of this book contains 400 pp. The dozens of the halachic decisions of this volume give very significant information about the Jews of Syria and Iraq during the 18th century. Most of it is new material for the historians of the Syrian and Iraqi Jewish communities, especially in the area of the social and economic status of the Jewish society in those lands.

PROTESTANT MISSIONARY ACTIVITY IN THE 19TH CENTURY AMONG THE MIDDLE EASTERN JEWISH COMMUNITIES AND THE CONVERSION OF JEWS TO ISLAM AND CHRISTIANITY IN THE JEWISH MIDDLE EASTERN COMMUNITIES IN THE SAME CENTURY
Dr. Leah Makovetsky

The topic of this research is the popularity of missionary activity in the 19th century and its impact on Jewish communities in the Middle East. The research material on these topics is quite scant except that concerning Christian missionary activities in Palestine during the 19th century. My intention is to give maximum detail about the reasons for Christian missionary activity, the achievements and failures of the Christian mission societies, and their educational activities among Jews in the Middle East. I additionally deal with the popularity of conversion to Christianity and Islam in Jewish society itself and the influence of this phenomenon on the community in the 19th century.

THE TEACHING OF RABBI ELIA BENAMOZEGH
Meir Seidler*

The main field of research is modern Jewish philosophy and the challenge of modernity. I deal mainly with traditional German-Jewish thinkers (most of them orthodox), from Mendelssohn to Rosenzweig, who made the main philosophical contribution in this area, in the 19th century. There were also thinkers outside the German-Jewish context, who paved their own philosophical way while dealing with the main currents of European philosophy. One of them was Rabbi Elia Benamozeh (1823-1900) of Leghorn in Northern Italy. The writings of Rabbi Benamozeh are a major focus of my research.

R. Benamozeh wrote his works in three languages: Hebrew, Italian and French. Like his German-Jewish orthodox contemporaries, R. Benamozeh approached European culture with a daring openness and like them he tried to formulate a coherent Jewish position on matters of crucial importance for thinking Jews of his (and of our) time. His thought confronts issues like particularism and universalism (i.e. Israel and the nations), religion and state (i.e. religious coercion), heteronomy and autonomy (man’s freedom), religion and nationhood, religion and (natural) sciences, Biblical criticism and more.

R. Elia Benamozeh seems to be the first and foremost Sefardic thinker in the 19th century who tried to find a systematic and comprehensive answer to these questions in light of modern thinking. He was a prolific writer and his contribution is important, as he is considered a genuine master of Kabbala and his attempts at harmonizing Jewish and European culture are expressed in the framework of his kabbalistic conceptions, a truly unique approach which cannot be found among his mainly German-Jewish counterparts.

There is still much work to be done in the research of his numerous tri-lingual writings.

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THE TRIFOLED STRUCTURE IN SUGYOT OF TRACTATE ERUVIN

Dr. Uri Zur*

The project is designed to emphasize the literary aspects of Talmudic sugyot and, in particular, the variety in forms of the thrifold structure of sugyot, and their development until their final form.

The research program aims to examine the sugyot in Tractate Eruvin in each of its ten chapters, 105 pages, and identify the sugyot that are characterized by a thrifold structure, specify its unique nature, chart its scheme, and use Talmudic research tools to highlight these features.

The methodology is to compare each sugya to all manuscripts of Tractate Eruvin, fragments of the Geniza, Yerushalmi Talmud, Ge’onim literature, Rishonim and Acharonim, and Talmudic studies. The thrifold structure of Talmudic sugyot can either be explicitly or implicitly expressed in all the above sources, and this constitutes evidence or support for the thrifold structure of the sugya. Discrepancies and modifications in this extensive Literature, relative to sugya at hand, shed light on the process of formation of the thrifold structure.

Theory was developed on the basis of study and analysis of several sugyot from different tractates. According to this theory, the thrifold structure of sugyot (that is their formalistic dimension) constitutes a dominant feature in the sugya’s editing, to the extent that it had a significant impact on the content of the sugya.

In other words, contents added to, eliminated from or modified in the material by the redactors were designed to form and establish this threefold structure.

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A POLYVALENT READING

Dr. Amnon Shapira

The study offers a new method in reading literature – "A Polyvalent Reading". It deals with "Connotative Reading" of the Bible (and of many other types of literature as well).

This method is the result of a recent general trend toward Intertextuality, as defined by Julia Kristeva, and the Russian post-formalist Batchin, and was applied to the Bible by the American professor Michael Fishbane in his book, Biblical Interpretation.

In this study, five chapters are isolated from the Bible (from the stories about Jacob and Esau in Genesis), and each word is examined in relation to its prevalence in the Bible. When there is a word which appears a multiple of times in a particular context and this word seems to take on a new meaning in a majority of cases it additionally takes on this new meaning. Thus, a new language is uncovered, hidden under the existing one.

DEMOCRATIC VALUES IN THE BIBLE

Dr. Amnon Shapira

The study deals with Democratic Values in the Bible.

In 1943, the Assyriologist Th. Jacobsen published an article entitled: Primitive Democracy in Ancient Mesopotamia. He claimed that the first "Democracy" in the world existed in Mesopotamia in the 28th century BCE. This theory is the currently accepted one in modern Near Eastern research. In the current study, this theory is applied to the Bible, using a non-historical, literary-rhetorical approach. This study does not claim to establish an "ancient democracy" in the Bible, but rather prove that many of the basic values of democracy appear in the literary subtext of the Bible. These include Dignity of Man, Freedom, Equality, Opposition, Separation of Powers, etc.
RELIGIOUS JEWISH ANARCHISM
Dr. Amnon Shapira

"Jewish Anarchism" is a non violent movement, which focuses on the wish to bring about 'tikkun olam' (world repair) through peaceful means and deals with the communal structure of the people of Israel.

As opposed to Catholicism, which is based on a hierarchal Church with the Vatican at its peak, Judaism is non-centralized. Its leadership consists of a gallery of sages who carry on a dialogue between themselves, and the Jewish orientation is communal. One explanation for the miraculous survival of the Jewish people throughout two thousand years of exile is its ability to construct an autonomous framework of communalism, which had social and organizational elements which served as a substitute for a country. This is a modern expression of Anarchism: "less state and more communalism/society." Today's communal activity is not meant to replace the country's government, as this is not possible; but this activity certainly serves as a challenge to it (as may be seen today in the activities of Israel's "Third Sector," with the assistance of thousands of social NPOs).

According to this study, the Bible prefers the "federal" Judge over the centralized King. The great 15th century Bible commentator, Don Yitzhak Abarbanel, was well aware of this when he claimed that the most corruption ever experienced by the Jewish people was in the days of the First Temple and was clearly caused by the kings. This viewpoint has much support in modern times. Two supporters of this outlook are the late Professor Martin Buber, a well-known philosopher from Hebrew University and Professor Gershom Sholem (winner of the Israel Prize for research of the Kaballah and president of the National Institute for Sciences). The latter claimed that "the Anarchist theory is, in my opinion, the only significant social and religious theory."

Hopefully this research will better enable us to investigate the earlier works of Sholem and Buber.

NATURE AND LANDSCAPES IN THE BOOK OF PSALMS - OBSERVATIONS OF THE RELATION BETWEEN MAN, NATURE AND GOD
Abraham Ofir Shemesh*

The Book of Psalms contains a wide range of literary forms, but it seems that nature related images and metaphors are particularly recurrent. Many examples from nature, from the world of animals, from the seasons, from natural phenomena and descriptions of landscapes of the Land of Israel abound. The literary and theological ideas that were treated in my research are as follows:

- Nature is a source of spiritual inspiration. The Song to Nature in the Book of Psalms symbolizes best the relationship between man and nature and the bond between the material aspect of life symbolized by nature and the spiritual aspect of life. The elements taken from nature and landscapes are material, 'plastic', and help man in his attempt at touching the infinite.

- Cosmic pluralism and random occurrences cause events to look like forces are disconnected from each other, and for some, even destructive, but through the Psalms we understand that they are dominated and masterminded by a superior force. Therefore, we observe, that it is not war, hazard, chance or chaos, but a worthy harmony that brings concentration and comprehension "In wisdom you made them all...." (Psalm 104:24). This approach in the Book of Psalms is parallel to theological DA (the Design Argument) theory that takes the order of the world as evidence of the existence of a super intelligent entity.

- Observation of Nature and the Universe allows man to situate himself in the ecosystem. As for the author of the Psalms, he uses them often to express his own evaluation or criticism. By these means, man gets a different perspective of his own relative dimension, which helps him comprehend his own limits in the infinite. On several occasions, King David describes his helplessness, his weaknesses and his problems, using metaphors drawn from nature. The flowers cycle of life from blooming to withering, resembles human destiny, for example. Furthermore, through motives taken from nature, he shows his devotion and faithfulness to God.

The fact that these songs attributed to King David contain many allusions to nature seems to reveal the very deep relationship between David and nature. He spent his childhood and youth in nature and this is why elements taken from nature help him show his religious feelings, his thoughts and his ideas and allow us to evaluate the world in the same light.

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"CROWN WHICH HIS MOTHER GAVE HIM AT HIS WEDDING" (SONG OF SONGS, 3, 11): THE REGALIA OF WEDDING CROWNS IN ANCIENT WORLD

Abraham Ofir Shemesh*

Customs, tools and objects are integral parts of religious rituals or Rites of Passage in many cultures. The goal of this research is to describe the use of crowns in wedding ceremonies in the Biblical period and in our Sage's period. We will examine the regalia of the phenomenon and deal with the materials and the modeling of these wedding crowns.

The Bible mentions many kinds of crowns: 'Keter', 'Ateret', 'Nezer', 'Tziz'. These terms express different variations of crowns, which were made of many kinds of materials and were used by different people. In the Biblical period, brides dressed up in special ornaments (see: Isha, 61, 10), but, there is no mention of a bridal crown. The custom of putting a crown on bridegrooms' heads during their wedding ceremonies was first mentioned in Song of Songs, 3, 11, in a description of King Solomon's wedding. The crown was not only a jewel, but also symbolic and a status object. Crowns ('Atarot') were common jewels to kings and bridegrooms. It seems that the crown was a symbol for the 'royal' position of the bridegroom in the wedding ceremony.

In the Sages literature crowns were mentioned under many names such as: 'Kliil', 'Kliila', 'Ateret Klula' and 'taga'. According to these sources the basic materials for preparing crowns were numerous: 1. Expensive metals (gold); 2. Minerals (salt, sulfur); 3. Plants and flowers (rose, myrtle, olive, and cane). There were also colored crowns that were colored with purple ('Argaman'), azure ('Tchelet') and scarlet ('Tolat shani') dyes. In this research we will also describe these materials and deal with their uses for preparing crowns in Greek and Roman ancient world.

RABBI MANOHA'S BOTANIC REASON FOR THE PROHIBITION OF EATING LEGUMES ON PASSOVER

Abraham Ofir Shemesh*

This research addresses a botanic reason, which explains the prohibition of eating legumes on Passover. Rabbi Manoha (Provenance 14th century), is credited in developing this opinion.

According to Rabbi Manoha, 'Vichas' (Vicia) is wheat, which because of various reasons is changed from a grain to a legume in Europe. Ancient people thought that after growths, common in legume development were a harvest that changed grains to legumes. We assume that agricultural innovations during the Middle Ages, including three field crop rotations of grains and legumes, popular in European fields of the time, increased the after growths among the harvest of wheat and other grains in a particular growing season, and strengthened the concept that a grain changes to legume.

This ancient theory was common in the East and West from the classic period until the Middle Ages. Mention of this theory are found in the scriptures of Pliny (23–79 A.C) and Great Basil (329–379 A.C), and in the Jewish literature of the time. It seems that this theory of legumes must have regained popularity at Rabbi Manoha's time. Since this was not a well based theory and caused many disagreements many sages rejected it as irrelevant.

"VENIF YADO EL HAMAKOM VEASAF ET HAMETZORA" (2 KINGS, 5, 11): TOUCH AND HAND MOTIONS AS MAGIC TECHNIQUES FOR A LEPROSY CURE

Abraham Ofir Shemesh*

According to 2 Kings, 5, 11, Elisha suggested to Nahaman, the Aramaic military commander, that he dip into the waters of the Jordan River to cure his leprosy. In contrast with that, Nahaman expected that Elisha would move his hand over the afflicted organ and cure it, as this was the accepted cure for leprosy in the ancient magic/medical rite. This research suggests two commentaries for the usage of the term 'הנפת יד.

1. Touch - It seems, from the Bible and Ancient Eastern literature, that body touch transferred the vital forces. The Midrash and the Genesis Apocryphon of Qumran cave 1 (1QApGen) claimed that bad spirits caused leprosy, but a priest might cure it by putting his hands on the leper.

2. Waving hands over leprosy (without touching) – Moving hand or objects was considered a creative action, such as in case of miracles and sacrifices. Therefore moving hands over the leprosy ought to expel the bad spirits, which attacked the sinner. These commentaries will better help us understand these various cure techniques.

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SORGHUM IN THE DIET AND TRADITION OF YEMENITE HALACHA
Abraham Ofir Shemesh*

Sorghum had an important place in the diet of Yemen’s Jews. This was especially common in regions, such as Sharab, where wheat did not grow at all. This reality caused many halachic problems concerning the appropriate blessing for sorghum and the custom to make Kidush on Sabbath with wheat bread.

The first signs of doubt about the ‘sorghum bread’ blessing arose in Yemen’s community in 13th century. According to a request of the Yemenite community, Rabbi Abraham ibn Mimon determined that the ‘sorghum bread’ blessing was ‘sheakol’. In addition due to the spreading of Rabbi Yosef Karo’s halachic authority, many rabbis preferred Karro’s opinion to bless the sorghum bread ‘Sheakol’. One of these supporters was Rabbi Yichye Tzalach (18th century) and his interference on this issue had a great influence on the blessing custom in Yemen.

There were many rabbis in the history of this Halacha who objected to this suggestion and they took a minority opinion claiming that because of the importance of sorghum in the Yemenite diet its’ blessing should be ‘Mezonot’.

SYPHILIS IN JEWISH SOURCES: MEDICAL, HALACHIC AND ETHICAL ASPECTS
Abraham Ofir Shemesh*

Syphilis is a sexual disease, which is rare today. This research discusses the historical and medical-halachic background of syphilis according to Jewish Scripture in the Middle Ages.

For the first time in the history of the Jewish law, the sages of the 16th century discussed syphilis. They specifically addressed the relationship between the syphilis patient and his wife. Period sources describe syphilis as a skin illness with wounds that cover the patient’s body. There seems to have been some confusion between syphilis and leprosy and it was hard for the ancient physicians to distinguish between them.

Many sages claimed that the syphilis patient must divorce his wife, when his smell is bad or his skin has peeled off. Others claimed that only a leprosy patient must divorce his wife, because leprosy had no cure, but that the syphilis patient did not have to divorce because syphilis had a cure.

We can assume that the introduction of the syphilis discussion in rabbinical sources of this time coincides with the outbreak of the syphilis plague in Europe at the end of the 15th century and throughout 16th century.

RABBI KOOK’S RELIGIOUS DECISIONS ON SUBJECTS RELATED TO ECOLOGY IN ISRAEL: HALACHA AND IDEOLOGY IN CONTEXT
Abraham Ofir Shemesh*

At the beginning of the 1920’s, Rabbi Kook was the rabbi of Jaffa and the new Jewish colonies in the Middle East. He was widely consulted about his opinions on many different subjects. He mainly based his decisions on three different grounds: the world of Halacha, the actual prevailing local context and the Zionist ideology by which the Jews were building their homes in Eretz Israel and reviving agriculture on this land.

He was conscious of the importance of his role in that historical period, particularly rich in changes for the region like the return of the Jews to the homeland as well as the rebirth of Jewish agriculture.

He therefore decided that he had to base his decisions on the preexisting Halacha as well as develop new solutions for problems that had no Halachic precedent. For example, when he was asked by the Rehovot Council how to handle the problem of goats destroying almond trees, he used a law (takana) from Hazal (our Sages) that forbade the farmers to breed goats in Eretz Israel. He followed this path despite opposition from other rabbis who maintained that this decision was no longer valid. He believed that that decision should be revalidated since the Jews had returned to Eretz Israel and they had to deal with agriculture questions about this land.

For questions regarding private property and the rights of the public, like the expropriation of lands for the construction of a well or the widening of a road, he favored decisions that emphasized the development of the settlements and the well being of the public.

Rabbi Kook, who was a consensual religious personality, would be called upon to serve as an arbitrator in a case of damages caused by chicken farming as well as in a case where damages had been inflicted on eucalyptus trees that had been planted around the houses to fight against malaria. In each case, he gave a different decision but in both matters he recommended that specialists in those specific areas be consulted.

Rabbi Kook was a well respected authority in the various communities in the newly formed Jewish colonies in the Middle East and he changed the face of the Halachic rulings of his time. His decisions continue to affect the community to this day.

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BIOLOGY IN RABBINIC LITERATURE: FACT AND FOLKLORE
Abraham Ofir Shemesh*

The intellectual worlds of the Sages, and the doors of the houses of learning, were open to debates on information in many different fields. In the present research, we reviewed debates pertaining to the world of nature.

Some of the information accumulated by our Sages resulted from observations of nature, while other, no less prominent information, was based on external sources. The Sages were attentive to information conveyed through rumors, especially through Greek and Roman scholars of the time.

The present research addresses two areas of biological observations of the Sages: reproduction and embryology on one hand, and eight different creatures noted in the classic rabbinical literature on the other. These creatures deserve the title “realistic/legendary.”

Our starting point is that most sources reflect a mixture of accurate information and folk beliefs that lack any basis in reality. Regarding the legendary creatures, the imaginative descriptions, in many cases, have a kernel of realism. This kernel became wrapped in contents from beliefs, rumors and ungrounded opinion. This came as a direct result of the lack of consistent tools of research or methods of observation.

Thus, on the one hand, the “wild man-like creature” (“אדני שדה”) meets the basic criteria for great apes, although the tradition that it is connected by a navel, the source of its nourishment, has no basis in reality. Similarly, there is no connection between the salamander’s orange coloring and the heat of ovens, and its blood has obviously no effect on preventing burns. Still, the creature’s coloring, its attraction to heat and the fact that it was mostly hidden from sight were the source of these beliefs.

Mention of these legendary creatures is not limited to theoretical debates in the rabbinical literature (as in the case of the hyena or the salamander). These creatures also appear in Midrashim, regarding practical questions of Halacha dealing with everyday reality.

DECEITS AND FORGERIES IN ANCIENT FOOD INDUSTRY ACCORDING TO RABBINICAL LITERATURE: REALITY AND LEGAL ASPECTS
Abraham Ofir Shemesh*

This research deals with foods forgeries in the Middle Ages, according to the rabbinical literature (14–19th centuries). As in our era, this ancient phenomenon had far reaching legal, religious and economic implications, so the Jewish sages had to deal with it. The contribution of medieval halachic authorities was to draw attention to the phenomenon and to provide the tools by which it could be detected.

Their aim, of course, was to enable their communities to avoid religious prohibitions (such as kashrurt problems), but also to help decide in prosecution cases. It is difficult to determine the extent of the forgery phenomenon in the Middle Ages, but we can assume that food forgeries were pretty common in medieval markets.

There were many different methods of forgery. Many of them were simple and others were sophisticated. Examples of the simpler ones are: 1. Re-marketing of used tea leaves that have been dried. 2. Adding cheap substitutes to increase the volume of materials. For instance, adding cheap oils to olive oil, that was expensive in Europe countries; adding local honey made from grapes (‘dibs’) to bees’ honey and adding flour to sugar. Many of the forgeries were more sophisticated: sly forgers used unoriginal stamps or original stolen stamps. In many cases forgers perform adulteration in the food. The imitation of saffron, a valuable condiment, involved the addition of unusual materials, such as red wine and ox-meat fibers, fried in pig’s fat. This forgery was common in the markets of Barcelona, an important port in the fourteenth century.

Food products that were forged were expensive foods that were difficult to obtain. The importance and high price of the original products stemmed from many sources: some required hard work to produce, or reached Europe and Middle East from distant countries in the Far East (India or China), such as tea and sugar.

In the nineteenth century, when the chemical industry began to develop rabbis recommended the use of chemical analysis to check foods that were suspected of forgery. One of these rabbis was Rabbi David Zevi Huphman (Hungary 1843 – Germany 1921). He recommended checking milk, which was suspected of being mixed with pigs’ milk, in laboratory.

It is clear that the issue of food forgery was especially threatening to Halachic observance and troubling to the rabbinical authorities through the centuries. This explains the extensive quantity of response on the subject.

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**MAYBE ONE WILL PREPARE CARPET FROM HIS FATHER AND MOTHER’S SKIN: THE USE OF HUMAN SKIN IN THE ANCIENT WORLD REALITY**

Abraham Ofir Shemesh*

Using Human skin for industrial goals is an anomaly phenomenon in mankind’s history, but is still common in our time.

This phenomenon was common in many ancient nations, such as the Scythians, the Romans and in many countries in medieval Europe and using human skin for cosmetic goals is widespread in China in the modern era.

Skinning was used for many purposes:

1. As revenge or frightening of a conquered nation, especially among nations that tried to rebel against their conquerors. The Romans prepared a mask from human scalp, and they used it in their public holidays in order to degrade the Jews;
2. For industrial goals – the historical sources report about the preparing of mirrors of human skin. We assume that the skin was used as a prestigious material for covering the mirror body or the handle;
3. Magical goals - Romans legions used magical objects made of human skin for winning their battles. Rabbi David Ben Zimra (16th century) claims that human skin has a magical quality, especially the skin of one’s parents which can help him against his enemies;
4. Tuvia HaCohen, (1652–1729) reports that Jews used a medical-magical belt which was prepared from human skin, but the exact medical aim of the belt is unknown.

We can assume that our sages determined that human skin is unclean, and therefore resisted this phenomenon and tried to discourage it in the ancient Jewish community.

**MEDICAL RELATIONSHIPS BETWEEN JEWS AND NON-JEWS IN THE OTTOMAN EMPIRE IN MEDIEVAL AND MODERN TIMES ACCORDING TO RABBINIC LITERATURE, HALACHA AND REALITY**

Abraham Ofir Shemesh*

Patient-doctor relationships are the foundations of any healthy human society. These relationships hold social significance as well. History indicates that when people are sick they are usually more tolerant towards strangers and others. In such instances, the walls come down, as do religious-social divisions between sects, ethnic groups, and faiths, and the level of assistance and consideration rises. Was this the reality during the Ottoman period?

Ancient Jewish law, as reflected in rabbinic literature, took a strict approach to medical relationships between Jews and non-Jews. In principle (aside from certain circumstances), a double ban existed: The Rabbis forbade Jews to provide non-Jews with medical services: to treat them, circumcise them, or deliver their babies, in order to refrain from helping pagan-idolatrous society Jews were also forbidden from using non-Jewish medical services (medical treatments or the purchasing of certain medications) for fear of harassment or murder disguised as the failure of medical treatment. Such laws created particularly severe social conflicts in the case of mixed societies based on joint systems (economy, trade). This research focuses on the religious, social, and historical aspects of the prohibition to maintain medical relationships, focusing on the halachic development of this issue in Islamic countries in medieval and modern times.

This religious-halachic issue, which has implications for the modern era as well, has been discussed in studies and articles by halachic authorities; however it has never been historically researched. We have pointed out that circumstances did not enable the public to fulfill these instructions to the letter, and therefore many halachic authorities in the post-Talmudic period dispensed with the prohibition of medical relationships almost completely, and some even permitted the treating of non-Jews on the Sabbath, even when involving its desecration. The question of treating Muslims was discussed by halachic authorities in both Christian and Muslim countries. Stricter views were voiced concerning the treatment of Christians, but the dispensation to treat Muslims and deliver their babies was clearer. Halachic authorities claimed that the original prohibition specified idolaters and that Muslims do not engage in idolatry. Another major claim supporting the concession was the concern of animosity and harassment by the non-Jewish population.

The historical sources indicate that in practice Jewish physicians, some of them Rabbis and scholars did treat non-Jews – both Muslims and Christians. The classical example is the Rambam, who laid the foundations for permitting such conduct even before the Ottoman period. Although forbidding the treatment of non-Jews in his “Mishne Torah”, in practice he served as court physician of the Egyptian ruler. The sources also indicate that Jews sought the services of non-Jewish physicians.

It is quite clear that in practice the medical relationship between Jews and Muslims was prevalent.

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PUNISHMENTS OF DOGS’ DAMAGES ACCORDING TO JEWISH LAW

Abraham Ofir Shemesh*

The Jewish law’s attitude towards raising dogs has been discussed in many scholarly articles. On the other hand, the issue of dogs’ damages has not been discussed enough. It is the intention of this research to address the various damages and punishments for dogs that are cited in Jewish Halachic sources.

In the Talmudic and rabbinic literature, many kinds of dogs’ damages: property damages (attacking animals, destroying fields and objects) and human body damages (biting, scars, castration, and miscarriage because of barks) are mentioned.

The halachic sources deal with the legal implications of two kinds of dog attacks: spontaneous and those caused by incitement. In the Mishnaic period, deaths which were caused by dogs came under the jurisdiction of the Sanhedrin. The execution of animals which killed humans was a legal practice in the Sanhedrin law and also over hundreds of years in the non-Jewish courts in Europe. After cancellation of the Sanhedrin Institute, there was no legal Jewish instance that could judge in death cases.

In order to oblige a fine of bodily damages, there must be “expert judges” (‘Dayanim Mumḥim’) that are authorized by a suitable institute. In comparison to the civil law that obliges the payment for bodily damages, the rabbinic court cannot give judgment of monetary fine, because there are no “expert judges” in our era. Hence, the legal authority of rabbinic court in dogs’ damage cases is very restricted.

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TAVSILI – A TRADITIONAL ORAL TRANSLATION OF TORAH INTO THE LANGUAGE OF GEORGIAN JEWS: TEXT AND ANALYSIS  

Dr. Reuven Enoch*

Tavsili, created over hundreds of years and passed orally from generation to generation, played a very important role in the religious life of Georgian Jews. As part of this project, the text of Tavsili will be published for the first time. Analysis of this translation will enable to study some issues regarding the history of Georgian Jews, as well as the history of Jewish Diaspora in general. In addition, analysis of Tavsili is interesting in the context of studying the translations of the Old Testament. Obviously, such research will also enrich our understanding of the history of Georgian language. Finally, this text is an important contribution to the research of Jewish languages in general.

ANTI-ECUMENISM AS A FANATIC NATIONALISM IN GEORGIA: THE CASE OF TWO RELIGIOUS FIGURES - GABASHVILY AND MKALAVISHVILY  

Dr. Reuven Enoch*

Georgia is a predominantly Christian country, although ethnic diversity is a substantial factor, with a considerable number of Muslim ethnic Georgians, Catholic and other Christian denomination ethnic Georgians, Gregorian Armenians, Muslim Azeris, Orthodox Russians, Kurds, Jews, etc.

Problems in inter-ethnic relations were buried under the rug during the Soviet rule in Georgia, but the situation changed drastically with Perestroika (after 1985). Nationalistic movement in the country was often accompanied by slogans like “Georgia for Georgians” and demands to proclaim Orthodox Christianity as the state religion. Ultra nationalist Zviad Gamsakhurdia’s election as the president exacerbated ethnic and religious tensions that quickly transformed into armed conflicts. This period saw the first appearance of anti-ecumenist religious figures in Georgia. Gabashvili believed that Georgia should be a monarchy, in order to preserve the Orthodox religion. Gabashvili’s ideas were furthered by Basil Mkalavishvili. Mkalavishvili declared that the God’s descending to earth was near. Hence, all the political squabbling and materialistic concerns were futile, except for one objective – to strengthen the orthodoxy and prepare the country for the Judgment. As a part of this study, I analyze the activities of these figures, their contribution, and their influence on the political life of modern Georgia.

This study is a part of a larger project, “Religious Figures in Areas of Conflict”, carried out at the Harry S. Truman Research Institute for the Advancement of Peace at the Hebrew University of Jerusalem.

This study was designed to investigate the relationships between gender role stereotypes, rape myths, and social distance from sex offenders and sexual crime victims among students and therapists. A Rape Myth Acceptance Scale, an Attitude Variables Questionnaire, and a Social Distance Scale were administered to 125 female social science students and 51 female therapists. The findings validated our hypothesis: traditional gender role attitudes and belief in rape myths were positively related to social distance. Although therapists were willing to be in social contact with both victims and offenders to a much greater degree than were students, both groups expressed a decline in willingness to have social contact with victims and offenders, especially when the relationships were closer and more intimate. It seems that three decades after the first studies of rape myths, prejudices and stereotypes concerning rape and rape victims still exist.

ATTACHMENT STYLE, HOME-LEAVING AGE, AND BEHAVIORAL PROBLEMS AMONG RESIDENTIAL CARE CHILDREN  

Dr. Maly Shechory* & Dr. Elian Sommerfeld**

In a prospective study, the attachment style, home-leaving age, length of time in residential care, and behavioral problems among Israeli residential care children (n=68), were studied. Data analyses showed that children removed from their homes at a later age suffered from higher levels of anxiety, depression and social problems compared to children taken from their homes at the age of 7 or less. It was also found that a prolonged stay (over two years) in residential care was related to higher levels of anxiety and depression. An interaction effect of a child's attachment style and home-leaving age was found in the child's level of aggressive behavior.

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AGGRESSION AND ANXIETY IN RAPISTS AND CHILD MOLESTERS
Dr. Mally Shechory* & Prof. Sara Ben-David

This study expands the empirical and theoretical understanding of the distinction between those who perpetrate sexual assaults against children (child molesters) and those who perpetrate them against adults (rapists). Two questionnaires were completed by eighty-eight incarcerated, male sexual offenders (45 child molesters and 43 rapists): the Spielberger State Trait Anxiety Inventory (1966, 1972, 1975) and the Buss-Durkee Hostility Inventory (1957, 1961, 1971). It was found that the rapists’ level of aggression was significantly higher than that of the child molesters. No significant differences in anxiety levels were found between the two groups. The results are discussed in terms of their relevance to theory and clinical practice.

CHILD SEXUAL ABUSE: IS THERE ANY DIFFERENCE BETWEEN INTRAFAMILIAL AND EXTRAFAMILIAL CHILD MOLESTERS?
Dr. Mally Shechory* & Prof. Sara Ben-David

The assumption regarding the dichotomy difference between Intrafamilial and Extrafamilial heterosexual child molesters was studied. According to literature reviewed, variables connected with self-esteem, anxiety and aggression have been found as characteristics among child molesters. In this study, different measures of these variables have been examined. Subjects were 45 inmates (who have abused girls of up to 12 years old) divided into two groups: 24 intrafamilial and 21 extra-familial child molesters. Results indicated no significant differences between groups in all examined measures. Both groups, in comparison to the general population norms, displayed low levels of self-esteem and aggression, and high levels of state and trait anxiety. Examination of the clinical measures shows that both groups suffer from mental problems. The discussion was dedicated to the theoretical and therapeutic ramifications of the findings. The possible explanation to the difference between child molesters according to the criteria of intra/extra familial was emphasised and was found to be unsatisfying. It did not provide an explanation to this complex phenomenon. Seeing the phenomenon of incest as a result of family disfunction can lead to oversight regarding other problems and causes related to the abusers sexual deviant.

RELATIONSHIPS BETWEEN GENDER ROLE ATTITUDES, ROLE DIVISION, AND PERCEPTION OF EQUITY AMONG HETEROSEXUAL, GAY, AND LESBIAN COUPLES
Dr. Mally Shechory* & Dr. Riva Ziv

The purpose of the present study was to investigate the relationships between gender role attitudes, household tasks, and the perception of equity among heterosexual, gay and lesbian couples. One hundred and twenty-four participants (54 heterosexuals, 30 gay men and 40 lesbians) were tested. It was found that same-sex couples had more liberal attitudes toward gender roles than did heterosexual couples. In addition, significant differences were found between the spouses in their responses regarding role division in housekeeping in each group. The responses of heterosexual spouses correlate more closely with each other regarding the role of each of the spouses than was the case for same-sex couples. However, the role division among lesbian couples was more egalitarian than that of heterosexual couples. In addition, heterosexual women consider their married life less equitable than heterosexual men do. Similarly, one of the gay spouses considers the relationship less equitable than the other spouse does. The results are discussed in terms of their relevance to theories of social perception and cultural backgrounds.

EFFECTS OF THE HOLDING TECHNIQUE AMONG CHILDREN IN RESIDENTIAL CARE
Dr. Mally Shechory* & Dr. O. Dvir

The purpose of the present study was to help understanding the therapeutic value of the holding technique for children who exhibit extreme uncontrolled behavior. The RAF questionnaires were administered to 91 children in therapeutic residential care (51 of whom underwent holding, and 40 did not). The questionnaires were administered twice year apart. In addition, eight staff members, who have actually held the participants, were interviewed, and their reports were analyzed. Repeated-measures analyses of variance showed that children’s suicide attempts among those who were held, declined. Although their level of aggression has not changed (according to the questionnaires), the interviews revealed a decrease in the children’s physical aggression. The staff members reported closer emotional ties with the children, more open expression of emotions and higher level of restraint. Stepwise regression analysis indicated that suicide attempts and aggressive behavior predicted greater need for being held.

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YOUTH INVOLVEMENT IN RESISTING THE DIENGAGEMENT PLANE: ASSESSMENT OF LEGAL AND ILLEGAL ACTIVITIES

Dr. Mally Shechory* & Dr. A. Laufer

The study examined 262 adolescent residing in Judea and Samaria which took part in resisting the implementation of the disengagement plane during September 2006. The aim of the present study was to assess social variables that differentiate between youth who took part in legal activities and youth who took part in illegal actions. Results indicated that the most prominent activities were legal activities such as demonstration (90% of the sample), handing out stickers and "orange ribbons" (70%) and the persuasion of solders to resist the plan (40%). However, 60% of the youth were involved in illegal activities, such as blocking roads and confrontation with police and military forces. These youth were more ideologically, tended to live in settlement that were contender for possibly future evacuation, knew people that were hurt by terror attacks and were present during evacuation of a settlement. Although, the reasons for involvement in the resistance were mostly ideological and religious ones, hatred for the Arabs was more mentioned by youth that were involved in illegal activities.

Overall, results of the current study suggest that feeling of incapability to influence the political system and high ideology and religious obligation were the most significant factor contributing to youth involvement in illegal activities.

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PLANNING POST FACTUM: RE-SETTLEMENT OF THE GAZA SETTLERS AFTER THEIR EVACUATION

Dr. Miriam Billig* & Prof. Yossi Katz

An examination of the process of relocation of Gaza and North Samaria settlers reveals that the present geographic distribution of this population is not a result of a careful planning, but rather an outcome of a complex sequence of decisions involving, apart from the government, public and religious settlement leaders, ideological settling bodies and private voluntary initiatives.

Both the present and future geographic distribution cannot be understood without analyzing the views and the goals of all the above-mentioned parties, as well as the system of relationships between them, including preconsents, compromises, oppositions and struggles regarding the different spatial preferences. These preferences are related to ideological and pragmatic considerations (e.g., unification versus separation, center or periphery), national versus community and personal priorities and many other factors. Thus, the outcome of this process cannot be understood without examining the special circumstances, in which the decisions were made, the lack of communication between the government and the settlers, and the fact that the institutions in charge of the relocation often lacked the professional knowledge required to address the special needs of the relocated population.

In this study, we will explore the motivations and the goals of the above-mentioned parties, the complex interactions between them and the past, present and future outcome of this process, which can best be defined as "planning post factum".

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YOUNG PEOPLE IN RELIGIOUS KIBBUTZ: THE PRO AND CON FACTORS
Dr. Miriam Billig* & Prof. Yossi Katz

This study focuses on the pro and con factors, affecting the attitude of young people aged 24-45 towards living in religious kibbutzes. The two main questions of this research are:

1. What does the kibbutz, in its present form, have to offer young people to make them choose it as their place of residence?
2. What should be added or changed in the kibbutz, in order to attract more young people?

Our intention is, on one hand, to identify the reasons that motivate the second generation of young people who grew up in the kibbutz, as well as those who grew up elsewhere, to live in kibbutz after the marriage, and, on the other hand, to understand what makes young people leave and why so few of them choose to join it. The research will allow to create a general profile of religious kibbutzes as a whole, as well as of every kibbutz individually, and to identify the satisfaction factors and the problems in the kibbutz, as perceived by young people. At the second stage, the research will make recommendations as to the possible actions that could motivate young people to move into kibbutz.

A NEIGHBORHOOD FOR THE BLIND: INCLUSION OR NORMALIZATION?
Dr. Miriam Billig* and Dr. Rachel Sharaby

Mass immigration to Israel in the 1950’s included disabled people, among them many who were visually impaired. Different ways were explored to absorb them, one of which was to settle them in a separate neighborhood for the blind with sheltered workshops to employ them and the necessary public services. From the records of those days, one can form a picture of the daily life of the residents of this neighborhood and their problems. Findings were analyzed according to modern principles and criteria of normalization and inclusion, which indicated that the special neighborhood for the blind was effective in rehabilitation of its residents, though economically not sustainable.

THE EFFECTS OF RELIGIOSITY AND IDEOLOGY IN COPING WITH DEMORALIZATION DUE TO TERRORISM: A STUDY OF RESIDENTS OF GAZA, JUDEA AND SAMARIA
Miriam Billig* and Robert Kohen

The influence of religious belief and ideology on the emotional responses in the aftermath of terrorist attacks has been hardly addressed in the literature. Our study examined this influence in Gaza, Judea and Samaria settlements, in the period starting three month before the evacuation of Gaza settlements and ending a week before the evacuation in August 2006. The analyzed population consisted of residents of religious and secular community settlements and religious agricultural settlements. The study sample included 289 households in Gaza, 186 in Judea, and 231 in Samaria, who were interviewed over the phone. The interviews examined the following variables: psychological distress measured using the Demoralization Scale of the Psychiatric Epidemiology Research Interview (D-PERI), level of exposure to terrorist attacks and measures related to attitudes towards the disengagement process, ideology and demographic/social variables.

The findings reveal that a considerable part of the interviewed were exposed to terror: 5.9% were injured since the beginning of the intifada, 7.8% lost a relative, 64% lost a friend, and 15.3% had their house damaged in a terrorist attack. The initial statistical analysis showed that exposure to most of these events increased the demoralization.

It turned out that those who had been injured experienced more stress related to their security, were more strongly opposed to the disengagement process and felt alienated by the government. Over all, we found a greater tendency to demoralization in those interviewed, who supported the disengagement, or were more alienated from the government, or lived in the secular settlements.

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SOCIAL CAPITAL AND ITS VALUE IN COPING WITH CRISIS SITUATIONS

Dr. Miriam Billig*

Gaza settlers have met with many upheavals and dramatic changes in the last decade: from fulfilling a creative pioneering vision by establishing new settlements, to a challenging period under constant security threats and real existential danger. This study evaluates the contribution of social capital to the settlers’ endurance in confronting crises in recent years. Our assumption is that, particularly at times of crisis, the typical components of social capital can be identified and its contribution can be compared among different communities.

The study is based on in-depth interviews with Gaza residents and settlement officials, various publications and internal documents, from year 2003 to the months following the evacuation. Generally, the findings suggest that both security and evacuation threats served as a strengthening factor, socially and community-wise. In all the settlements, the social capital contributed considerably to the residents’ ability to cope with various threats. At the same time, the cultural environment influenced the ways of coping in every group and was the determinant factor for the quality and the long-term impact of the social capital. The conclusion of this study is that the settlers’ demand to preserve the communities after the evacuation was justified, and in cases, when the settlers have done this on their own initiative, their ability to cope with the evacuation crisis was better indeed.

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Functional Regions of the Jewish Settlement in Judah and Samaria

Dr. Izhak Omer¹, Dr. Hernan Casakin* & Dr. Miriam Billig**

Israel is divided into functional regions, which are based on theoretical suppositions about the size of the different settlements and their relative distances. While there were some empirical works concerning the division of Tel Aviv and Jerusalem metropolitan areas into functional areas, there are no up-to-date empirical studies addressing the functional regions of Judea and Samaria.

The goal of the current research was to identify and define functional regions in the Judea & Samaria settlements, according to a spatial analysis of patterns of economical and social activities of their residents. A particular focus was set on activities related to public services, shopping, employment, and residential mobility.

The research was based on a survey carried out among 292 participants from 16 settlements. The main conclusions are threefold. First, the Jewish settlement in Judea and Samaria does not form an independent subsystem, but rather consists of several geographical regions that belong to the major metropolitan areas. Second, the functional-economical dependency within Judea and Samaria was found to be rather restricted. Third, unlike the functional-economical regions, most of the social regions identified in this study were found to belong exclusively to the Judea and Samaria settlements, with weak links to other settlements in Israel.

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ARIEL UNIVERSITY CENTER OF SAMARIA: SCIENTIFIC ACTIVITIES 2007-2008

ARAB STUDENTS’ PERSPECTIVES ON INSTITUTIONAL CLIMATE: A STUDY OF TWO ACADEMIC INSTITUTIONS IN ISRAEL

Prof. Dan Soen*, Dr. Nitza Davidovich** & Dr. Michal Kolan

The research is based on a survey carried out in two academic institutions: the Ariel University Center of Samaria (AUC); and the Western Galilee College (WGC), a much smaller institution, an extension of Bar-Ilan University.

The study intends to examine four aspects related to the climate of the institutions and the fabric of interpersonal relations between these two groups of students:

- Arab students’ perceptions of equality and consideration for minority groups;
- Unique difficulties experienced by Arab students;
- Students’ perceptions of the relationships between the two groups;
- Arab students’ apprehensions stemming from their minority status.

Findings highlight a complex, mainly positive reality, and stand in contrast to prevalent public beliefs and to the situation on other campuses in Israel. The important lesson of this study is that - despite differences in religion, culture, and nationality, despite the complexity of the minority experience in Israel, and despite the dark shadow cast on Arab-Jewish relations by the Israeli-Palestinian conflict – a rather positive climate prevails on these campuses, as far as the relations between these two groups are concerned.

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DEPARTMENT OF MULTIDISCIPLINARY STUDIES (HUMANITIES)

JEWS AND ARABS IN TWO ACADEMIC INSTITUTIONS: TRACKING ENROLLMENT MOTIVES OF THE TWO NATIONAL GROUPS

Dr. Michal Kolan*, Dr. Nitza Davidovich & Prof. Dan Soen

The research focuses on a comparison of Jewish and Arab students’ motives for enrolling in two academic institutions: the smaller Western Galilee College (WGC), which operates as an extension of Bar-Ilan University, and the larger, the Ariel University Center (AUC). The main question considered in this study is whether there are any differences in the enrollment patterns and enrollment motives of the two national groups.

The starting point of the research is that the two groups of students come from segregated educational systems, which effectively reproduce separate and distinct cultures. One result of this fact is that the academic achievements of Arab high school students are inferior to those of their Jewish colleagues. Moreover, employment opportunities after graduation are very different for the two groups. Consequently, the hypothesis that this research is designed to test is that there are differences in the enrollment motives and the enrollment patterns of the two groups.

To this end, we have conducted a survey including 459 respondents, and the results of the survey will be processed using appropriate statistical tools.

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EXPANDING ACCESS TO HIGHER EDUCATION: CULTURAL BACKGROUND AND OBJECTIVE DIFFICULTIES OF ARAB STUDENTS IN TWO ACADEMIC INSTITUTIONS IN ISRAEL

Dr. Nitza Davidovich*, Prof. Dan Soen**, & Dr. Michal Kolan

Recent official data reveal that between 1990 and 2001, there was a 220% growth in the enrollment of Arab students in Israeli institutions of higher education. At the same time, the total growth of the students’ population stood at a mere 125%. Moreover, data also reveal that the tendency to continue studies in higher education institutions is growing in the Arab sector considerably faster than in the Jewish sector. However, Arab students still face grave difficulties, as they enter the institutions of higher education

This study closely examines the profiles of Arab students enrolled in two academic campuses: the Ariel University Center of Samaria (AUC) and the Academic College of Western Galilee (WGC), in order to identify connections between their academic success and their academic-socio-economic-family-personal background factors.

The main research question posed by the team is what actual difficulties are encountered by the Arab students in the two colleges, and to what extent they manage to cope with them successfully. Moreover, the study also wishes to determine whether these academic institutions have offered Arab students options that are not available to them in Israeli universities.

A QUESTION OF IDENTITY: ON THE ISRAELI IDENTITY OF ARAB AND JEWISH STUDENTS ON TWO CAMPUSES

Prof. Dan Soen*, Dr. Nitza Davidovich**, & Dr. Michal Kolan

The study is conducted in two academic institutions in Israel, the Ariel University Center of Samaria (AUC) and the Western Galilee College (WGC). It is intended to focus on students’ perception of their Israeli identity. Against the background of the current social discourse that promotes post-nationalism ideas, it seems that the Israeli public still recognizes nationality as a prime basis for identity and self-determination. The research strives to discover what are the differences, if any, in the perceptions of Israeli identity between the two groups.

The study tries to analyze these perceptions, as they emerge from the responses to a questionnaire administered to a sample of 459 students, as well as from papers written on the subject by nearly a hundred Arab and Jewish students on the AUC campus.

The main research question posed by the team is to what extent the term “Israeli” appropriately describe the identity of Jewish as well as Arab students in both academic institutions. Another subsidiary question posed by the team is to what extent the students regard nationality as a key basis for identification and self-determination.

The research utilizes of both quantitative and qualitative methods.
THE IMPACT OF THE ARIEL UNIVERSITY CENTER ON ITS GRADUATES’ ATTITUDES TOWARDS THE REGION AND ITS IMAGE

Dr. Nitza Davidovich*, Prof. Dan Soen** & Prof. Shlomo Sharlin***

Concepts such as place attachment, place belonging and place identity play a central role in current regional planning and regional development, as well as in urban planning and development programs. Concurrently, research on mobility often considers migration to be a discrete act, by which the individuals change their place of residence as a result of constraints or by decision. Nowadays, it is recognized that the study of mobility is inseparable from the study of settlement or permanence. It is also recognized that the understanding of migration and settlement necessitates understanding the interaction between people and places.

Available data suggests that 153 of the University Center graduates settled in the region of Samaria within the last ten years. While studying, students usually concentrate on their studies. However, many of them spend time working in the region and living in the dormitories on the campus site. Working or living in the region helps to establish a daily contact with the region. The research focuses on the impact of students’ encounters with the region on their attitudes, attachment, and identity, as well as on their decision to settle there.

The purpose of this research is to answer the question to what extent the University Center has contributed, directly or indirectly, to the students’ attitudes towards the region; and to what extent it has contributed to their decision to settle there. Specifically, we examine the influence of the following factors: living in the dormitories or in rented quarters in the region, working in the region, the Center’s climate, teachers, and social fabric on the campus.

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WWW - OPINION LEADERSHIP ON THE NET
WHO WRITES WHAT AND WITH WHAT EFFECT?
Dr. Tirza Hechter

Six decades after the introduction of the concept of Opinion Leadership by Lazarsfeld and his colleagues (1944), studies in this area are still extremely relevant for communication and political studies. Yet, scholarly attention to the conceptualization, the antecedents, measurement and consequences of opinion leadership within the context of CMC (Computer-Mediated-Communication) groups is very recent and only now it is beginning to show theoretical and/or empirical results. Based on both survey methods applied to group CMCs as well as content analysis of their online verbal artifacts, this research advances a revised model of Opinion Leadership, in various communicative environments of the Internet, proposing the new concept of “Textual Opinion Leadership”.

This research’s two main contributions to communication theory and specifically to political communication literature are: First, expanding the construct of opinion leadership and opinion seeking to the group CMCs’ context, while focusing on its conceptualization, antecedents and measurements. Second, through survey and content analysis of a convenience sample I examine the difference between two types of opinion leadership – perceived opinion leadership (measured by PS, i.e., the Personality Strength measurement) and textual opinion leadership, specifying the latter's relevance for political communication and civic participation research.

A STUDY OF A CEMETERY IN ISRAEL
Dr. Talia Shay* & Mark Katzenelson

The study focuses on a cemetery, which was occasionally used by private people who themselves interred their loved ones that could not be buried in public cemeteries in Israel. Today, the cemetery is used by people who immigrated from the former U.S.S.R in the 90's. We, myself and my assistant, himself a former immigrant from Russia, visit the site and interview the relatives of the deceased, as well as the authorities who are the owners of the cemetery territory. The purpose of this study is to understand the relatives' attitude to their new homeland as reflected by their involvement with various authorities and by the treatment and attention they render to the tombs of their loved ones.

NEW PERSPECTIVES OF CONTEMPORARY ISRAELI WOMEN’S CULTURE
Dr. Talia Shay*

This study is conducted on a feminist theater for the purpose of investigating some new perspectives on contemporary women's culture in Israel. The group of actresses comprises about ten participants and a female director. The group meets once a week for a few hours in a house that belongs to a female organization. This study tries to analyze the politics of the theater, as opposed to that of the actresses in relation to Israeli society. It also tries to compare the above theater to other feminist theaters in the world.

The researcher has been a participating observer in the group and also conducted interviews with the participants.

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Dr. Mira Moshe

This study deals with the media framing of Judea-Samaria as seen in the financial daily Globes in the period 2000-2006. Two questions were posed: 1) can we characterize reporting on Judea-Samaria, and if so, how? 2) Is there a gender-related difference in the character of the reporting from Judea-Samaria? The method used to analyze the 565 articles published during this period was structural content analysis. Findings were as follows: a) security and terror were given preference in coverage over financial topics; b) coverage of financial topics dropped away from central position, but coverage of security and terror did not; c) the Judea-Samaria district tends to be framed in a negative context, which is maintained over time and which appears equally in articles on finance and on security and terror; d) a preference for articles written by male journalists over those by female journalists was found; e) no significant gender-related differences were found in the centrality and context of reports from the area on financial topics; f) female journalists writing on the topics of security and terror frame their reports in a more negative context than male journalists.

IT’S ABOUT TIME: ADMINISTRATIVE TIME

Dr. Mira Moshe

This study develops and characterizes the administrative concept of time. The coverage of the Judea-Samaria district in Globes, Israel’s only financial daily press, in the period 2000-2006, was subjected to substantive content analysis. The administrative concept of time operates according to ‘tactical administrative time’ (short- or long-term schedules, ad-hoc operations, and altering or adapting short- or long-term schedules) and/or ‘strategic administrative time’ (stopping the clock, turning the hands back or forward, to interrupt the time flow and efface the sense of continuity). Implementation of these concepts was made in the context of center-periphery relations.

TEMPORARY VS. PERMANENT: TIME FRAMING IN THE ISRAELI POLITICAL ARENA

Dr. Mira Moshe

This study juxtaposes ‘temporary’ versus ‘permanent’ based on a study of the Israeli Prime Minister’s ‘permanent incapacity’ (the result of illness) and of the President’s ‘temporary incapacity’ (the result of a police investigation). Analysis of the temporary, the permanent, and their mutual relations indicates that: a) temporariness receives more attention than permanence; b) individual status affects the framing of an event as ‘temporary’ or ‘permanent’; c) ‘temporary’ is framed in contradistinction to ‘permanent’; d) ‘temporary’ framing is present-biased, ‘permanent’ framing future-biased. Furthermore, while temporariness is framed within contexts of instability, permanence is framed in contexts of continuity and preservation.

WHERE IS MOM’S APRON? – INSIGHTS INTO ISRAELI SOCIETY THROUGH CHILDREN’S READING AND TEXTBOOKS

Dr. Rina Shachar*

This study examines Israeli children’s literature over a few decades to see if changes have transpired in the reflection of gender structuring in children’s books. The theoretical background begins with the presentation of inequality in Israeli society, distinctions between the sexes, and a discussion of their sources, as well as an examination of the decisive role of society in gender structuring. The issue of gender in the educational system, the structuring of sex stereotypes, and their influence on the distribution of roles between males and females in the society is discussed. The study examines children’s literature as a means of transmitting cultural and social attitudes and contents for the purpose of influencing their values, personality and behavior. Israeli textbooks designated for first to fourth graders from the 70’s until today were surveyed, as were reading books for kindergarten to fourth grade from the 50’s until today. The aim of this survey was to reveal any changes that had transpired in the reflection of gender structuring in the educational system. The findings show that changes in the reflection of gender structuring were minor and insignificant. It may thus be concluded that no real change in the reflection of gender structuring occurred in Israeli children’s literature. The equality called for today, in the 21st century, is still not fully realized in practice.

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Dr. Rina Shachar* and Or Anabi

This study examines the attitudes of youth in 2005 in regard to marriage, role distribution in the family, courtship patterns, and sexual promiscuity. In addition the study examines whether change processes have occurred in youth attitudes in 2005 as compared with their attitudes regarding the same issues in 1990 and in 1975. The main findings of the study in regard to the four issues examined reveal a much higher expectation of equality than in the past. The young women have led these attitude changes and actually constitute the guides of this change process. This trend is very apparent among secular and conservative Jews. (It should be noted that this trend constitutes a continuation of the direction we detected in earlier studies.) Today's youth are less captivated by stereotypic patterns. Young men and women act in a much more androgenic, open manner, and tend less to assume gender-linked traditional roles. However, there is a large gap in attitudes between secular and conservative youth and religious youth. The religious youth today retain conservative-traditional attitudes regarding the issues of marriage and raising a family, courtship patterns, and sexual promiscuity. The only field in which the religious reveal attitudes of equality pertains to family role distribution. Thus we can conclude that the religious identity of the subject is the dominant factor affecting attitudes towards marriage. As for the gender aspect – the gap between the attitudes of young females and young males is decreasing, and new directions have become dominant. The ethnic factor, considered to exert great influence earlier, was revealed as a negligible factor in the study of 2005, and no connection was found between the parents' or grandparents' origin and youth attitudes in regard to all the issues examined in this study.

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NEW FATHERHOOD
Dr. Rina Shachar* and Keren Layush

This study explores the characteristics of the 'new father' as distinct from the traditional father and attempts to identify the factors that impel the male to becoming a new or remain a traditional father, both from the personal and the social perspective. The goal is to determine the characteristics that contribute to new fatherhood. The issues examined include: the relation between (a) the father’s attitudes and sensitivity, (b) his 'parenting model', and (c) his gender identity, on the one hand, and his degree of involvement in child rearing, on the other hand; (d) the relation between the father's perception of his degree of involvement in child rearing and his partner's perception of that involvement; (e) the demographic characteristics of the new father (origin, age, education, socio-economic status, religious identity).

The findings show a high degree of involvement of the new father in child rearing. They also reveal that the father's positive feelings towards fatherhood are the most significant factor moderating his development into the new father. Furthermore, fathers of families in which the wife has a full-time job outside of the home are more involved. The greater the scope of the wife's job, the more involved the father is in the upbringing of his children. In addition, there is congruence between the partner's perception of the degree of the father's involvement in caring for the children and the father's own perception of his involvement in child rearing. This finding testifies to the closing of the gap between the perceptions of both parents regarding the father's involvement. Involved fathers occurred more frequently among males of mixed origin and among the population belonging to the conservative (religious) sector. No correlation was found between the parenting model which the fathers were subject to in their homes as children and the parenting model they adopted. Moreover, no correlation was found between the following variables: age, education, and socio-economic status and the involvement of the fathers in caring for their children. The findings provide evidence for a process of change in the division of parenting roles between the spouses in favor of a greater state of equality.

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Dr. Rina Shachar*

Do words in songs for young children influence their perception of equality or stereotypes? Songs for children in Israel from the 1920's until today (2004) were examined based on parameters used by the Israeli educational system to analyze literature and textbooks for young children. The findings support the assumption that children’s songs are characterized by a lack of awareness of the gender structuring they transmit through gender stereotypes, though the words of the songs and the illustrations and descriptions of different types of ‘male-female’ professions reveal the presence of such stereotypes. Nonetheless during the last few years a change has transpired. As the number of female writers has increased, so has awareness of the problem, and the newer the songs, the more care is given to presenting equal opportunity between genders and the free selection of professions liberated from stereotypes.

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RAPE PERCEPTIONS, GENDER ROLE ATTITUDES, AND VICTIM-PERPETRATOR ACQUAINTANCE

Prof. Sarah Ben-David & Ofra Schneider

The connection between rape perceptions, gender role attitudes, and victim-perpetrator acquaintance was examined. One hundred fifty Israeli students rated their perceptions of the victim, the perpetrator, the situation, and the appropriate punishment, after reading scenarios in which rape was committed by a neighbor, an ex-boyfriend, and a current life partner. Significant negative correlations were found between gender-role attitudes and four measures of rape perceptions. ‘Traditionalists’ minimized the severity of all rapes to a greater degree than ‘Egalitarians’. As the acquaintance level increased, there was a greater tendency to minimize the severity of the rape in terms of perceptions of the victim, the situation, and the punishment; the situation was decreasingly characterized as rape and was perceived as less violating of the victim’s rights and less psychologically damaging. Women tended to have more egalitarian attitudes than men and were less likely to minimize the severity of the rape in measures of perceptions of the situation and of the appropriate punishment.

ATtribution of Blame to Rape Victims Among Therapists and Non-Therapists

Dr. Yael Idisis¹, Prof. Sarah Ben-David and Efrat Ben-Nachum¹

This study examines the hypothesis of modular judgment in the context of attribution of blame to rape victims. Modular judgment was operationalized using blame schemata suited to judgment of everyday aggression. Subjects were 72 individuals, 36 therapists and 36 non-therapists; half were men and half women. Each subject was presented with written descriptions of four rapes, which included information regarding victim’s gender (male versus female) and victim’s prior acquaintance with the rapist (stranger or known). Dependent variables were attribution of blame and judgments regarding severity of the rape and of the punishment deserved by the rapist. Among both therapists and non-therapists there was a slight general tendency to blame the victim. As expected, women were blamed more than men. Also, men attributed less blame to male victims then did women, whereas women attributed less blame to female victims then did men. These results support the theories of modular judgment and of defensive attribution. As for judgment of severity of the rape, therapists judged the rapes as slightly more severe. Similar results were found regarding judgment of deserved punishment. We suggest further investigation of the connection between blame attribution and rape myths, which may facilitate blaming the victim.

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SECONDARY TRAUMATIC STRESS AND THE TRAUMA VOLUNTEER IN VICTIM ASSISTANCE CENTERS

Dr. Hilla Avielly & Prof. Sarah Ben-David

Undertaking voluntary work is a relatively common activity in western countries such as the USA and UK, and it is now clear that the role of volunteers in supplementing health and social welfare services is important. However, volunteers working with trauma victims are potentially subject to ‘secondary traumatic stress’ (STS). STS is the natural behavior and emotion resulting from knowing about a traumatizing event experienced by significant other, or resulting from helping or wanting to help a traumatized or suffering person. In this study we reviewed the literature regarding STS and discussed the special characteristics of the volunteer in regard to secondary traumatic stress prevention.

FEAR OF TERRORISM AND THE COPING PARADOX

Prof. Sarah Ben-David & Dr. Keren Cohen-Louck

Recent years have seen a rise in terror attacks on the Israeli people. The literature in the field indicates, interestingly, that although women are less likely to encounter terrorism, they exhibit a higher level of fear and more negative psychological symptoms than men. These major gender differences generate two main paradoxes; ‘the fear-victimization paradox’ and ‘the coping paradox.’ The purpose of this study was to examine the field of fear of terrorism and to suggest an integrative explanation for the gender differences. The explanations presented discuss gender differences in terms of the way in which each gender perceives terrorism, as well as the use of different, gender-specific coping styles. These explanations help clarify both paradoxes and may assist in gaining a better understanding of the above-mentioned gender differences in levels of fear of terrorism.

A SCALE TO EVALUATE EXERCISE PERFORMANCE

Yehuda Sataf, Dr. Tamar Jacob, Physical and Therapy staff Rosh Ha-Ayin Clinic

In order to improve physical therapy service, patients with chronic and sub-acute musculoskeletal disorders who were on waiting list for treatment were instructed, in a single session, to perform home exercises during the waiting period. The purposes of this study is to assess the psychometric phenomenon of a simple three grade scale (complete, partial, and no performance), which aims to evaluate the quality of exercise performance and to identify a suitable set of home exercises prescribed after a single instruction session. Patients suffering from chronic and sub-acute neck (4), back (6) and knee (6) pain, who were referred to physical therapy, were instructed to perform a set of exercises during a four week waiting period. The quality of performance of three sets of exercises was evaluated after one month by 8 senior physiotherapists using a simple three grade scale. Between two to six physiotherapists observed each patient. Interrater agreement rates, distribution of grades on scales categories, and that of final grades were calculated. The suitability of each exercise for these patients, after a single session of instruction, was evaluated on the basis of exercises performance and a discussion between raters.

The percent of observations with complete agreement between raters on back, knees, and cervical set of exercises was 77 (95% CI 69-84), 77% (95% CI 70-84), and 80 (95% CI 72-88) respectively. Raters evaluations were distributed on all scales categories, and final grades were distributed along scale’s range. Most exercises were performed completely or partially and, therefore, were identified as suitable for home exercises. Criteria for performance of questionable exercises were defined.

This simple scale for the assessment of exercise performance seems to be practical, stable, and reliable. Home exercises after a single session of instruction should be very carefully selected.

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EVALUATION OF PROFESSIONAL SKILLS OF UNDERGRADUATE PHYSICAL THERAPY STUDENTS AT CLINICAL AFFILIATIONS – RESULTS OF TWO PT PROGRAMS IN ISRAEL

Dr. Tamar Jacob, Shulamit Werner

For many years, evaluation of Physical Therapy (PT) students in clinical affiliations has been based on methods, which have not been adequately tested. This study is a first step towards evaluating the psychometric phenomena of two evaluation tools: a standardized Clinical Affiliation Evaluation Form (CAEF) and a Final Clinical Examination Form (FCEF).

Grades awarded by both methods to 122 PT students in two PT programs in Israel.

Distribution of grades was evaluated by its skewness and kertosis. Paired t-tests were used to compare grades awarded by different evaluation methods and by different type of examiners. Intra-class correlation was used to evaluate the degree of agreement between two types of examiners.

Grade averages were high with a small distribution in both programs. Grade averages based on CAEF were higher than grade averages based on FCEF. Grades awarded by clinical instructors were higher than grades awarded by additional examiners.

Grades awarded by additional examiners who are clinicians from the facility were higher than those awarded by examiners who are faculty members.

Grades of PT students in clinical affiliation are usually high. The use of two evaluation tools seems to be justified. It is also desirable to employ a faculty member as an examiner in addition to the clinical instructor at the practical exam at the end of the affiliation. The content, reliability, and validity of both evaluation tools should be assessed in the future.

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CAN ARM LYMPHEDEMA REDUCTION BE MAINTAINED AND QUALITY OF LIFE IMPROVED BY PARTAKING IN AN EXERCISE CLASS? A CASE SERIES STUDY

Jillian H Bracha¹, Dr. Tamar Jacob, Ruthi Peleg² and Dorit Tidhar³

Arm lymphedema is a chronic condition affecting multiple aspects of daily life. Treatment consists of infection prevention, lymphatic massage, compression therapy, and special exercises. The intensive stage of treatment reduces swelling and the patient enters a maintenance program for which she is responsible. Quality of life (QOL) shows also improvement with lymphedema reduction. During the maintenance stage, further reduction and perception of change in QOL were observed among participation in a special exercise class as described in the Casley-Smith Method.

Evidence regarding the effect of exercises on lymphedema is inconclusive.

Eight women with post breast cancer lymphedema, in the maintenance phase of lymphedema treatment, took part in a weekly exercise class for a period of eight weeks. Arm circumferences were measured at 6 points before and after each class. Volume was calculated using the formula for a truncated cone and summing the cones. A QOL questionnaire was done before treatment and after 8 weeks.

Limb volumes showed decreases after each class and over the 8 week period. QOL improved in some of the dimensions.

In this small group, lymphedema volume decreased and aspects of QOL improved with a weekly exercise class performed in the maintenance stage over a period of 8 weeks.

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Numerous daily activities require coordination of body movements with moving objects. Healthy individuals can easily perform such tasks by modifying the speed, trajectory and rhythm of their movement, but adults with Parkinson disease (PD) experience severe difficulties trying to modify their movement to accommodate functional demands.

Several experiments illustrated that external auditory and visual cues assist individuals with PD to improve rhythm control and tracking of moving object. However, most motor control investigations of adults with PD were conducted on the light distal segments of the limb, like the hand and fingers, which require only minimal adaptation to gravitational and inertial forces. In order to further understand the motor control impairment of individuals with PD, there is a need to investigate their joints mobility and muscular activity during unconstrained oscillation and tracking performance of the total limb, with and without visual cues.

After receiving approval by the ethical committee of Meir hospital and performing a pilot study, 10 individuals with a primary diagnosis of PD and 10 healthy individuals of comparable age were recruited to the study. The participants will be evaluated by Unified Parkinson Disease Rating Scale (UPDRS), range of motion tests, Berg Balance Scale (BBS), and Timed Up & Go Test (TUG). The participants will be asked to swing their more affected upper extremity, while tracking a pendulum. The tested performance will include the following tasks: free oscillatory movement, free oscillatory movement with closed eyes, tracking the pendulum while viewing its total range and partial range, and conducting the fastest limb oscillation possible. Movement kinematics and muscular activity will be analyzed using computerized motion analysis and electromyography systems, respectively. This analysis may enhance our understanding of motor disorders in individuals with PD and contribute to the improvement of therapeutic interventions.

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FAST WALKING OF ADULTS WITH HEMIPARESIS: VARIATIONS OF JOINTS’ KINEMATICS SYMMETRY
Dr. Zvi Kozol, Dr. Wen Ling1, Dr. Judith Deutsch2, Dr. Arthur J. Nelson3

Gait of adults with hemiparesis (AWH), post stroke, is characterized by uneven kinematics of the affected and unaffected sides (asymmetry). When AWH increase their walking speed their stride length and cadence increase but the change that occurs in their gait asymmetry is controversial. PURPOSE: To determine the bilateral changes in gait kinematics and in their relationships with the level of motor control, when AWH assume fast walking. METHOD: 30 AWH secondary to a stroke were requested to walk at their self-selected walking speed and as fast as they could walk, safely. The participants were videotaped simultaneously from 3 directions and selected kinematic parameters of their lower extremities and trunk were determined, using a computerized motion analysis system. In addition, the motor deficit of the paretic lower extremity was evaluated by Fugl-Meyer motor control scale. ANALYSES: A two-ways MANOVA and Pearson product-moment coefficients were calculated to determine the changes of the kinematics and the relationships between the kinematics and the Fugl-Meyer scores, respectively. RESULTS: The kinematic parameters of the unaffected side have increased to a larger extent than those of affected side (p< 0.005). The correlation of the gait kinematics with the Fugl-Meyer score revealed that the motor control impairment is associated with the performance of specific gait events.

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THE MYSTERY OF ORIGIN OF LIFE
Prof. Moshe Trop

How did life start on earth? This is the major question confronting scientists today in their search for the origins of life.

The most common theory is that of the "organic soup," a conglomeration of simple compounds which formed in the atmosphere and were washed down into the ocean and combined with the compounds found in the ocean. These oceanic reactions resulted in an abundant accumulation of organic material. Some scientists have challenged this theory by running pre-biotic simulation experiments in their laboratories. These experiments suggest that the "organic soup" theory is highly unlikely to have succeeded at the dawn of time.

Most of the basic essential biomonomer building block molecules of life have been synthesized in the laboratory by scientists under conditions similar to those assumed for ancient earth. This includes D and L amino acid isomers that can be polymerized into proteins as well as the five bases and the several sugars used in the genetic code polynucleotide DNA and RNA molecules. However it is quite certain that they could never have accumulated sufficiently in the ocean's "organic soup" to take part in the origin of life.

The following are some of the main difficulties with the "organic soup" theory: (1) many of the molecules that might be produced in the upper atmosphere would be almost completely destroyed by sunlight and cosmic rays before they settled in the ocean. (2) Along with the 20 L amino acids of interest, a much larger number of other amino acids would be formed which are of no use in living systems. By becoming incorporated into any of the amino acid polymer chains formed in the organic soup, these would have prevented the production of the amino acid chains of proteins that are needed for living cells. (3) Many of the building block molecules are very unstable and would decompose quite rapidly after their formation in the ocean. (4) The amino acids, hydroxy acids, keto acids, sugars, and other chemicals, such as hydrocyanic acid, which supposedly collected in the ocean, would be used up rapidly in reactions of no value for the beginnings of life. (5) Phosphate, which is essential in the formation of life, would practically all be precipitated from the ocean by the plentiful calcium and magnesium ions present there. (6) Lipid molecules are essential for the formation of living cells membranes. However, any fatty acid would be precipitated rapidly from the oceans by calcium and magnesium.

These and other difficulties suggest that, in all probability, the random chemical reactions necessary for the creation of the simplest living cell would not occur in an environment of an "organic soup".
AN UNDER WATER ULTRASONIC WAVE MASSAGE THERAPY DEVICE

Prof. Moshe Trop, Dr. Gedalia Mazor\textsuperscript{1}, Dr. D. Nemirovski\textsuperscript{1}, Dr. U. Levinger\textsuperscript{2} and Esther Gonen

Our research introduces an underwater ultrasonic massage therapy device that we would like to bring to the market in the near future.

Ultrasonic hydro massage stimulates the body’s blood circulation and leads to toxin removal. It also improves the metabolism and lymphatic circulation. Moreover, ultrasonic hydro massage raises muscle tone and allows the muscles to relax.

Ultrasonic waves are created when air bubbles rupture after colliding at high speed. The energy created by the wave’s converts into heat causing the blood vessels and capillaries to become dilated, thus facilitating the influx of nutrients and stimulation of the body’s immune system. Molecules in the body vibrate, creating a resonant effect and then increase energy levels.

Classical hydro massage consists of a strong water stream mixed with air created by atomizers located on the side of the bath. In traditional massage therapy, the pressure is applied directly to body tissues. In contrast, these ultrasonic bubbles apply pressure by actually penetrating the skin. This promotes cell activity and increases blood circulation inside the body tissues. Some Jacuzzi baths are already equipped with ultrasonic atomizers.

The proposed portable domestic spa technology offers an alternative health treatment for rheumatic pains and promotes muscle relaxation. It combines generators of ultrasonic waves and air bubbles in one portable machine, which is designed to form a sleeve that surrounds the affected limb and direct the water stream against it.

The device can be used in the home and in spas, as well as in hospital care units, hospices, etc. This device still has to acquire minimum safety standards approval to allow it to be sold as an over-the-counter (OTC) medical device for home use.

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THE EFFECT OF DIETS AND MEALS ON INFLAMMATION

Olga Raz, Dr. Tovit Rosenzweig\textsuperscript{*}, Prof Shlomo Berliner\textsuperscript{1}

Sub-clinical internal inflammation is associated with increased risk of insulin resistance, type 2 diabetes mellitus, and cardiovascular diseases. Inflammation is known to be induced by several factors, such as recurring infections, smoking, and sedentary lifestyle. In the last few years it was found that consumption of various diets with different compositions of carbohydrates, proteins and fats affects the inflammatory process.

The aims of this study are:

• To evaluate the effect of intervention programs, including consumption of high-complex-carbohydrate diet (HCCD) and intense physical activity, on the inflammatory state of morbidly obese subjects.

• To compare the effect of HCCD with the isocaloric American Heart Association Step 1 Diet (AHAS1D) on the development of inflammation in apparently healthy overweight subjects.

• To investigate the effect of a single meal composed of different type of fatty acids (saturated; saturated vs. monounsaturated; monounsaturated) on the development of inflammation in healthy subjects.

The results so far indicate that HCCD has anti-inflammatory effects. In addition, consumption of saturated fatty acid meals has unfavorable effects on the inflammatory state, as indicated by elevation of CRP and proinflammatory cytokines.

Future studies will explore the molecular effects of HCCD using microarray technology, as well as the genetic background (SNPs) that affects the anti-inflammatory response of different participants to the diet.

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MANAGING HEALTH AND FINANCE: CHALLENGES, OUTCOME AND CONTROL IN THE ISRAEL DEFENSE FORCES

Ilan Hosiosky, Dr. Yossi Weiss, Dr. Racheli Magnezi

The Defense budget comprises 16 percent of the State budget, which also finances the Ministry of Health and civilian health care. The health care funds receive their budgets from several sources, the capitation formula—which is determined by law—being the main factor that affects the allocation to each fund. The objective of this study was to describe how the budget allocated for medical services provided to soldiers, which is a public budget, is planned, managed, monitored, and controlled. Several aspects are considered: the interface with the civilian health system; the methodology for budgeting a health care system; possible results for managing a medically-centered budget; the possibilities for monitoring the provided services. We also examine the potential for decentralization of authority. Managing the budget, locating appropriate alternatives, and the availability and accessibility of medical services are important when arranging procurement and contracts with both military and civilian systems. Restructuring based on updated information might serve to improve future health services.

1 Medical Corps, IDF, Israel

CIGARETTE AND NARGILA (WATER PIPE) USE AMONG ISRAELI ARAB HIGH SCHOOL STUDENTS: PREVALENCE AND DETERMINANT OF TOBACCO SMOKING

Dr. Liat Korn & Dr. Racheli Magnezi

Cigarette smoking is a popular habit among Arab Israelis. Over the past decade, smoking tobacco using nargila, a water pipe, has become a popular and accepted behavior among teenagers in Israel. Although the use of this water pipe (nargila) is an old habit among Middle Eastern adult males, its emergence among youth is a new phenomenon.

A representative sample of high school students in Tayibe, Israel is the subject of this survey.

This sample represents data collected from 326 adolescents (boys 52.5% and girls 47.5%), ages 15–18, studying at one of the largest high schools in this Arab region of Israel. Our results show that one third of the sample population smoked either cigarettes (36.2%) or nargila (37.1%). The gender difference among youths smoking cigarettes was 24.8% (48.0% for boys and 23.3% for girls), in contrast to 37.6% (55.0% for boys and 17.4% for girls) for nargila. There was a statistically significant correlation between cigarette and nargila smoking in populations where religion played a smaller role in the children's life. The correlation also existed between parental smoking, and low student academic achievement. Students' perceptions of low academic achievement (OR 4.51, \( p < 0.001 \)), students' mothers who smoke (OR 3.57, \( p < 0.001 \)), and student's fathers who smoke (OR 2.75, \( p < 0.01 \)) increase the youths' chances of using nargila.

Our conclusions show that smoking cigarettes and nargila are equally popular, and that patterns of smoking cigarettes and nargila parallel each other.

It is our recommendation that there is a need for increased educational efforts to turn the tide on this new behavior.
This study examines the activity of nargila smoking among teenagers in Israeli society and additionaly examines the effects of this commonly accepted pastime.

The Nargila is a device used for smoking substances such as, tobacco, herbs and hard drugs, which works by water-filtration and indirect heat.

Over the past decade, nargila smoking using mainly tobacco has become an accepted behavior among teenagers in Israel. Our study examines nargila smoking among teenagers and its correlation to family and school problems and to risk behaviors, such as cigarette smoking and alcohol use.

This article presents the findings from the international study data of the HBSC (Health Behavior in School-aged Children), conducted by the World Health Organization. The Israeli representative sample consisted of data collected from 6681, 6th, 8th and 10th grade school children. Sampling consisted of data collected from the Jewish and Arab secular and religious, school systems.

This study shows a statistically significant association between nargila smoking and an involvement with other health risks.

Strong predictors in the use of nargila as a one-time experience, or as a weekly experience, correlate with a history of cigarette smoking, drunkenness and violence. These findings suggest that the causes that influence nargila smoking also influence other risk behaviors.

Our findings conclude that there is a need for a State prevention program and a protocol that consists of educating students, parents, teachers, and public health representatives about the risks of this accepted social behavior.

This study presents insights into safety promotion in community-based intervention programs, and their success in preventing unintentional injury among children.

We modeled and used an evaluation tool to estimate the effectiveness of these community-based injury prevention programs. The intervention program we studied consisted of a five-year multidisciplinary, multi-strategic childhood safety promotion and injury prevention protocol. The purpose of this program was to set up safety awareness in ten low-income communities in Israel. This study describes the process, impact and outcome of these intervention programs.

The study includes the difficulties faced during the evaluation process, implementing the programs goals and documenting the insights gained from this pilot program. Findings suggest that evaluating the program was a positive and important undertaking. Evaluating the success of the outcome in the earlier program, however, did not confirm its effectiveness. It appears there were hindrances to the progress and implementation of the program.

This study gave us insights into the many obstacles faced by the pilot program. It also gave us tools to correct such obstacles in the future.
CHILDREN INJURY PREVENTION: INTERVENTION IN THE BEDOUIN CITY OF RAHAT

Dr. Michal Hemmo-Lotem¹, Efrat Merrick², Liri Endy-Findling³,
Aziza Abu Freh⁴, Claudia Jinich-Aronowitz⁵,
Dr. Liat Korn & Prof. Joav Merrick⁶

For several years, the National Center for Children’s Health and Safety (Beterem) has worked on many levels to promote the safety of children in Israel. One of these projects is a 1- year, multidisciplinary, multi-strategic childhood safety promotion and injury prevention project that took place in the Bedouin city of Rahat in the Southern part of Israel. This specific intervention study took place from March 2003 to March 2004.

The main goals of the project is to identify hazards and dangerous obstacles in public places in Rahat. In order to provide a safe public environment for the children we removed or repaired these obstacles. We defined “Obstacle” as any barrier that could endanger the safety of a child. We defined ten examples to illustrate the hazards in this applied research project, and we solved 80% of the problems within the project period (time to solve the problems took between 1 week and 3 months, depending on various factors).

We recommend the involvement of a safety coordinator from the community to identify and focus on safety hazards, the use of a documentation diary to log the time to identify and solve the problems and the use of photographs to illustrate the hazards and the changes.

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VARIOUS CONTRACT SETTINGS AND THEIR IMPACT ON THE COST OF MEDICAL SERVICES

Dr. Racheli Magnezi, Dr. Rachel Dankner¹, Dr. Ron Kedem² and Prof. Haim Reuveni³

The aim of this study is to analyze the effects of outsourcing healthcare on career soldiers in the Israel Defense Forces (IDF) in different settings, with a view to developing a model for predicting per capita medical costs. Demographic information and data on healthcare utilization and costs were gathered from three computerized billing databases relating to the IDF Medical Corps, a civilian hospital, and a healthcare fund; the three provided services to 3,746, 3,971, and 6,400 career soldiers, respectively. Visits to primary care physicians and specialists, laboratory and imaging exams, number of sick-leave days, and hospitalization days, were totaled for men and women separately for each type of clinic. A uniform cost was assigned to each type of treatment to create an average annual per capita cost for medical services of career soldiers. A significantly higher number was recorded for visits to primary care physicians and to specialists, as well as imaging examinations by Leumit Healthcare Services (LHS), than for visits and tests in hospitals or in military clinics (p<0.001). The number of referrals to emergency rooms and sick-leave days was lowest in LHS as compared with the hospital and military clinics (p<0.001). The medical cost per capita/year was lowest in LHS as well. It appears that outsourcing primary care for career soldiers to a civilian healthcare fund represents a major cost effective change, associated with lowest consumption and lower cost of medical care. Co-payment should be integrated into every agreement with the medical corps.

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THE COST OF PREVENTING STIGMA BY HOSPITALIZING SOLDIERS IN A GENERAL HOSPITAL INSTEAD OF A PSYCHIATRIC HOSPITAL

Dr. Racheli Magnezi, Ilan Zrihen, Isaac Ashkenazi, Gad Lubin

Hospitalization costs in psychiatric hospitals are lower than in psychiatric departments of general hospitals. However, soldiers hospitalized in psychiatric hospitals are subject to the stigma associated with mental illness. The goal of this study was to examine the financial costs of preventing such stigma by hospitalizing soldiers in psychiatric departments of general hospitals rather than less-expensive psychiatric hospitals. A further goal was to find ways to reduce hospitalization costs, taking into consideration the consequences of the stigma to patients and their families. Costs, medical data, and demographic data were gathered from records of soldiers hospitalized for psychiatric illness. The most expensive causes of hospitalization were determined (acute psychotic state and adjustment disorders) and the characteristics of the soldier most likely to present psychosis were described. Recommendations include rerouting patients from hospitalization to ambulatory day care when possible and from general to psychiatric hospitals. We also recommend adopting a psychiatric diagnosis related group pricelist to standardize sums paid per diagnosis, and creating a system for considering, on a case-by-case basis, early discharge of soldiers with psychotic disorders during the stressful first half year of military service.

OUTSOURCING PRIMARY MEDICAL CARE IN THE ISRAELI DEFENSE FORCES: DECISION-MAKERS 'VERSUS CLIENTS' PERSPECTIVES

Dr. Racheli Magnezi, Dr. Rachel Dankner, Dr. Ron Kedem and Prof. Haim Reuveni

Decision-makers in the Israeli Defense Force (IDF) determined that the Medical Corps (MC) would outsource the primary care services required by career soldiers to a skilled civilian health care provider, in an attempt to improve the efficiency, quality and 'image' of the MC care system, while controlling expenses. A cross sectional survey designed to reveal the decision-makers' considerations for outsourcing primary care for career soldiers and to evaluate whether these considerations matched career soldiers' satisfaction level parameters was conducted during February 2002 in IDF bases and civilian primary care clinics. The results reveal that MC decision-makers are concerned about loss of professional prestige and dependence on the civilian system. On the other hand, a high level of satisfaction following outsourcing was found among career soldiers due to: medical staff attitude, pleasant facilities, quality of care, availability and accessibility of medical care. Agreement about five factors was found among decision makers and career soldiers: working environment, medical personnel attitude, quality and availability of medical care, and patient satisfaction level. It was concluded that outsourcing of primary care from military to civilian providers gives high client satisfaction level. The motivation for and results of outsourcing are relevant to other large organizations worldwide.

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DEVELOPMENT OF A CAPITATION SCALE FOR IDF CAREER SOLDIERS IN ISRAEL

Dr. Racheli Magnezi, Dr. Yossi Weiss, Yossi Cohen and Dr. Amir Shmueli

The Israeli National Health Insurance Law allocates a national healthcare budget to the sickness funds, which in turn provide medical care to the civilian population. Medical care for members of the IDF is financed through the budget of the Ministry of Defense and is not included in the national healthcare budget. Benefits provided to soldiers serving in the permanent forces are far more extensive than those provided to civilians. Because of the absence of co-payments, poor management, and the cost-based budget, military healthcare costs in Israel are expected to exceed civilian healthcare costs (after adjusting for age and sex).

The present study derives age- and sex-based capitation rates for military personnel, and compares military and civilian age-based expenditure and capitation rates.

THE SCHOOL OF ARCHITECTURE

ASSESSING THE USE OF METAPHORS IN THE DESIGN PROCESS

Dr. Hernan Casakin

Metaphors enable understanding of a concept in terms of another concept, which is generally not associated with it. In problem-solving tasks, reasoning by metaphors has a significant influence in the development of innovative ideas. In the design domain, metaphors help to structure thinking and to represent situations from a new viewpoint. Despite the frequent use of metaphors in design practice, no empirical work has studied in depth the role played by metaphors during the whole design process. In this research, the use of metaphors is explored in terms of its impact and complexity, during the different phases of the design process. These phases deal with the definition of design concepts and framing of design situations, the generation of goals and constraints, and the mapping and application of structural relationships to the design problem.

DESIGN AIDED BY VISUAL DISPLAYS: A COGNITIVE APPROACH

Dr. Hernan Casakin

Visual displays provide a valuable supportive tool for solving design problems. Throughout the design process and, particularly, in the early stages of the process, designers are exposed to a vast number of visual displays. These include various external representations, such as pictures, diagrams or sketches, which provide designers with helpful explicit and implicit references. Despite the importance of this pictorial material, only a small number of studies have examined the spontaneous use of visual displays as an aid in design problem solving, when no instruction to use analogy is given. Furthermore, no studies have compared the impact of visual displays in solving ill-defined and well-defined design problems. The main goal of this work is to empirically investigate the use of visual displays in these two problem contexts, by studying the design process of groups of designers with different levels of expertise. Findings showed that both experts and novices profited from the use of visual displays in ill-defined design problem solving, resulting in a significant enhancement in the quality of design solutions. Additional results showed that visual displays did allow experts, but not novices, to improve their performance in solving well-defined design problems. These findings may have interesting consequences for design education. It is suggested that practicing with both within-domain visual displays (which belong to the same or closely related area as the original problem) and between-domain visual sources (which belong to a remote area) can help designers in general, and novices in particular, to spontaneously retrieve meaningful information and to enhance their design abilities.
ASSESSING CREATIVITY IN DESIGN PROBLEM SOLVING
Dr. Hernan Casakin & Dr. Kreitler

This study is focused on the assessment of creativity in design problem solving. The purpose is to examine the possibility of defining creativity in design in terms of objectively measurable characteristics. An empirical research was carried out among students of architecture from first to fifth years. Their design outputs were evaluated by expert judges. The assessment of creativity in design was based on a number of factors dealing with: fluency, flexibility, elaboration, and innovation as well as aesthetic skills in design representation, fulfillment of design requirements, reference to context and usefulness. Findings showed that the evaluation of creativity in design corresponds mainly to innovation. Although evaluations do not correspond to other components of creativity, such as fulfillment of design requirements, flexibility, fluency, usefulness, these were found to be important. Elaboration and reference to context were found to have the weakest effect on creativity evaluations.

SELF-ASSESSMENT OF CREATIVITY: IMPLICATIONS FOR DESIGN EDUCATION
Dr. Hernan Casakin & Dr. Kreitler

This study examines self-assessed creativity and design. In particular, it analyzed the relationships of self-assessment with the level of expertise, and the grades obtained by students in the course of their academic studies, with possible implications for design education. Findings support the view that self-assessed creativity is a valid and legitimate tool for design evaluation. Understanding how students assess their own design tasks and products have important implications for design education, and paves the way for generating intervention programs to encourage and develop design creativity.

1 Tel Aviv University

METAPHORS AS AN ALTERNATIVE REFLECTIVE APPROACH TO ARCHITECTURAL DESIGN
Dr. Hernan Casakin

Metaphors affect the way designers think, perceive, conceptualize, and organize their knowledge. The vague character of metaphors allows capturing the essence of a problem under different perspectives. In the design domain, this cognitive strategy can help to reflect over a problem situation, and restructure it anew. This is particularly relevant in design problem solving which by definition is ill-structured. Empirical research dealing with the use of metaphors as a supportive design tool was carried out. The investigation enabled an insight into the way metaphors helped students, and the knowledge gained from the application of this tool in design problem solving. Moreover, it was possible to identify what were the most frequent difficulties found during the process, and what could be the role of metaphorical thinking in future design tasks. Metaphors are proposed as an alternative reflective approach, and as an educational tool for the development of design skills.
THE SCHOOL OF MASS COMMUNICATIONS

KEEPING IN TOUCH: USES OF NEW MEDIA FOR POLITICAL ORGANIZATION AND SOCIAL CAPITAL ENHANCEMENT

Dr. Azi Lev-On

Former residents of the evacuated Gush Katif region, once parts of closely-knit and cohesive communities, have been spread across Israel in temporary settlements since the disengagement. The goal of this study is to learn how they interact with one another to organize politically and to enhance their social capital.

To study the use of communication media by Gush Katif evacuees, we are conducting two related studies. One consists of a survey of the users of Katif.net, the major Internet site in use by former residents of Gush Katif. This seems like an unusual case of a virtual community that continues to thrive online even as its offline ‘predecessor’ has disintegrated. The second study involves a survey of members of Katif communities who have re-settled with the entire respective community, along with members of other communities who have re-settled as individuals. We will look at the differential patterns of media uses by members of these groups.

The study is innovative in its uses of Web-based surveys and data analysis. It can provide valuable insights about the ways the online realm functions as scaffolding for offline political activism and social ties.

STUDYING INTERNET-BASED COLLABORATIONS

Dr. Azi Lev-On

Collaborative projects such as Wikipedia, YouTube, project Gutenberg and many more demonstrate the feasibility of using the internet as an organizational hub for the production of large-scale and complex public goods, based on small donations by many contributors. Existing studies focus on particular domains such as the production of open-source software and a small number of ‘flagship’ collaborations. In a series of surveys I examine the scope and levels of motivations to contribute to more socially- and politically-oriented ‘civic’ collaborations in such policy areas as crime prevention, consumerism, local community action, and more. We can extrapolate from this research to learn about the potentials to implement participatory models of democracy online.

The surveys aim at identifying people’s types and levels of motivations to contribute to online collaborations, and they address a variety of related questions, like the scope of contributions, the background of volunteers, the sense of community, trust, spillover effects to volunteering offline, and more.
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