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Research Profile

of

Ariel University

ARIEL UNIVERSITY | Kiriat Hamada, Ariel, 40700, Israel

Last updated 07/2019

From the Desk of the Vice President and Dean for Research and Development

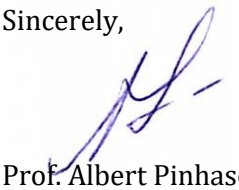
Since receiving accreditation in 2012 as the eighth Israeli university, Ariel University is the fastest growing university in Israel. Ariel University serves as a home to young, dedicated and innovative researchers and to several diversified interdisciplinary research centers.

Located in the heart of Israel, Ariel University is a natural continuation of Israeli heritage. We are proud to take part in advancing Israel's internationally recognized position as a central hub of research for the benefit all of humankind.

This Research Profile collection briefly presents key research highlights from the 4 faculties and 2 schools offering studies in 26 different departments at Ariel University. This coming year will see the opening of the Dr. Miriam and Sheldon G. Adelson School of Medicine, which will become the Israel's sixth medical school, Further accelerating the development of medical research in Ariel.

As research advances, topics continually interface and research becomes increasingly interdisciplinary. In order to get most out of this Research Profile, we recommend to search by both keywords and by department.

Sincerely,



Prof. Albert Pinhasov
Vice President and Dean for Research and Development
Ariel University

ARIEL UNIVERSITY

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RESEARCH CENTERS

https://www.ariel.ac.il/wp/rnd/research-centers/

THE SCHLESINGER FAMILY CENTER FOR COMPACT ACCELERATORS, RADIATION SOURCES AND APPLICATIONS (FEL)

Head of Institute: Prof. Aharon Friedman
Head of the User Facility: Prof. Asher Yahalom
Year of establishment: 1999
Website: https://www.ariel.ac.il/wp/fel/

Field of Research:
Accelerators, Radiation Sources and Application.

The Schlesinger Center is Israel's national knowledge center for accelerator and radiation sources. The center is home to three accelerators that cover a wide range of applications from cancer treatment and medical research to development of security technologies and more. The center works closely with the Israeli Ministry of Defense and collaborates with similar institutions worldwide.

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ARIEL ENERGY RESEARCH CENTER

Head of Center: Dr. Itsik Sapir
Year of Establishment: 2009
Website: https://www.ariel.ac.il/management/energy-research-center-ariel

Field of Research:
Energy production, conservation and management, water and wastewater treatments

The Energy Research Center at Ariel University is an inter-disciplinary center involving Mechanical Engineering, Chemical Engineering, Electrical Engineering as well as Chemistry, Biology, and Financial disciplines.
Many graduate students, Ph.D. students and Post-Doc researchers and experts from Israel and abroad are involved in the research being conducted in laboratories at the Energy Research Center. The academic faculty enlists the help of the students to achieve the research objectives and to train the next generation of scientists and engineers.

Services provided by the Center:

- Programmable Sources and Loads Hydrogen Facilities
- Fuel Cells Power Electronics
- CFD and FE combined analysis
- Heat transfer measurements
- PIV measurements

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ARIEL CENTER FOR PHOTONICS AND SOLID STATE

Head of Center: Prof. Shmuel Sternklar
Year of establishment: 2019

Fields of Research:
Photonics, optics, Interferometry, Spectroscopy, Plasmonics, Nanoelectronics, imaging.

The Ariel Center for Photonics and Quantum Electronics is a home for innovative basic and applied research in all areas of photonics.the Centes nurtures interdisciplinary research in a wide spectrum of fields in photonics , and serves as a conduit for spinning off photonic-related application to industry.

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HOMELAND SECURITY R&D CENTER

Head of Center: Prof. Yosef Pinhasi
Year of Establishment: 2000

Fields of Research:
Wide band communications and radars, millimeter and tera-Hertz wave passive and active remote sensing and imaging, energy efficient communication techniques, accurate time and frequency analysis and characterization, transmission detection and identification, radiative power beaming, high power masers, lasers and free-electron lasers, spectroscopic measurement techniques for dielectric materials characterization, 5G physical layer communication techniques, software defined radios for millimeter wavelengths, millimeter wave antenna arrays and variable focusing dishes, reduction of elements in patch antenna arrays, atmospheric propagation models for millimeter and sub-millimeter radiation (including fog and haze), modeling of indoor and outdoor wireless links including multi-paths and fading.

The Center provides the following services:
Analytical and numerical methods for modeling distributed interactions between electromagnetic radiation and dielectric materials, equipment for measurement and characterization of wireless systems, materials and propagation in a wide band of frequencies up to the Terra-Hertz regime. Multi-wave antennas and components, wide-band radiations sources and (coherent and non-coherent) detectors.

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ROBOTICS RESEARCH AND APPLICATION CENTER (RRAC)

Head of Center: Prof. Shraga Shoval
Year of Establishment: 2016

Fields of Research:
Mobile robots, motion planning, swarm robotics, drones, cobots, intelligent systems, intelligence control of complex systems.

The Robotics Research and Application Center (RRAC) integrates theoretical and practical research problems, algorithms and systems. The RRAC has expertise in the design of mobile robots in challenging terrains, implementation of robotics technologies in traffic safety, motion planning of robotic swarms (ground as well as areal) and the integration of Cooperative Robots (Cobots) in manufacturing and medical systems.

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ARIEL CYBER INNOVATION CENTER (ACIC)

Head of Center: Major General (Res.) Ami Shafran, Dr. Amit Dvir, Dr. Eran Omri
Year of Establishment: 2013
Website: http://www.ariel-cyber.co.il/

Fields of Research:
Cyber Technologies, information security, cryptography, security regulation

ACIC's primary objective is to offer robust infrastructure for all cyber security research and developmentת such as information security, cryptography, security regulation, and criminology. ACIC aims to solidify its leadership role in the community of cyber security practitioners, building itself up as a hub of intra- and inter- institutional collaboration and cooperation with academic institutions, industries, governmental organizations, and across public and financial sectors. The center is also committed to the next generation of cyber security professionals, and will support young researchers so that they embody the highest ethical and professional standards. The Center provides the following services:

- Research laboratory
- Comprehensive Cyber Training System Range (in collaboration with CyberBit)
- Special grants encourage cyber research in the university

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DATA SCIENCE AND ARTIFICIAL INTELLIGENCE RESEARCH CENTER

Head of Center: Dr. Amos Yehuda Azaria, Dr. Chen Hajaj
Year of Establishment: 2019

Fields of Research:
Data Science, Artificial Intelligence

Ariel University established the Data Science and Artificial Intelligence Research Center to support research in data science and its related fields, promote collaboration, and train future data scientists. The center connects experts with academics from various fields across campus who specialize in a variety of disciplines. In addition, the center supports graduate students who major in the core fields of data science.
We believe in the great potential of data science and artificial intelligence and welcome you to join us in turning this potential into practical and applicative research.

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DISASTER RESEARCH CENTER, IL

Head of Center: Dr. Avi Zigdon
Year of establishment: 2018
Website: https://www.ariel.ac.il/wp/afranaim

Fields of Research:
Multidisciplinary and interdisciplinary emergencies and large-scale sudden disasters.

The Disaster Research Center, IL (DRCIL), is a leading multidisciplinary and interdisciplinary research center for the study of all-hazard emergencies and large-scale sudden disasters (LSSD). The objective of DRCIL is to conduct operational and tactical LSSD preparation research in order to promote innovative contributions from diverse fields of expertise. The research outcomes will be published to the public and boost potential expert collaborations.

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NAVIGATION AND ACCESSIBILITY RESEARCH CENTER OF ARIEL UNIVERSITY (NARCA)

Head of Center: Dr. Daniel-Robert Chebat
Year of establishment: 2019

Fields of Research:
Navigation, orientation & mobility, accessibility, blindness, visual impairment, disability, computer accessibility, sensory substitution, sensory enhancement, cognitive neuroscience, psychological research, behavioral research, psychophysics, navigational aids, cognitive aids.

The Navigation and Accessibility Research Center of Ariel University (NARCA) is an institution within the Department of Behavioral Sciences Psychology of Ariel University, Israel. The NARCA supports research on orientation and mobility, navigation, accessibility and travel aids of all kinds for people with sensory or cognitive deficits. Our research will focus on teaching of skills for accessibility and navigation, the use of tools and gadgets for accessibility and navigation, and general research on these topics, in terms of practical applications or theoretical research. The NARCA provides research facilities for scientists from a wide range of disciplines, for example the

humanities, neuroscience, engineering, neurolinguistics, neuromarketing, neurology, psychology, and behavioral sciences.

NARCA comprises several different research groups based in different departments at Ariel University (Behavioral Science, Psychology, Engineering, Education, Social Sciences and Medicine), we also collaborate with several different research groups at other Universities and Institutions.

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AGASS - ASTROPHYSICS GEOPHYSICS, AND SPACE SCIENCE

Head of Center: Prof. Boaz Ben Moshe
Year of establishment: 2018

Fields of Research:

Nano-satellites, sattelites communication, remote sensing, environmental modeling.

The center deals with astrophysics (including cosmological subjects), geophysics and space science (including planetary physics of bodies in the solar system and beyond). It is a multidisciplinary field that covers theory, observations and development of advanced technologies. The center aims to conduct international level interdisciplinary research at Ariel University to promote a basic scientific understanding of the astrophysical and cosmological phenomena related to the origins of the universe. It also promotes research in other fields related to geophysics, atmospheric physics, space exploration and the solar system.

Ariel University is actively involved in research using observations carried out at the Mount Hermon Cosmic Ray Observatory.

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MATERIAL RESEARCH CENTER

Head of the Center: Prof. Michael Zinigrad
Year of Establishment: 2000
Website: http://www.ariel.ac.il/sites/conf/mrc/

Fields of Research:

Nanotechnology, metallurgy, mathematical modeling, advanced coating technologies, electrochemistry and corrosion.

The Material Research Center coordinates and promotes research activities in the field of materials engineering. The center has five well-equiped and advanced labrotories, using novel approaches and tequinches, addressing now-days chalanges.
Presently the following research groups are working in the framework of the Center:

- Advanced Materials Laboratory
- Metallurgy and Applied Nanoscience Research Lab
- Laboratory of Composite Films Fabrication
- Biomaterials Laboratory
- Laboratory for Materials and Samples Preparation

The special features of the research activities of the Center are as follows:

- Using of advanced techniques (such as mathematical simulation) for the optimization of existing materials technologies and development of new technologies and materials.
- Research in a field of materials for energy sources (solid oxide fuel cell, photovolaics materials, litium-ion battery materials, etc.).
- Solving various ecological problems by means of implementing alternative processes, utilizing alternative raw materials and developing green materials and technologies.
- Wide application oriented basic investigations aimed at providing strong scientific base for future applied research projects.

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THE CENTER FOR RADICAL REACTIONS RESEARCH

Head of Center: Prof. Dan Meyerstein
Year of establishment: 2019

Fields of Research:
Radicals, photochemistry, bioradicals, radiation chemistry, electrochemistry, sonochemistry, redox processes, water splitting, advanced oxidation processes, environmental processes.

The Ariel Center for Radical Research studies all aspects of radical processes. The center has access to a linear electron accelerator, as well as to photochemical, electrochemical and sonochemical equipment.

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THE SCHLESINGER FAMILY MEDICAL RADIATION PROTECTION, TRAINING, INFORMATION AND RESEARCH CENTER

Head of Center: Emeritus Prof. Tuvia Schlesinger, Dr. Dan Gamliel
Year of establishment: 2002

Fields of Research:
Medical imaging, ionizing radiation, radiotherapy, radiation protection.

The Schlesinger Medical Radiation Center is a center for research, teaching and information on medical imaging (especially with X-rays and radioactive sources), radiation therapy and radiation protection.

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INSTITUTE FOR PERSONALIZED AND TRANSLATIONAL MEDICINE

Head of Institute: Dr. Igor Koman. MD, PhD, DrSc
Year of establishment: 2014
Website: https://www.translationmed.com/

Field of Research:
Drug Research and Development, 3D Bio Printing, Non-invasive medical sensors

IPTM bridges the research bench with the industry by providing cutting edge technologies supported by highly effective management at all stages of project development. The institution intresets lie on a spectrum of areas and include Drug Discovery and Repurposing, Personalized Medicine, 3D BioConstructing and Medical Cannabis.

IPTM provides the following services:

1. 2D/3D Cell Culture Facilities
2. Pre-clinical Studies in anti-cancer drug development

International Liaisons:
Roswell Park Cancer Research Institute, Buffalo, USA
The Baruch Padeh Medical Center, Poriya, Israel
Fundació Hospital Universitari Vall d'Hebron – Institut de Recerca, Barcelona, Spain
Ben-Gurion University, Beer Sheva, Israel
Albert Einstein College of Medicine, New York, USA
SUNY Downstate Medical Center, New York, USA
InSphero, Zwitzerland

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ARIEL CENTER FOR APPLIED CANCER RESEARCH

Head of Center: Prof. Michael Firer. PhD.
Year of establishment: 2010

Field of Research:
Cell biology , Molecular biology, Immunology, Biophotonics, Bioinformatics, Medicinal chemistry.

At ACACR, researchers from a wide spectrum of disciplines are applying their expertise to spearhead an innovative interdisciplinary battle against cancer that crosses yesterday's traditional biomedical boundaries, leading to applied practical applications using cutting-edge technology and science.

Our mission is:

- To facilitate interdisciplinary research collaboration between faculty members at the Ariel University into applied aspects of cancer research.
- To focus the research goals of the Center on the development of innovative applications for the prevention, diagnosis and treatment of cancer.
- Encourage research collaborations between the center's faculty members and other scientists in Israel and abroad.

The expertise of the current Center faculty members covers a broad scientific disciplines:

- Cell biology
- Molecular biology
- Immunology
- Organic and synthetic chemistry
- Biophotonics, electronics, electromagnetics and physics,
- Mathematics
- Bioinformatics.

Collaboration between these scientists provides the fertile soil needed to develop new breakthroughs technological in the fight against
cancer.

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CANCER CHEMICAL GENETICS CENTER

Heads of Center: Prof. Michael Sherman
Year of Establishment: 2018

Fields of Research:
Genomics, drug cocktails design, predictive biomarkers

The Center has established a strong research base in Cancer studies both fundamental and translational. The major focus is development of a strategy to enhance the activities of existing anti-cancer drugs and drug candidates.

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ARIEL INTEGRATIVE BRAIN SCIENCE CENTER (IBSCA)

Heads of Center: Dr. Izhak M. Michaelevski
Year of Establishment: 2006
Website: https://www.ibsca.net/

Fields of Research:

Investigation of major brain functions and diseases using integrative research approaches encompassing molecular, behavioral, pharmaceutical, biotechnological, optical and mathematical techniques.

The center is an interdisciplinary interdepartmental and interfaculty entity uniting the scientists from different fields with the central goal to unravel the mysteries of the neural system. The purpose of IBSCA is to investigate major brain functions and diseases using integrative research approaches encompassing molecular, behavioral, pharmaceutical, biotechnological, optical and mathematical techniques. The Center comprises young scientists conducting cutting-edge research using the latest technology.
IBSCA serves as a platform for research collaborations with other institutions in Israel and around the globe.

The Center provides the following services:

- Behavioral Neuroscience Unit;
- Scanning Electron Microscope JEOL JSM 6510LV with Electron Dispersive Spectroscopy NORAN SS7;
- Molecular Biology Unit;
- In vitro, ex vivo, and in vivo electrophysiology;
- Optogenetics;
- Optical Imaging Unit;
- Bioinformatics service.

The center is actively involved in working out and establishing of new advanced neuroscience study approaches and in cultivation of excellent future neuroscientists.
The Center has long-standing collaborations with scientists from the United States (Vanderbilt University, Roswell Park Cancer Institute) and the Russian Academy of Science.

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THE RESEARCH CENTER FOR DENTAL MEDICINE

Head of Center: Dr. Andy Boiangiu, Dr. Gadi Turgeman
Year of Establishment: 2018

Fields of Research:
Dental medicine, regnereative medicine, tissue engineering, biomaterials.

The center is a home for both basic science researchers as well as clinicians, providing a multi-disciplinary approach for innovative translational research in dental medicine. It also aims to bridge the gap between genral dental practitioners and the academia, by providing courses and tools for GPs intrested in research.

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THE INSTITUTE OF ARCHAEOLOGY

Head of Institute: Prof. David Ben-Shlomo
Year of establishment: 2015
Website: http://archaeology.afau.org/

Fields of Research:
Archaeology and History of the Ancient Near East.

The Institute of Archaeology at Ariel University is the newest archaeological institute in Israel and was established with the vision of bringing new approaches to archaeological research in the region. The Institute views archaeology as an integral part of humanity's cultural heritage which can, and should, serve as a link between the academy, the public and our common past. With this in mind, the Institute develops programs dedicated to "community archaeology", integrating both local schools as well as volunteers from Israel and abroad, of all ages and from all walks of life.
Several projects under the aegis of the Institute are currently underway:

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THE MIDDLE EAST & CENTRAL ASIA RESEARCH CENTER

Head of Center: Dr. Ronen Choen
Year of Establishment: 2013
Website: http://www.ariel-mecarc.com/

Fields of Research:
Middle East, Political Science, International Relations and Law.

The center provides a unique forum for interdisciplinary research from fields of social sciences, international relations and humanities relating to Middle East (ME) issues. The goal of the center is to advance knowledge of significant past and present movements and forces working in the region. These insights are critical in decision-making in today's world where the ME plays a global role. The center's regular online publication, THE JOURNAL FOR INTERDISCIPLINARY MIDDLE EASTERN STUDIES (JIMES), and is published regularly with contributions from scholars from Israel and overseas.
The center has four main research devisions:

- Iranian and Shi'a Affairs
- The Normalization of Relations with Arab and Muslim States
- Israeli Arabs & Palestine Division
- Public Diplomacy & Foreign Policy Division

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HOLOCAUST HISTORY CENTER

Head of Center: Dr. Kiril Feferman
Year of Establishment: 2018

Fields of Research:
Holocaust, Jewish History

The Center for Holocaust Research promotes documentary-based and historically-grounded scholarship about the developments that paved the way to, comprise, and issue from the Holocaust. Jewish dimension of the Holocaust is viewed across the entire political spectrum. Within this framework, given its numerical importance and generally galvanizing potential, special attention is given to the elucidation of the processes in Eastern Europe within and towards the Jewish population, as well as the Jewish religious responses vis-à-vis the Holocaust.

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THE CENTER FOR JEWISH STUDIES AND STATE OF ISRAEL HISTORY

Head of Center: Prof. Yossi Goldstein
Year of Establishment: 2015

Fields of Research:
Bible, Talmud and Jewish law, Hebrew literature, Yiddish and folklore, Jewish history and modern Judaism, history of Zionism, Jewish and Israeli press, history of the State of Israel, Jewish sociology, Jewish economics, sociology of Israeli society, Jewish philosophy, and Hebrew and Jewish languages

The Center for Jewish and Israel Studies was recently founded at Ariel University for the purpose of promoting excellence in scholarship in the fields of Jewish studies and the history of Israel. The Center will serve as a supportive home for outstanding scholars working in a broad range of disciplines within the humanities and social sciences.

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THE INSTITUTE FOR THE STUDY OF NEW MEDIA, POLITICS AND SOCIETY

Head of Institute: Prof. Azi Lev-On
Year of Establishment: 2011

Fields of Research:
Communication, Internet, social media.

The Institute is an "incubator" for initiating, managing and supporting research on the effects of new media, i.e. social media, smartphones, the "Internet of things" and more.

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FACULTY OF ENGINEERING

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All departments in the Engineering Faculty have received official recognition from the Council of Higher Education and are authorized to register their graduates in the Engineers' Ledger. Considerable resources are being invested in developing and renovating the school's engineering laboratories. The course of studies is aimed at imparting an academic engineering education, while emphasizing training and preparing the graduates for careers as engineers in the market's most innovative fields. Hundreds of graduates of these programs have already successfully integrated into Israel's hi-tech industry and into graduate degree programs at other academic institutions.
This faculty unites five departments:

1. Electrical and Electronics Engineering
2. Civil Engineering
3. Chemical Engineering – Biotechnology and Materials
4. Mechanical Engineering – Mechatronics
5. Industrial Engineering and Management

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Head of Department:
Prof. Monika Pinhas
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The Department of Electrical Engineering and Electronics was established in 1992, while the Department's B.Sc. and M.Sc. degrees (with thesis) were formally recognized by the Council of Higher Education in 2004 and 2007, respectively.
The academic staff is engaged in a wide variety of theoretical and experimental research tracks, some of which are funded by various national and international funding agencies. Hundreds of graduates of the Department have successfully integrated into RandD centers in private industry, in the public sector and in Ph.D. programs at Ariel University as well as at other universities.
The teaching and research laboratories include: radio frequency (RF) and monolithic microwave integrated circuit (MIMIC) research, computer communications, electrooptics and biophotonics, millimeter, submillimeter and terahertz waves research, high voltage and quality control, machinery

and high power, superconductors, microwave, control systems, radiation laboratories, and algorithms research and development.
In 1999, the Free Electron Laser Center (FEL) was established at Ariel University and is now recognized as a national research center by the Israeli Ministry of Science. The FEL facilities are used by scientists and professionals from Israel and abroad.

ELECTRICAL AND ELECTRONICS ENGINEERING

Prof. Yahalom mainly work in classical field theory, which includes the following sub topics:

- Fluid dynamics and Magneto hydrodynamics: Variational Analysis, Symmetries and Conservation Laws, Analytical and Numerical solution methods.
- Electromagnetism: Fault Allocation method, Relativistic Engines, Diamond Characterization, and Humidity Detection in the sub-terrain root layer, Cancer Treatment.
- Gravitation: Stability of solutions in General Relativity.

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ELECTROOPTICS LABORATORY

The Electrooptics Laboratory is engaged in basic and applied research in the following areas: advanced concepts in optical radar and 3D imaging, nonlinear optics in optical fiber and solid-state materials, RF photonics, fiber-optic sensors, surface enhanced Raman spectroscopy, optical scattering in diffuse media, optical communications, quantum optics and development of terahertz sources. Prof. Shmuel Sternklar is the Head of the Laboratory, and Prof. Er'el Granot is associated with it. The researchers in the Laboratory include doctoral, masters as well as undergraduate students. Several research programs in the Laboratory are or have been supported by external funding programs such as the Israel Science Foundation, the Israel Innovation Authority (formerly, the Office of the Chief Scientist), and the Israel Ministry of Defense.

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HIGH VOLTAGE (HV) LABORATORY OF POWER NETWORKS AND SYSTEMS

The High Voltage (HV) Laboratory of Power Networks and Systems is designed for teaching and research in the field of HV transmission, distribution and power supply systems of different purposes. The main directions of research focus on various aspects of the electric power quality (EPQ) such as:

- Influence of certain types of voltage distortions on different types of electrical equipment;
- Economic damage caused by the reduction of the EPQ in power networks;
- Power meter measurement errors in power networks with different types of current harmonic sources;
- Determination of additional losses in power transformers due to current harmonic levels;
- Frequency response of measuring current and voltage transformers;
- Methods and means of improving the EPQ;
- Problem of reliable registration of the regime parameters as random processes in electrical power networks.

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MILLIMETER AND SUB-MILLIMETER WAVELENGTH RESEARCH LABORATORY

Three main research topics are prioritized in the Millimeter and Sub-Millimeter Wavelength Research Laboratory:

- Millimeter wave (MMW) and THz imaging using a very inexpensive plasma lamp called a Glow Discharge Detector (GDD): So far, we developed an 8X8 GDD Focal Plane Array (FPA);
- Realization of chirp MMW RADAR using GDD;

- Fourier transform infrared spectroscopy (FTIR) in MMW, Far Infrared (FIR), and Mid Infrared (MIR): The spectroscopy research deals with characterization and recognition of materials according to their signature.
- Metamaterials properties are also investigated in the Millimeter and Sub-Millimeter Wavelength Research Laboratory.

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OPTIMAL CONTROL AND STABILITY LABORATORY

The Laboratory deals with the theory of dynamical discrete/continuous (hybrid) systems: unified state models of single-rate and multi-rate systems, stability, controllability, observability, optimal control and estimation, filtering, terminal control, computer-aided methods of control systems design, and parametrical optimization and simulation.

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HIGH POWER MILLIMETER WAVE GYROTRON LABORATORY

In this laboratory high power microwave and millimeter wave tubes are developed, mainly based on a novel ferroelectric cathode as an electron source and gyrotrons as tubes. Until now, gyrotron tubes with ferroelectric or thermionic cathodes from 7GHz to 95GHz, with output power of up to 100KW and with pulse duration from 100ns to 0.5ms, have been demonstrated. Currently, a water-cooled DC Solenoid has been developed for a 1.8T magnetic field. It has been manufactured and successfully tested at the target magnetic field for more than 5 minutes. The solenoid was integrated in the Gyrotron and will soon be tested. Successful operations of the DC solenoid will allow longer pulse duration of the RF Power at second harmonic 95 GHz Gyrotron with output mode TE02.

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ALGORITHMS RESEARCH AND DEVELOPMENT LABORATORY

The general research interests of the Algorithms Research and Development Laboratory include: Artificial Intelligence (AI), machine learning, automatic image-classification, parallel algorithms for pattern recognition, image classification, system-on-chip and embedded hardware implementation of algorithms, field-programmable gate array (FPGA) algorithm hardware implementation, and fast data compression.

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NANO-OPTICS LABORATORY

Research interests of the Laboratory include:

- Plasmonics: Surface Plasmon Polaritons are collective oscillations of the charges in a vicinity of the conductor-dielectric interface. These oscillations can be coupled to light and lead to unexpected phenomena such as extraordinary light transmission, subwavelength focusing, etc.
- Singular optics: Light, just like a fluid, can exhibit vortices under particular phase conditions. In these beams, the electromagnetic energy circulates around a singular point in the beam center carrying quanta of angular momentum. In the central region, the phase of the optical field is not defined and physical laws fail. Accordingly, various intriguing phenomena are awaiting discovery.
- Time resolved Plasmon imaging: Optical phenomena and, particularly, surface Plasmon excitations occur in a femtosecond time-scale. To view and analyze these effects in real time, researchers in the Laboratory use a sophisticated optical system based on the heterodyne interference principle. Owing to this system, researchers have access to intriguing ultra-fast optical phenomena at the nanoscale.

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BIOMEDICAL OPTICS LABORATORY

Research in the Biomedical Optics Laboratory primarily concentrates on the development of innovative and novel medical devices based on the use of light for diagnostic, functional, and imaging applications including brain trauma diagnostics, cancer spectroscopy, and blood flow imaging.

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ELECTRICAL ENERGY STORAGE SYSTEMS LABORATORY

The Laboratory under the supervision of Dr. Moshe Averbukh deals with:

- Research and applications of electrical energy storage systems and facilities based on electrochemical principles as a rule for enlarging renewable energies penetration into grid;
- Ultracapacitors investigation and verification of their parameters and equivalent circuits;
- Vanadium redox flow batteries research for improvement of energy efficiency, design control systems, and development of equivalent electrical circuits;
- Investigations of conventional electrochemical batteries for energy storage, development power electronic circuitry for control, and battery parameters of State-of-Charge (SOC) and State-of-Health (SOH) verification.

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RADIATION SOURCES AND APPLICATIONS LABORATORY

Laboratory research activity is concentrated on theory and simulations of free-electron radiation sources for millimeter and submillimeter wavelength scales as well as particle accelerators. The research is mainly carried out in the framework of the projects of the Schlesinger Family Center for Compact Accelerators of Ariel University, including research for upgrade and operation of the

electrostatic millimeter wave free-electron laser and development of the new free-electron radiation source for THz frequency range driven by picosecond and sub-picosecond relativistic electron pulses supplied by the hybrid RF-LINAC gun.

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MICROELECTRONICS AND THIN FILMS

The Center for Microelectronics and Thin Film was established at Ariel University, Faculty of Engineering, in response to the massive demand for young Hi-Tech experts in the Israeli market of Microelectronics Industry;
The Center was founded by Prof. Gady Golan in 2017 with his own grants, within the Schlesinger Family Center for Compact Accelerators, Radiation Sources and Applications.
The main goal of the Microelectronics Center is to train theoretical and practical skilled specialists in the various developing Microelectronics fields.
Sub goals of the Center are:
Development of novel deposition methods;
Research in plasma discharge phenomena;
RandD in semiconductor coatings: Si, Ge, SiGe, SiC, In_2O_3, SnO_2 etc., for the creation of modern Electron devices;
RandD in photo-chrome thin film oxides: VO_2, NiO, TiO_2, etc.;
Annealing methods: Vacuum Photothermal Processing (VPP);
Photovoltaic Sysytems – PV;
The laboratory is equipped with state of the art Microelectronics Systems;

- Thin Film RF and DC Sputtering deposition systems;
- Optical Evaluation systems for thin films;
- Shockley, Hall effect, $ Point Probe evaluation station;
- Spectrophotometer station for thin films evaluation.

The lab is unique in the Israeli Engineering in terms of its research and equipment.

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ARIEL RELIABLE INTEGRATED ELECTRONICS LABORATORY

Our Laboratory has developed prediction capability to accommodate cutting edge CMOS device from 45nm onwards. Currently, we are developing models to accommodate 16-10nm FINFETs. We are also up to date in our research of GaN power devices for energy conversion and RF applications. Our funding comes from the US Air Force and Office of Naval Research, MOFAT with additional support from IRT Saint-Exupray in France.

We maintain continued interest as well as supplies of materials and boards from commercial sources. Our methodology saves companies over 90% of their reliability qualification budget. We have 2 commercial partners using our methodology now and we can show any company or government supplier how accurate reliability prediction can be performed efficiently and more statistically correctly than standard practices.

As for our power device research, we have developed specialized circuits to characterize Silicon MOS devices and GaN devices are under test and development. This development will take us into the future of power device and conditioning circuit reliability using our same multiple-mechanism model approach for lifetime prediction.

One final part of our investigation that is still waiting for support is the inclusion of packaging and solder-joint effects. These effects will include ceramic capacitors, resistors and other passive components. At the moment, these models are not included and require a modest investment in our laboratory. Our laboratory is Continually finding new applications of reliability physics and our developing Multiple Mechanism Matrix Methodology for predicting failure rates for products in super-large scale production.

ARIEL will design the tests and perform highly accelerated life testing based on our models for physics of failure using the Multiple-Mechanism Matrix to predict failure rate as FIT.

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LOW TEMPERATURE QUANTUM MATTER LABORATORY

The laboratory was founded by Prof. Eli Farber in 2003 and was later joined by Prof. Shmuel Schacham. The two researchers have been collaborating on several projects funded by shared grants of about 1 M NIS per year.

The laboratory focuses on the field of Microwave and THz passive devices based on High Temperature Superconductors. The research covers devices such as couplers for microwave communication and superconducting RF front-end and terahertz antenna arrays for extremely sensitive power detection based on Quantum Josephson effect.

The laboratory is equipped with state of the art THz systems, operated in frequency and time domains:

- Microwave vector Networks and spectrum analyzers;
- Thin Film sputtering deposition system;
- Transport system for low temperature characterization of superconducting thin films;
- Optical cryostats in the microwave and THz frequency range.

The lab is unique in Israeli Engineering in terms of its research and equipment.

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HYBRID ENERGY SOURCES R&D LABORATORY

The Hybrid Energy Sources Laboratory (HESL) in a nutshell is engage with energy management between two (or more) voltage buses. The research areas are in the fields of Power Electronics with Robust Control, Micro-Grids, Hybrid Systems, Storage Devices, Renewable Sources, Sizing of Sources and Real Time Energy management based on different Algorithms. Dr. Ilan Aharon is the head of the laboratory, and Dr Chen Hajaj is associated with it. The HESL carry out basic and applied research.

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WIRELESS COMMUNICATION NETWORKS

1. Wireless Mesh Networks
   - Resource allocation using graph theory
   - Distributed methods for resource allocation
   - Opportunist routing
2. Wireless Sensor Networks
   - Communication networks for IoT
   - Hybrid wireless and satellite communication systems
   - Wireless Body Area Networks
3. Resilient Communication Services Protecting End-user Applications from Disaster-based Failures
4. Other Topics
   - Synchronization in systems with LDPC codes
   - Cognitive Assessment and Brain Training using EEG

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DEPARTMENT OF CIVIL ENGINEERING

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The faculty members of the Department carry out academic research and combine research with applied engineering activities as well as enhancing the Department with their rich experience gained from large-scale and high impact projects in the field of civil engineering.
The faculty members are involved in research in the following areas: reinforced concrete structures, structural response to earthquakes, structural control and stability, static and dynamic behavior of structural components made of advanced materials, studying characteristics of construction materials, intelligent transportation systems, construction management, and engineering education.

CIVIL ENGINEERING RESEARCH

The main civil engineering research areas consist of structural control, seismic design, passive damping devices, semi-active dampers, active devices, seismic isolation, hybrid vibration control systems, reinforced concrete structures, fibred concrete, testing structures, and engineering education.

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RC STRUCTURES AND SEISMIC LOADS RESEARCH

The main research areas are as follows:

- Reinforced concrete (RC) Structures (including Spatial Structures) including experimental and theoretical investigations, using minimax principle and structural phenomena;
- Experimental investigation of dynamic parameters and ductility of full-scale buildings under horizontal (seismic) loads.

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REPLACEMENT MATERIALS RESEARCH

The research focuses primarily on special concrete mixtures, cement replacement materials, partial replacement of clinker with limestone powders, nano materials in concrete mixtures, packing density, and chemical admixtures for concrete.

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CIVIL ENGINEERING RESEARCH

The research is focused on methods and algorithms for computer-aided structural analysis and design, seismic analysis and design of reinforced concrete structures, and mathematical modeling of reinforced concrete behavior.

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ENVIRONMENTAL ENGINEERING RESEARCH

The research areas consist of:

- Life Cycle Assessment of building envelope technologies, building lifetime shearing layers, heating, ventilation and air conditioning (HVAC) design, concrete mixtures, cement replacement, and seismic design;
- Green Building: green points credit allocation for green building standards, green standards and certified projects.

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COMPUTAIONAL MECHANICS RESEARCH

The research interest is computational mechanics in the dynamic domain. Particularly, the research focuses on the following fields:

- Elastic wave propagation in heterogeneous medium.
- Multiscale analysis in the dynamic domain.
- The effect of micro inertia on material's macroscopic response.
- Elastic meta-materials.
- The effect of material's micro structure on the macroscopic dynamic properties.
- The structural response to impact load.

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INTELLIGENT TRANSPORTATION SYSTEMS RESEARCH

The main research areas are as follows:

- Strategic Planning for Deployment of Intelligent Transportation Systems Equipment
- Real-Time Adaptive Control of Traffic Signal Systems
- Progression Optimization in Arterial Streets and in Networks
- Dynamic Routing of Connected and Automated Vehicles
- Integration of Traffic Assignment and Signal Control in Traffic Networks

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FUTURE MOBILITY LAB

My research fields are transportation systems technologies and evaluation. I use the state of the art in behavioral models, simulation, and estimation tools to investigate the potential and impacts of innovations and policies on transportation systems.
My research experience in transportation systems technologies is mostly related to my research experience in MIT at Future Urban Mobility (FM) lab. The Lab is spearheading several projects on the planning, design, and operation of future passenger and freight systems. In particular, the Smartphone based Future Mobility Sensing (FMS) project has already achieved worldwide recognition for its implementation of a broad data collection effort using smartphones and GPS loggers matched with web-based tools to infer human activities in space and time, including mobility and location choices. I was studying the impact of this innovative data collection system on behavioral models estimation in Singapore and Tel-Aviv.

Most of my work in that lab was devoted to the development of the integrated simulation platform SimMobility. The SimMobility project integrates and links together various mobility-sensitive behavioral models with state-of-the art simulators to predict impacts of mobility demands on transportation networks, services, and vehicular emissions and to evaluate future urban transportation scenarios. I was leading the SimMobility Mid-Term simulator development in this innovative project and intend to continue using it for Israel. SimMobility Mid-Term is an agent

based, fully econometric, and activity-based demand model integrated with a dynamic traffic assignment model. In my work, I focused on the development of improved capabilities of the different advanced forms of mobility options such as mobility on-demand, automated mobility on-demand and Uber like services etc.

Another project I was deeply involved in focused on the evaluation of autonomous vehicle (AV) policies and their land and transport implications, for the Ministry of Transport in Singapore. In this study, we developed fetchers to accommodate AV's in SimMobility. Specifically, we studied how shared autonomous vehicles (AVs) reduce the use and demand for private cars, increase public transport mode share, and support higher intensities of development. We examined how and what type of AV system to deploy to support such a scenario, and identified innovative urban designs integrating optimum AV deployments by examining the impact and associated trade-offs of different land use scenarios where mixed traffic was present. We also identified optimal charging station location for AVs in Singapore and estimated energy consumption of AVs at optimum deployments under various future scenarios.

My research experience in transportation systems evaluation is mostly related to my doctoral thesis, which dealt with incorporating equity considerations in transportation project evaluation and planning. This multidisciplinary research combines methodologies from the field of economics with features and deep knowledge of travel behavior, transport planning, and modelling. At the theoretical level, this work is the first to utilize Activity-Based Models' advantages for equity analysis, and the first to suggest a practical way to use the Capability Approach in transportation project evaluation. At the practical level, the development of this research enabled better analysis of the impact of various transport investments and policies on different population groups, and these are tested by few synthetic case studies, and in a full scale, real world, case study. At the policy level it provides appropriate guidance to embed equity objectives into future transport policy and decision-making processes, it consists an important contribution to the forming EU equity guidelines for the European commission.

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DEPARTMENT OF CHEMICAL ENGINEERING

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The Department of Chemical Engineering was established in 1993, and has has two sub-streams:

Chemical Engineering and Biotechnology:
The aim of this curriculum is to prepare engineers with an applied orientation in the planning and operation of chemical and bioengineering industrial processes. The courses train students in chemistry, various sub-disciplines of biology, biotechnology, and the ability to plan and operate relevant processes, while taking into account the needs of both man and the environment.
The chemical industry offers a wide variety of employment opportunities to a graduate in chemical/biotechnological engineering. These include: isolation and production processes, integration and management of complex processes, supervision of operational units and equipment, development of new processes and efficiency improvement of existing processes, and economic viability assessment of new processes. Other possibilities include biomedical research and development, drug development and manufacturing, development of alternate energy processes, solutions to environmental problems, scale up of laboratory processes, consultancy, market analysis for introduction of new products and services, and product sales.

Chemical and Materials Engineering
In 2008 permission was granted to the Department to open a new stream called *Chemical and Materials Engineering.* In addition to their qualification in chemical engineering, graduates of this stream are uniquely trained in a range of emerging fields such as novel metals, complex materials, natural and synthetic polymers, biomaterials, glass, and ceramic materials. The curriculum emphasizes green chemistry – the interrelationship between materials science and modern environmental requirement.

LABORATORY FOR METAL AND CERAMIC COATING AND NANOTECHNOLOGY

The Laboratory deals with materials science, materials engineering, mathematical modeling, and simulation.
Some recent research projects of the Laboratory include:

- Synthesis and analysis of nano-crystal materials on the basis of manganese oxides using the technique of intensive plastic deformation.
- Mechano-chemical synthesis of Nano-composites with biologically active substances.
- Classification of carbide nano-powders by diffraction techniques for homogeneity degree, particle size, and micro-stress (micro-deformations).

- Development of selective coatings for power devices on the basis of Nano-sized ceramic powders.
-

The Laboratory has developed unique methods of mathematical modeling of phase interaction at high temperatures. These methods allow us to build models taking into account various physical, chemical, and technological parameters. The models can be implemented in the optimization of various technological processes.

Development of environmentally friendly coating technologies as an alternative to chrome plating is one of the latest developments of the Laboratory. This coating technology is as an alternative to electrolytic hard chrome plating. The project includes advanced technologies in the following fields: Nano-materials (obtaining nano-size powders), special coatings (spraying lightweight metals), and electrochemistry (micro-arc oxidation). The applications of the technologies cover all ranges of machinery. In the first stage, developments will be applied to avionics (landing gear mechanisms of aircrafts).

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ADVANCED MATERIALS LABORATORY

The research interests of the Laboratory focus on materials science: in particular, physical metallurgy of non-ferrous alloys, nanotechnology, advanced coatings by a plasma electrolytic oxidation for corrosion, wear resistance, and bio applications, synthesis of advanced materials for solid oxide fuel cells, mathematical modeling of physico-chemical processes, and development of fully printable organic or inorganic solar cells.

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LABORATORY OF ENVIRONMENTAL BIOTECHNOLOGY ENGINEERING

The Laboratory of Environmental Biotechnology deals with the search for biological solutions to environmental problems. One direction of the research is dedicated to development of biofuel

production using wastewater as a source of lipids for biodiesel and agricultural wastes and surplus products for bioethanol. Another research priority of the Laboratory is to find a solution to the serious problem of water quality and quantity in the region. A method for wastewater disinfection based on a use of photosensitizers and metal compounds immobilized onto a solid phase is being developed in the Laboratory.

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LABORATORY FOR IMMUNOLOGY AND CANCER BIOLOGY

The philosophy of the laboratory's research is to apply advances in biology, chemistry and physics to develop novel, targeted and personalized therapies for the treatment of cancer. Our research focuses on two approaches. One is the development and clinical application of peptide-drug conjugates in which peptides are used to specifically target drugs inside cancer cells to kill them. The second is the development of personalized immune-transplantation therapies for leukemia and lymphoma.

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LABORATORY OF INTERFACE SCIENCE

Established in 1998, the Laboratory of Interface Science is led by Professor Edward Bormashenko and focuses its investigations on interfacial properties of polymers, metals, and ceramics. The Laboratory has published more than 200 papers and holds 10 patents. The Laboratory concentrates on the fundamentals and applications of interface science, including phenomena of superoleophobicity and superhydrophobicity, development of interfaces with prescribed properties, plasma, and UV treatment of solid and liquid surfaces. Since 2004, the Laboratory has developed technologies of manufacturing micro-porous polymer materials with the breath-figures self-assembly. Additionally, since 2013 the Laboratory has researched the impact of cold radiofrequency plasma on the germination of seeds. In recent years, the Laboratory has investigated the processes of self-propulsion of micro-objects.

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LABORATORY OF ENVIRONMENTAL MICROBIOLOGY

The Laboratory carried out research on Environmental Microbiology, focusing on three main subjects: 1. Bioremediation of toxic organic pollutants by utilizing several substrata such as coal bottom ash, geo-textile sheets, and agricultural wastes for biofilm formation to improve biodegradation; 2. Microbial fuel cells (MFC): we propose a novel MFC facility for domestic and industry sewage applications which will bio-remediate wastewater and simultaneously produce energy; and 3. Microbial Electrolysis Cell (MEC) to investigate bio-hydrogen production from sewage.

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FLUID MECHANICS AND HEAT TRANSFER LABORATORY

The Laboratory conducts research in the fields of combustion, boiling two-phase flow, and explosive boiling by using numerical analysis and computational fluid dynamics to simulate the mechanisms of two-phase flashing flow. The work is concentrated on the following areas:

- Modeling of Flashing Two-Phase Flow: Models of bubble formation and growth are being developed. The two-phase models are used for analysis of the blowdown scenario. This subject is of critical importance for the investigation of the safety of compressed liquid systems.
- Numerical Model for Boiling Liquid Expanding Vapor Explosion (BLEVE): To estimate the thermodynamic and dynamic state of boiling liquid during a BLEVE event, the model predicts, simultaneously, the bubble growth processes in the liquid at the superheat-limit state, the front velocity of the expanding liquid, and the shock wave pressure formed by the liquid expansion through the air.
- Simulating Fluid Dynamics using a variational principle: A new way to solve flow equations using a variational technique, the solution of the flow problem is obtained by using a numerical algorithm to find the extremum value of an “Action,” i.e. by a variational principle.

- Micro-Pumps: A pumping effect was found when a vapor bubble is generated and then made to collapse repeatedly in a small straight channel connecting two reservoirs. This effect is being investigated theoretically and experimentally.

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LABORATORY FOR R&D POCESSES

- Development of a Multi-channel Air-lift Bioreactor for Algae Production
- Mixing, Flow Patterns in Agitation and Residence Time Distribution
- Energy and Environmental Problems
- Control Release Chemicals
- Extrusion Processes
- Liquefaction of Biomass

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LABORATORY FOR APPLIED THERMODYNAMICS

The research interest of the Laboratory focuses on development universal, theoretically-based and accurate modeling framework for simultaneous prediction of thermodynamic and transport properties of pure compounds and mixtures in wide range of conditions, including the extreme pressures. During our research special attention is given to detection and removal of numerical problems associated with the molecular-based models and, as well, simultaneous prediction of critical, sub-critical and supercritical data.

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LABORATORY OF POLYMER SCIENCE, BIOMEDICAL POLYMERS AND POLYMERIC COMPOSITES

My main research activity is focused in the fields of:

- Biomedical Polymers, which includes Development of Artificial Polymeric Implants, Medical Devices, Diagnostic and Prophylactic Devices and Controlled Delivery Systems.
- Synthesis and Characterization of Novel Polymers, targeted for specific Biomedical and non-biomedical applications.
- Novel Advanced Polymeric Composites and Polymeric Nano-Composites, for Biomedical and non-biomedical applications.
- Polymer-Based Nanotechnology.
- Polymer Chemistry and Physics; Plastics Engineering; Polymer Crystallography.

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ENVIRONMENTAL ENGINEERING LABORATORY

The Laboratory is involved in studying several environmental issues. One of them is purification of municipal and industrial wastewater. In Israel sewage is treated not only as a potential source of pollution, but also as a source of water for reuse. For instance, it can be used for watering of agricultural plants saving plenty of fresh water. For that purpose wastewater must be purified appropriately. In many cases to achieve such level of wastewater purification, it is necessary either to significantly improve methods currently used in industry or to develop new ones. Another our research is directed on renovation of soil contaminated with hazardous substances and/or depleted of substantial nutrients. For those purposes we study a possibility of using both chemical and biological approaches.

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LABORATORY FOR WINE ANALYSIS

The aims of the Laboratory's research efforts are to apply the newest genomic and technological approaches into grapevine and wine research. The Laboratory research focuses on the development and application of new methods for grapevine aDNA analysis, the collection and characterization of the endogenous Israeli grapevine germplasm, the application of NGS tools for genomic characterization of grape traits and the development of robotic and sensoring technics to improve wine quality and production methods.

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METALLURGY AND APPLIED NANOSCIENCE RESEARCH LABORATORY

Our research combines traditional physical metallurgy and nanoscience to engineer metallic materials with required properties. The work focuses on modification methods by the addition of various nanomaterials into molten metals to improve their properties and performance. Additionally, our research interests focus in the synthesis of various intermetallic compounds by mechanochemical techniques.

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DEPARTMENT OF MECHANICAL ENGINEERING – MECHATRONICS

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The Department of Mechanical Engineering and Mechatronics has successfully trained Mechanical and Mechatronics engineers since 2007. Graduates are absorbed easily into all areas of industry and graduate studies. The unique mechatronics program trains engineers in the

interdisciplinary fields of mechanical engineering, electrical engineering and electronics, and computer science. In recent years, the Department has grown and additional tracks were launched: *Mechanical Engineering* with an emphasis on CAD/CAM, production, and machinery as well as *Energy and Natural Gas* with an emphasis on conventional and renewable energy resources, energy storage, efficiency, and natural gas. The three undergraduate routes stress the uniqueness of the Department as a leader in innovative areas, including mechatronics, robotics, biomedical applications, energy, and nano-optics, along with a wide base of classical mechanics professions. The Department has eight research laboratories and twelve teaching laboratories.

PASLIN LABORATORY FOR ROBOTICS AND AUTONOMOUS VEHICLES

The RAV Laboratory is the first robotics laboratory at Ariel University, established by Prof. Zvi Shiller in 2003. The Laboratory focus is on optimal motion planning, dynamics and control, dynamic stability as it relates to autonomous vehicles, tracked vehicles, industrial robots, and active safety of ground vehicles. The research has been supported by the Ministry of Science, Defense Ministry, Israeli Space Agency, General Motors, and Paslin Foundation.

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FLUID DYNAMICS LABORATORY

Research interests of the Laboratory include:

- Investigation of multiscale fluid dynamics and transport processes in biomedical and energy systems using experimental and numerical methods;
- Optical methods for flow visualization and particle image velocimetry (PIV);
- Numerical methods for simulating fluid and structure dynamics in models involving complex geometry, unsteady flow, moving boundaries, and fluid-structure interaction;
- Investigation of hemodynamics and vascular remodeling in the cardiovascular system and of cardiovascular devices;
- Flow control and optimization of fluid and gas in energy systems, including microturbines, hydrogen generators, fuel and gas pipes, microfluids, flow of Swarmbots, etc.

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BIOMECHANICS AND HEMODYNAMICS LABORATORY

Research interests of the Laboratory include:

- Interaction between blood, tissue, and medical devices in the vascular system and vascular remodeling;
- Numerical methods to predict complex tissue and stents dynamics;
- Biomechanics of human joints and optimization of human body movements;
- Man-machine interaction in transportation engineering and safety.

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TRANSPORTATION SYSTEMS AND ROAD SAFETY LABORATORY

Research interests of the Laboratory focus on the following:

- Driving cycle production;
- Advanced traffic simulations using driving simulator by STISIM DRIVE;
- Development of adaptive driving cycles for various regions and various categories of vehicles;
- Investigation of the possible impact on the environment of converting the existing vehicle engines in Israel to natural gas.

The STISIM DRIVE driving simulator allows simulation of driving while providing various parameters on the road, traffic volumes and parameters of different vehicles: for example, number of lanes, width of each lane, presence or absence margins on each side of the road, distance between intersections, control system of intersections, slope of longitudinal and vertical way, radius of curvature, truck crawling routes, and lighting. Length of the tested section is determined by average distance traversed in an hour, types of vehicles, traffic currents, and parameters of the vehicle such as power, weight, and maximum speed.
This system is considered quite advanced for traffic simulations. This is a multi-purpose simulator that can be used for exploration of issues related to individual vehicles, traffic currents, and road

safety through various traffic conditions (including municipal roads) and under different climatic conditions.

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THE LABORATORY OF RENEWABLE AND SUSTAINABLE ENERGY RESEARCH

The Laboratory of Renewable and Sustainable Energy Research is an interdisciplinary hardware design laboratory. Research carried out in the Laboratory is related to the detailed study of energy conversion processes, mathematical modeling, and experimental testing of these processes. The graduate students, BSc students, and research assistants are engaged in a variety of projects.
The principal investigator is Dr. Simon Lineykin.
The main research topics are as follows:

- Using an autonomous thermoelectric generator operating at low temperature gradients instead of a battery in battery-operated systems;
- Solar cells and panels;
- Electro-acoustic EMI-free transformers and harvesters;
- Micro-power turbines;
- Electrical and electro-mechanical energy storages.

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TEST (THERMAL ENERGY SCIENCE AND TECHNOLOGY) LABORATORY

Research interests of the laboratory include:

- Thermodynamics – analytical and experimental investigations on mixed-fluid properties, phase equilibrium, and adsorption
- Cryogenics – sorption cryocoolers, cryogenic cooling for superconductors, gas liquefaction, thermal design for cryogenic applications
- Sorption Systems – cooling systems, thermal energy storage, fluid storage, hydrogen systems
- Heat transfer – micro scale heat exchangers, heat exchangers for cryogenic applications, heat switches

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LABORATORY OF BIO-INSPIRED AND COMPLEX MATERIALS MECHANICS

Research interests of the BCMM Laboratory include:

- Fabrication and mechanical characterization of soft and bio-inspired composite materials
- Biomechanics of soft tissues such as the intervertebral disc and cardiovascular tissues
- Structure-function in complex materials
- Non-linear numerical simulations of the spinal biomechanics

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APPLIED ENGINEERING OPTIMIZATION

Optimization is ubiquitous in engineering and with the rise of high performance computing, new opportunities and challenges in applied engineering optimization have emerged, including:

- Simulation-driven methods.
- Computationally expensive engineering problems.
- Metamodel-assisted optimization.
- Applied computational intelligence and machine-learning.
- Constrained and multiobjective problems.

Emphasis is placed on design and implementation of algorithms designed to solve real-world engineering problems. Examples of recent projects include:

- Integration of machine-learning techniques into simulation-driven optimization.
- Adaptive metamodel-assisted algorithms.
- Computational-intelligence based design optimization of aircraft.

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DEPARTMENT OF INDUSTRIAL ENGINEERING AND MANAGEMENT

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The Industrial Engineering and Management (IEM) discipline deals with a wide range of engineering know-how and quantitative analysis techniques. These include planning, control, design, and management of complex organizations and systems. The Department of Industrial Engineering and Management was established in 1994. The Department offers a Bachelor of Science (B.Sc.) degree recognized by the Council for Higher Education in Israel. The department offers courses in a wide range of topics including Operations Research, Systems Engineering, Robotics, Engineering Management, and Production, Inventory and Distribution Systems. Available to students and faculty members alike are a number of advanced laboratories in the areas of computers, electronics/electricity, automation, and robotics. Research subjects include:

- Robotics;
- Human factors;
- Operation research;
- Production management;
- Industrial automation;
- Human-machine interface;
- Learning machines.

ROBOTICS AND INDUSTRIAL MANUFACTURING LABORATORY

The Laboratory, established in 2006, focuses on applied research for military and medical applications. It is home to seasoned researchers from several disciplines: mechatronics, industrial engineering, computer science, and psychology.
Current projects include:

- Robotic systems for motion in tunnels and confined spaces;
- Rope climbing spider robot;
- Triple-tracked robot for accurate motion on steep slopes;

- Robot-human interface for robotic heart surgery;
- Multi-robot control;
- Natural interfaces for Phonee-robotics;
- Design and control of tracked vehicles;
- Force feedback in endoscopic robotic surgery.

The diversity of the research group allows for integrated solutions that take into account system kinematics, dynamics, and human factors. The center enjoys funding from national and international sources and maintains research collaborations with major research labs in Europe and the US.

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HUMAN FACTORS ENGINEERING LABORATORY

The research areas of the Laboratory include:

- Vision system displays and human interface design.
- Remote robotic command and control.
- Visual search in 3D virtual environments: "Reverspective," "Conjunction Search."
- Eye-dominance in visual search and fixation vergence.
- Velocity perception: dynamic visual search, "Herring's Law."
- Robotic surgery: reconstruction of "Haptic" sense.

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MULTI-AGENT SYSTEMS AND SCHEDULING RESEARCH

Dr. Grinshpoun's main research areas are multi-agent systems and scheduling. In the area of multi-agent systems, he is working on two main models – distributed constraint optimization problems (DCOPs) and Boolean games. Using the DCOP model, one can represent combinatorial optimization problems that are distributed by nature. In what is probably his most influential research contribution in this field to date, Dr. Grinshpoun extended the DCOP model to enable asymmetric constraints. Following this work, his research on multi-agent systems took a natural turn towards

privacy and strategic behavior. He is developing various privacy-preserving DCOP algorithms as well as investigating how the structure of the problem's constraint graph affects the loss of private information. In his work on Boolean games, Dr. Grinshpoun focuses on incentive mechanisms (such as taxation and side payments) for finding states that are both stable and efficient. A specific application of Boolean games is charging batteries of electric vehicles.

In the area of scheduling, Dr. Grinshpoun works on a vehicle routing problem (VRP) in which the routes are fixed. This limitation yields a unique and previously unstudied problem, in which scheduling becomes the main issue (rather than shortest routes as in most VRPs). Based on this research, he was awarded a research grant from the Ministry of Science, Technology and Space to develop a transportation solution for the elderly population. Dr. Grinshpoun is also working on the scheduling problem of assigning mechanics with different expertise levels to tasks in several (distant) garages within the same military base (a hard version of open shop scheduling).

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DATA SCIENCE AND GROUP DECISIONS RESEARCH

I am a data scientist interested in the design and analysis of machine learning and data mining algorithms for information extraction and information retrieval.
Research interests:

- Computational social choice: secure voting, iterative voting processes, preference elicitation and strategic voting
- Group decision support systems and group recommender systems
- Social networks and link prediction
- Ranking systems and ensemble models

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WEARABLE TECHNOLOGY IN THE SERVICE OF NATURALISTIC DRIVING STUDIES

Naturalistic road safety studies investigate driver behaviors in real driving conditions. Often behavior analysis is based on vehicle motion indices such as acceleration, speed, and distance to the lead vehicle. On a parallel track, physiological indices have traditionally been used as indicators in lab and field-tests to explain driving behavior by driver properties such as fatigue, distraction, and mental workload. The latest advances in wearable technology ('wearables') have paved the way for integrating physiological indices and vehicle motion indices in real-driving.

The purpose of our group is twofold:

- To conduct studies (that until recently were possible only in lab settings) in more complex and real-world driving venues.
- To test and improve the operation and quality of driving assistance systems by integrate kinematic and physiological sensors from wearables.

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INFORMATION SYSTEMS

- Mobile information systems in Health & Education
- Green technologies
- Internet of Things
- Collaborative learning technologies
- Social Networks
- Blockchain & Innovation
- Customer Relationship Management
- Big Data in Health

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NEURO-INFORMATION SYSTEMS (NEUROIS) LABARATORY

The Neuro-Information-Systems Lab (NeuroIS) at Ariel University focuses on neuroscience and neurophysiological theories coupled with Artificial Intelligence techniques to understand the development, use, and impact of information Systems.
In recent years, cognitive neuroscience has been developed into a valuable tool for informing research in Neuro IS. Neurophysiological tools have the advantage of being objective (vs. introspective like in the case of self-reports) and have the capacity to capture the flow of a cognitive process over time while a person makes a decision, interacts with a machine or with an information system.
EEG is an essential tool in complementing current research in cognition since it may highlight the important stages of cognitive processing, their sequential order, and the associated changes in the brain's functional networks with high temporal precision while a user processes information. Thus, EEG features may serve as a valuable tool for machine learning systems in the context of cognitive modeling.
The research is interdisciplinary drawing on techniques from brain science (neuroimaging), artificial intelligence (machine learning, autonomous agents), cognitive modeling (social and cognitive factors), and economics (game theory).

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MANAGEMENT INFORMATION SYSTEMS (MIS)

My research is related to the following topics and keywords:

- Network security and forensics, malware detection, automatic signature generation, intrusion detection and prevention, IoT breaches and defenses, data leakage prevention, big data interrogation for security and anomaly detection.
- M2M middleware, RFID, facility management.
- Electronic commerce. electronic catalogues, electronic kiosks.

- IS Strategy, key success factors for IS planning .
- Software Engineering, IS project cost estimation, UML diagram efficiency and effectiveness
- Organizational computing, DSS for meeting scheduling.

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PROJECT MANAGEMENT & SYSTEMS ENGINEERING, ENGINEERING SYSTEMS THINKING

I am an industrial engineering and management engineer interested in the areas of project management and systems engineering.
Research interests:

- Project management and systems engineering in multi-disciplinary projects
- The partnership between project managers and systems engineers
- Risks Management in multi-disciplinary projects
- Critical Success Factors in multi-disciplinary projects
- Quality management in production processes
- The T shape dilemma (depth against width) in the education of industrial engineering and management
- Developing engineering systems thinking

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FACULTY OF NATURAL SCIENCES

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The Faculty of Natural Sciences at Ariel University brings together teaching and research activities in the areas of multi-disciplinary core sciences: chemistry, physics, biology, mathematics, and computer science. A significant number of research centers operate under the auspices of the Faculty: the Center for Brain Research, the Cancer Research Center, the Center for Personalized Medicine, the Cyber Center, the Center for Materials Research, and the Center for Applied Radiation. The Faculty aims to foster academic research, collaborative science, and pioneering educational outlooks.
The Faculty of Natural Sciences includes five departments:

1. Chemical Sciences
2. Computer Science
3. Molecular Biology
4. Mathematics
5. Physics

DEPARTMENT OF CHEMICAL SCIENCES

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Despite its young age (established in 2003), the Department has already built a strong multidisciplinary character. Its core activities are designed to rationally employ the tools of advanced organic and inorganic synthesis in modern biochemical, pharmacological, and advanced material strategies for the development of new biologically active compounds as well as novel and state-of-the-art technologies in drug discovery, material science, and green chemistry.

LABORATORY OF MEDICINAL DESIGN

Research in the Laboratory of Medicinal Design focuses mainly on the development of novel multifunctional platforms for programmed release in targeted cancer therapy. These platforms can carry different anticancer "cocktail" drugs simultaneously and are designed to release linked drugs in a time-dependent mode. By conjugation to the specific carrier, these platforms almost exclusively enter the cancer cells rather than healthy tissue, ensuring much less toxic treatment. The applications

for such programmed drug delivery systems are broad, including targeted therapies for cardiovascular diseases, pain management, CNS disorders, and others.

Technology overview of the Laboratory:

- To load particular "cocktails" onto biodegradable platforms – prodrugging of "cocktail."
- To control the linkage of drugs to platform (ester, amide, carbamate, carbonate, etc.).
- To conjugate loaded platform to the carrier (peptide, AB, etc.).
- To determine cleavage profile for each drug depending on the linkage moiety.

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INORGANIC CHEMISTRY LABORATORY

Major research projects:

- Reactions of radicals at surfaces suspended/immersed in aqueous solutions.
- Reactions of radicals with transition metal complexes in aqueous solutions.
- The Fenton Reaction.
- The plausible roles of carbonate in catalytic oxidation processes.
- Catalytic hydrogen formation at noble metal catalysts.
- Advanced oxidation processes.
- Nano-partiles.
- Catalysis.
- Development of electron exchange columns.
- Environmental chemistry.
- Sol-gel matrices.

Major experimental techniques:

1. Radiation chemistry, including pulse-radiolysis.
2. Stopped flow.
3. Electrochemistry.
4. NMR and EPR.
5. Isotope labeling and isotope effects.
6. TEM and other nano-particle characterization techniques.

Collaboration consists of work between Prof. Dan Meyerstein, Tomer Zidki (Chemical Sciences Dept.), and Yael Albo (Chemical Engineering). Cooperation is also pursued with scientists from the Nuclear Research Centre, Negev; Sami Shamoon College of Engineering; Ben-Gurion University; Bar-Ilan University; and the Technion.

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LABORATORY OF ORGANIC LUMINOPHORES AND DYES

Newly established in 2016, the Laboratory under the supervision of Prof. Leonid Patsenker focuses on the development of novel organic luminescent materials in particular for clinical diagnostics, biomedical and pharmaceutical research including drug delivery, luminescent imaging and microscopy, high throughput screening, and photodynamic therapy of cancer. These materials include fluorescent reporters (dyes, probes and labels), photosensitizers and conjugates of these dyes with drugs and targeting peptides and antibodies. Prof. Leonid Patsenker's scientific background includes supervision of 20 national and international projects developing fluorescent biomedical materials, photodynamic sensitizers, and materials for LEDs among many others. The results were presented in 2 book chapters, more than 100 papers in journals, and 25 patents. In the past year, the new Laboratory has published four papers in peer-reviewed journals.

Technology overview of the Laboratory:

- Synthesis of organic luminophores and dyes including "on-off" switchable fluorescent reporters and activatable photosensitizers.
- Development of theranostic conjugates for targeted drug delivery and fluorescence monitoring.
- Spectroscopic characterization and primary biological evaluation of the developed materials.

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ORGANIC, BIOORGANIC AND MEDICINAL CHEMISTRY LABORATORY

The Organic, Bioorganic, and Medicinal Chemistry Laboratory carries out research in the following areas:

- Medicinal Chemistry: Novel approaches to drug design. Computationally aided design and synthesis of enzyme-guided selective modulators for PTP1B.
- Molecular Recognition: Study of inter-molecular interactions as well as preparation and analysis of model host–guest complexes. We are interested in the detection and neutralization of organophosphorus warfare agents using novel peptides and metallopeptides from phage display, selected using a specially designed activity probe.

The activities in the Lab involve aspects of Organic Synthesis, Medicinal Chemistry, Instrumentation of Computational Chemistry and Molecular Visualization tools, Bio-Organic Chemistry, Enzyme Kinetics as well as elements of Structural Biology.
Other collaborative projects in the Lab deal with: a) Chemical modifications of the fluorophore *syn*-bimane and b) Preparation of advanced anion-conducting membranes for electrochemical cells.
The projects in the Lab are multidisciplinary in nature, encompassing the areas of Organic Chemistry, Application of Computational Chemistry tools, and Bio-Organic Chemistry.

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INORGANIC AND ORGANOMETALLIC CHEMISTRY LABORATORY

Research focuses on diverse aspects of inorganic and organometallic chemistry, with a special emphasis on catalyst development. Investigation of potential catalytic systems is conducted with the following applications:

- Metallopeptide catalysts for decontamination of organophosphate toxins (pesticides, warfare agents);
- Molecular electrocatalysts for urea oxidation for development of direct urea fuel cells.

Our work involves the synthesis and characterization of transition- and main-group-metal complexes utilizing various ligand sets, and is carried out in collaboration with other researchers from the Departments of Chemical Sciences and Chemical Engineering at Ariel University.

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ELECTRONIC STRUCTURE AND THEORETICAL PHOTOCHEMISTRY RESEARCH

Electronic structure analysis of the Potential Energy Surface (PES) constitutes the thrust of my research. The whole topology of the potential surface can be constructed around the Conical Intersections (CI) since minima and Transition States (TS) are directly accessible from them. Development of the qualitative Valence Bond (VB) models to the analysis of computational and experimental data is an integral part of this research.
The goal is a development of the chemically oriented approach to the analysis of the ground or excited state PES and its application to the different reactions and unusual chemical species.

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LABORATORY OF MOLECULAR SYNTHESIS AND EDITING

The research of the laboratory is focused on developing new ways of forging chemical bonds between organic molecules. Within this broader context, there is a focus on umpolung chemistry of enolates as well as the chemistry of nitroxides. The laboratory is also working on hydrogen storage and is developing new anti-fungal agents.
Overview of key projects:

- Hypervalent iodine mediated enolate umpolung reactions.
- Catalytic reactions with nitroxides.
- Nitroxide mediated living polymerization.
- Hydrogen storage materials.

- Antifungal agents based on the natural product amphotericin B.

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ARCHAEOLOGICAL SCIENCE AND ARCHAOMATERIALS LABORATORY

My main research interest lies in the reconstruction and understanding of ancient pyro-technological processes, such as the production of metals, plaster, ceramic, glass and glazes. The study of technological choices and technological styles, manipulation and processing of raw materials, and the formation of by-products, have far reaching implications on the reconstruction of ancient society's cultural behaviors and stylistic choices, the spread of technological innovations, economic interactions and trade routes. These include:

- General ferrous and non-ferrous metallurgy: the use and manufacturing of metals throughout the span of archaeological and historical periods. These for example might include; technological aspects related to the making and processing of 'hacksilber' and silver coinage, the change and developments in the use of bronze alloys, the study of metallurgical refractories such as crucibles, as a tool for understanding and reconstruction of bronze, silver and gold production processes, alloying techniques, refining procedures etc.
- (b) Early iron production in the Levant: studying the advent of iron technology in the Southern Levant and characterizing the transition from the use of bronze to the use of iron. Identifying production centers, production technologies and the socio-political organization.
- (c) Technological capabilities of the ancient iron smiths: using metallography methods to study ancient iron tools and infer on technological capabilities and production methods such as steeling, quenching and tempering.
- (d) Identifying pyro-technology activities: developing new means for the identification of pyro-technological activities (controlled use of fire for the production of new man-made materials, such as ceramic, plaster, glass and metals) and the identification on of these technologies in the archaeological record.
- (e) Materials and provenance: developing new means for identification of raw materials sources (gem and semi-precious stones, metal ores etc.) in order to shed light on socio-political organizations and trade routes of the ancient world.
- Early vitreous materials, Faience and Glass: production technologies, pattern of technological discovery, adoption, choice, transfer and provenance of vitreous materials such as glazed steatite, faience, Egyptian blue and green frits, and glazed pottery and bricks.

- Lime plaster and ceramic: production of lime and ceramic materials has far and long histories which leave behind numerous types of archaeological artifacts and debris that can be studied in order to answer various questions concerning cultural issues of past societies.

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NANOPARTICLES AND CATALYSIS/LABORATORY

The Nanoparticles and Catalysis Laboratory performs basic and applicative research in the field of catalysis for redox processes and environmental chemistry. Also, we use radiation chemistry to initiate radical processes to study the mechanisms that may occur at surfaces.
Major research projects:

- Establishment of a LINAC setup for radiation chemistry research
- Mechanistic studies
  - Catalyzed reduction processes on metal nanoparticles via isotopic studies
  - M^0 nanoparticles and M^0-based alloy nanoparticles catalyzed reduction reactions
  - Effect of supports on metal-nanoparticle catalysts in redox processes
- Applicative studies
  - Catalytic materials for water splitting and pollutants removal by photo/electro-chemical methods
  - Attachment of anti-cancer drugs to gold nanoparticles for targeted drug delivery
- Environmental chemistry
  - De-SOx/NOx of flue-gases via oxidation with atmospheric O_2
  - Fixation of low activity radioactive wastes by coal fly ash/nanoparticles and study of radiation-induced processes at the surfaces.

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DEPARTMENT OF MOLECULAR BIOLOGY

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The Department of Molecular Biology is responsible for the biology curricula in six programs leading towards a B.A. or B.Sc. degree in the following programs:

1. Molecular Biology (B.Sc.)
2. Biological Chemistry (B.Sc.)
3. Bioinformatics track within the Computer Science and Mathematics Program (B.Sc.)
4. Chemical Engineering and Biotechnology (B.Sc.)
5. Physiotherapy and Health Systems Management (B.A.)
6. Nutritional Sciences

Research activities of faculty members concentrate on the fields of molecular biology, microRNA research, stem cells, genetic engineering, immunology, neurobiology, and neuropharmacology.

NEURAL TISSUE ENGINEERING LABORATORY

The Laboratory under the supervision of Prof. Baranes developed a breakthrough method for tissue regeneration. The technology is based on a unique scaffold made from skeletons of marine corals, which has the capacity to nurture neural cells with their calcium-rich crystals. This capability empowers the scaffold to support and promote survival and growth of neurons and glial cells, as well as stem cells, to form healthy and durable nervous tissues. Prof. Baranes is the first to use coral skeletons successfully for generating nervous tissue from dissociated cells and from adult brain slices and for repairing brain injuries. Moreover, a novel tissue generating media (TRM), which in conjunction with coral skeleton enhances recovery of wounded nervous tissue of the adult brain, was developed in the Laboratory.

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LABORATORY OF BEHAVIORAL AND MOLECULAR PSYCHIATRY

In the Laboratory highly committed students investigate personality-based molecular and hormonal changes in the brain resulting from stress as part of the etiology of affective disturbances such as personality disorders, anxiety, mania, and depression by employing a wide array of molecular and genetic tools to address this topic. Cultivating an understanding of the influence of stress and stress vulnerability will enable the development of biomarkers permitting clinical identification or/and improved therapeutic approaches for susceptible individuals prone to depression, anxiety, and substance abuse.

Some of the main research activities of the Laboratory are:

- Molecular biology of depressive and anxiety disorders;
- Critical role of personality in stress-induced drug dependency;
- Influence of resilience and sensitivity to stress on ageing and related cognitive impairments;
- Gut microbiome and behavior link using a mouse model of dominance and submissiveness;
- Anxiolytic natural plant extracts;
- Identifying at-risk populations for maladaptive response to prenatal stress.

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LABORATORY OF MOLECULAR AND FUNCTIONAL NEUROBIOLOGY

The laboratory of Molecular and Functional Neurobiology headed by Dr. Izhak Michaelevski investigates molecular mechanisms of memory formation, cognitive disorders in memory domain, as well as endeavors to elucidate physical bases of information processing and coding in the brain. The major direction of study includes investigation of the role of wide range of protein kinases and synaptic proteins in regulation of long-term synaptic plasticity and memory formation. Identification of master regulators of memory formation is one of the highest priority direction of the research, as well as understanding the role of gene expression on the late and persistent phase of long-term plasticity and long-term memory. The research interest of the laboratory also encompasses also use of non-ionizing electromagnetic radiation in disruption of protein aggregates involved in development of neurodegenerative diseases, the innovative project supported by the National Institute of Translational Research, as well as development of high-throughput synapse function analysis tool in collaboration with Dr. Perlson. In collaboration with Prof. Pinhasov, the laboratory is

involved in investigation of the role of stress and depression on early development of cognitive impairments. Recently, Dr. Michaelevski extended his research interest into the field of neural coding, suggesting a novel approach of understanding of memory coding and information processing in the brain, based on quantum theory.
Summarizing the main research interests:

- The Role of Signal Transduction in Regulation of Synaptic Plasticity and Its Link to Memory Formation
- Gene Expression and Protein Translation Role in Memory Formation
- Mechanisms of Regulation of Long-Term Synaptic Plasticity
- Mechanisms of Deterioration of Synaptic Transmission/Plasticity Involved in Pathogenesis of Neurodegenerative Diseases
- Stress, Aging and Synaptic Plasticity
- Role of non-ionizing electromagnetic radiation on protein folding in synaptopathies and neurodegenerative diseases
- Non-determinism and Quantum Approaches in Memory Coding and Information Processing

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CANCER EPIGENETICS LABORATORY

The research in the Laboratory is focused on the interrelations between cytoplasmic cytoskeletal rearrangements and chromatin structure and function inside the nucleus. We have found that induction of tumor cell migration induces global chromatin condensation, which is a prerequisite for proper cell migration. We also showed that major changes in cytoplasmic microtubules alter the nuclear envelope morphology as well as the global organization of the chromatin fibers. In our current research we analyze the molecular mechanisms by which condensed chromatin supports tumor cell migration as well as the changes in chromatin structure during tumor progression.

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COMPUTATIONAL BIOLOGY LABORATORY

The Laboratory under the supervision of Dr. Dror Tobi employs computational tools to study protein dynamics. Normal mode analysis is used to calculate protein dynamics and alignment algorithms are developed to compare the dynamics of proteins with different structures.

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DIABETES AND METABOLISM LABORATORY

The Laboratory for the Study of Diabetes and Metabolism, headed by Dr. Tovit Rosenzweig, focuses on the study of diabetes (mainly Type 2) as well as on several other aspects of the metabolic syndrome, including obesity and non-alcoholic fatty liver disease. Based on the understanding that the plant kingdom is a huge bank of compounds with different biological activities, the interests of the lab are mostly directed towards the study of herbs and nutraceuticals and their therapeutic potential in relation to these disorders. *In-vitro* and *in-vivo* models are utilized in order to investigate the activity of herbs/nutraceuticals, their active constituents, and their mechanisms of action.

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GENOMICS BIOINFORMATICS LABORATORY

The Genomic Bioinformatics Laboratory headed by Dr. Mali Salmon-Divon deals with the development of new tools and pipelines for the analysis of aspects of high-throughput sequencing data in order to investigate basic biological processes underlying human development and human health. The work is carried out in close collaboration with experimental scientists and clinicians aiming to bring advanced genomics technologies from laboratory bench to bedside. The Laboratory uses genome analysis methods to realize the potential of personalized medicine, including processing large scale genomic data, interpreting the functional effects of genomic variations, and translating these discoveries into medical practice.

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STEM CELL BIOLOGY LABORATORY

The general purpose of the Laboratory's research is to understand the molecular mechanisms underlying bone marrow derived from Mesenchymal Stem Cells (MSCs) and their application in therapy. The major concept of Laboratory study is that MSCs can be primed by proper molecular intervention to differentiate and migrate as desired for specific therapeutic purpose. Moreover, it is not only the differentiation of MSCs that mediate the therapeutic effect, but also their interaction with the surrounding tissue as reflected by their migration and secretion of various factors. The aim of this research is to consider the overall aspects of MSCs behavior in order to successfully apply MSCs for therapy.
Two major applications of MSCs are particularly addressed in the research. The first is directed towards neurobehavioral and neurodegenerative disorders in the brain and the second for cancer therapy.

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MOLECULAR BIOLOGY OF CANCER LABORATORY

The laboratory under the supervision of Dr. Stella Liberman- Aronov studies post transcriptional mechanisms regulating expression of genes involved in diverse biological processes such as cell development, proliferation, differentiation, apoptosis, and motility. Regulation of already transcribed messenger RNAs (mRNAs) occurs by several key regulators such as RNA binding proteins (RBPs) and MicroRNAs. They participate in the regulation of gene expression in both normal and pathological conditions. Of note, it is far from clear how these factors are involved in normal cell function or the extent of their impact on gene regulation as well as their participation in most diseases including cancer. We are therefore working on the identification of the functional role of RBPs and MicroRNAs in gene regulation in normal and cancer cells. In addition, we are also trying to understand what role plays these factors in cell aging development.

- The control factors involved in the post-transcription steps of gene expression in eukaryotes in normal and cancer cells;

- Understanding cancer development through the role of microRNAs;
- Examination of the role of miRNAs as a novel biomarker for diagnosis and prognosis of cancer diseases
- Development of anticancer treatment method based on irradiation with millimeter electromagnetic waves;
- Understanding of mechanisms of gene expression for aging related genes.

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ANAPHASE PROMOTING COMPLEX/CYCLOSOME (APC/C) LABORATORY

The laboratory for cell cycle and mitotic regulation, headed by Dr. Tamar Yulzary-Listovsky is focused on understanding the regulation of the Anaphase Promoting Complex/Cylosome (APC/C). In normal cell division (mitosis), one mother cell divides into two genetically identical daughter cells. This process is regulated by the APC/C activity and improper APC/C regulation will lead to an abnormal mitosis. This can generate defected cells with unequal amount of DNA that eventually can develop into malignant cells. The research in the lab is aimed to understand the link between mitotic regulation, abnormal mitosis and early phases of tumorigenesis.

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LABORATORY OF INFECTIOUS DISEASE AND ANTIBIOTIC RESISTANCE

Bacteria are now recognized as highly important due to their involvement in different pathogenesis conditions and their ability to cause various infectious diseases. After more than 70-years of antibiotic use, and the continued evolution of antibacterial resistance, the problem of antibiotic resistance is reaching a worldwide crisis. The emerging and spread of multidrug resistant (MDR) bacteria threatens to seriously compromise our ability to treat bacterial infections and pose a significant challenge in modern medicine.
Our laboratory studies basic aspects of bacterial pathogens focusing on antibiotic resistant strains with high clinical importance, and particularly, the natural gut inhabitants- enteric bacteria. We are interested in understanding the molecular mechanisms conferring antibiotic resistance and spread,

and identifying unique persistence and virulence traits involved in bacterial pathogenesis. Our ultimate aims are to improve antibiotic resistance diagnosis, prevent antibiotic resistance spread, and design novel targeted-therapeutics against MDR pathogens.

Main research topics:

- The role of antibiotic resistance plasmids in bacterial virulence and pathogenesis.
- The molecular mechanisms of serum resistance in Klebsiella pneumoniae.
- Development of novel antimicrobials to treat antibiotic resistant pathogens.
- Antibiotic resistant bacteria in companion animals and their zoonotic potential.
- The role of the gut microbiome in shaping social behavior using a mice model of behavior.
- Development of novel experimental infectious disease models.

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LABORATORY OF COMPARATIVE IMMUNOLOGY AND MOLECULAR ECOLOGY

The laboratory of comparative immunology and molecular ecology, headed by Dr. Matan Oren, studies the mechanisms that create genetic diversity in marine invertebrates. We are currently focused on two main biological questions:

- How do marine invertebrates diversify their immune systems in order to keep pace with evolving pathogens surrounding them?
- How do environmental changes affect the genetic diversity of marine invertebrates in the wild?

To answer these questions, we use the most updated molecular biology techniques for next generation sequencing, gene silencing, and gene expression profiling. The lab is equipped with an excellent marine culturing facility for marine invertebrates such as the Mediterranean Sea urchin and the jellyfish Cassiopeia. We are also looking at marine plastic debris and how it affects biological diversity.

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CANCER RESEARCH LABORATORY

- Research in my lab has focused on understanding the molecular mechanisms underlying the central role of the heat shock protein Hsp70 in cancer. In cancers Hsp70 is often expressed at very high levels, and its expression correlates with the aggressiveness of tumors. We have found that Hsp70 regulates tumor initiation and metastasis via modulation of signaling pathways initiated by major oncogenes. We further developed small molecules that specifically target this regulatory function of Hsp70.

  Our research addresses:
  (1) How Hsp70 regulates signaling pathways?
  (2) We are developing a new generation of Hsp70-targeting drugs.

- In another translational project, we are developing methods to rationally design drug combinations. Indeed, currently anti-cancer drugs are almost universally used in combinations, but fast and reliable methods to design potent combinations are lacking. We use novel technologies for fast genetic screens to identify genes that modulate responses to drugs, computationally analyze these screens, and use this information to predict which drugs should be combined.

- In a distinct project we study a process of aggregation of abnormal polypeptides. When chaperone and protein degradation machineries fail to handle abnormal proteins, they aggregate and cause cell toxicity, which may give rise to various disorders. As the last line of defense, a special machinery has evolved that transports these toxic aggregates to a centrosome location via microtubules, which leads to relieve of toxicity. The resulting non-toxic single large aggregate is called aggresome.
  Our research addresses:
  (1) What cellular components are involved in aggresome formation?
  (2) What signaling pathways control protein aggregation?

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LABORATORY OF CELL BIOLOGY

The Laboratory of Cell Biology is headed by Prof. Israel Hanukoglu. The research interests and achievements of this lab concentrate in the following areas:

- High-resolution mapping of the sites of expression of sodium and chloride ion channels (specifically, epithelial Na+ channel ENaC, and CFTR) in epithelia throughout the body. Major achievements: A. The first localization of ENaC on the surface of cilia in the female reproductive tract and the lung. This led to the understanding of the role of these channels in fluid volume maintenance on epithelial surface covered with multi-ciliated cells and provided explanation for problems of oocyte fertilization and implantation in patients with multi-system pseudohypoaldosteronism (PHA), and problems of lung clearance in cystic fibrosis patients. B. Localization of sodium channels in skin and sweat glands. This led to the visualization of the sites of sodium re-uptake in skin epidermis, providing explanation for the problems of salt-loss and dehydration in patients with PHA.
- Molecular genetics of pseudohypoaldosteronism: PHA is a hereditary syndrome of salt wasting resulting from unresponsiveness to mineralocorticoid hormone aldosterone. Achievements: We identified for the first time the mutations responsible for this disease in the genes that code the ENaC subunits. We also defined genotype-phenotype relationships in this disease by analysis of genes from patients from around the world.
- Structure-function relationships in ENaC that regulate blood volume and blood-pressure. Achievements: We identified conserved charged residues that are necessary for the intracellular transport of the channel subunits, and that this process is carried out for all three subunits together. Our studies elucidated aspects of the assembly, function and ligand regulation of these channels composed of multi-subunits.
- Cytoskeletal proteins: Achievements: The first cloning, sequencing and structural modeling of cytoskeletal keratins. Current work on the skin continues research in this field.
- Steroid hormone synthesis: Achievements: Isolation, cloning, and structure-function analysis of enzymes involved in steroid hormone biosynthesis. Cloning of the ACTH receptor. This line of work led to the characterization of novel families of enzymes and approaches for engineering of enzymes with altered coenzyme specificities. Currently our work in this field concentrates on mapping the cytological organization of the male reproductive tract that also includes steroidogenic cells.

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DEPARTMENT OF PHYSICS

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The department faculty consists of qualified experimental and theoretical physicists who work in various fields in applied and fundamental physics. Some of them got their degrees from the academic institutes in Israel and others got their education from accredited academic institutes abroad. The fields of research are various, ranging from studying the Universe to the research of elementary particles. The faculty members have international reputation and take part in prestigious international conferences. Their publications accepted to the most prestigious journals.

APPLIED SPECTROSCOPY LABORATORY

Prof. Y. Raichlin is the Head of the Laboratory, and Dr. M. Gaft and Dr. L. Nagli associated with him. Dr. R. Mines, Dr. J. Wolf, Dr. A. Goriachev and Dr. R. Grinev are research fellows of the lab. Members of the Laboratory have published more than 200-refereed papers.

- The scientific interests of the group are concentrated in the following fields:
- Research of fundamental and applied aspects of fiber optic evanescent wave spectroscopy. (FEWS)
- Research of fundamental and applied aspects of Laser Induced Breakdown Spectroscopy (LIBS)
- Research of fundamental and applied aspects of Raman Spectroscopy: gated UV Raman, femtosecond Raman, real-time Raman detection.
- Research in time-resolved luminescence, remote detection and identification of geological and mineralogical objects, detection of chemical and biological threats.
- Research of applied aspects of Optical Spectroscopy: express foods and drinks quality control.

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THE LABORATORY OF OPTICAL AND ELECTRICAL INVESTIGATIONS OF ULTRATHIN FILMS AND BIOLOGICAL OBJECTS

Prof. R. Pogreb is the Head of the Laboratory, and Prof. G. Vayman associated with him. The researchers in the Laboratory include doctoral and post-doctoral fellows. The Laboratory is engaged in basic and applied research in the following areas:

- Research of the dependence of properties of nanoscale films on time of irradiation processes.
- Cold plasma and UV effects on dielectric permeability and morphology of ultrathin polymer films.
- Relaxation spectra of polymers and phenomena of electrical and hydrophobic recovery.
- Design and construction of a facility based on electric field for biological treatment of wastewater.

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THE MOLECULAR RELAXATION LABORATORY

The Molecular Relaxation Laboratory under the supervision of Dr. Paul Ben Ishai deals with cooperative behaviors of matter via its interaction with Electromagnetic waves in the widest possible frequency range, from Hz to THz. The primary research tools of the Laboratory are Time- Domain THz Spectroscopy and Dielectric Spectroscopy. The Laboratory works in conjunction with a number of groups internationally on several topics. These include:

- THz wave interaction with Human Skin
- Ultra-confinement of molecules in Natural Minerals.
- The relaxation dynamics of water and aqueous solutions.
- Universal relaxation behaviors.
- Non-linear THz responses.

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LABORATORY OF MILLIMETER WAVE EFFECT ON BIOLOGICAL OBJECTS

The Laboratory under the supervision of Prof. K. Komoshvili investigates the influence of electromagnetic waves with millimeter wavelength (so called W-band) on biological objects such as cancer cells and in vitro and animals in vivo. The experiments are performed in either sweeping or continuous discrete frequency regimes with low generation powers (< 20 mW). In collaboration with the Department of Molecular Biology, morphological and physiological changes in the cells are analyzed by visualized methods and appropriate instrumentation (LUNA, FACS etc.).

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ULTRAFAST SPECTROSCOPY LABORATORY

The Ultrafast Spectroscopy Laboratory under the supervision of Dr. Dima Cheskis, research ultrafast processes in the area of condensed matter physics. Especially it focused in the following fields of research:

- Investigation of electronic, magnetic and optic dynamics in thin film materials;
- Study of magnetoresistance and other transport phenomena of graphene and other 2-D materials;
- Research in the area of optically manipulated valley degree of freedom (valleytronics)
- Research in the area of spin of electrons and its interaction with electronic charge (spintronic).
- Study of thermoelectric materials

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THEORY OF CONDENSED MATTER

The Theory of Condensed Matter Group includes:

- Prof. Baruch Even Shoshan (Rosenstein), on leave.
- Prof. Meir Lewkowicz
- Prof. Michail Zubkov (from October 2017)

The group focuses on systems where conduction and valence bands meet at the Dirac points as in 2D graphene and in recently synthesized 3D Dirac materials. Graphene, a one layer thick hexagonal array of carbon atoms, when undoped, exhibits a curious mixture of properties pertinent to metals and insulators. On the one hand, despite near absence of both charge carriers and impurities, it has a finite conductivity like a metal. On the other hand, the Coulomb interaction between electrons is unscreened like in a dielectric and hence is long range. 3D Weyl semimetals (WSM) exhibit peculiar electric transport qualitatively different from their 2D analogue.

We study:

- Dynamics of the particle-hole pair creation.
- Chiral anomaly and emergence of the neutral electron-hole plasma.
- Ballistic transport in graphene and WSM in and beyond linear response.
- Schwinger's pair creation rate via radiation generated by strong electric currents.
- Dynamics of electric transport in interacting graphene and Weyl semimetals.
- Nonlocal electrodynamics due to long range electron-electron interactions.

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HIGH ENERGY GROUP

The High Energy Group includes Dr. S. Bondarenko and Dr. A. Prygarin. Along with Postdoctoral Research Associate Dr. Semyon Pozdnyakov, it also consists of Master's students Tal Abadi and Rami Elkaiam.
The scientific interests of the group are concentrated in the following fields of research:

- Development of new approaches in the field of high-energy physics based on effects of saturation physics.
- Development of new approaches to the high-energy processes based on reggeized gluon degrees of freedom.
- Establishing connections between condensed matter physics and high-energy QCD scattering.
- Description of observed LHC experiment quantities in the framework of the QCD.
- Establishing the plasma physics approaches in the calculation of the effects of high-energy scattering and investigation of the anomalous properties of matter obtained in the scattering.
- Investigation of the integrability properties of the QCD super Yang-Mills BFKL model.
- Using novel mathematical techniques based on integrability inspired by quantum spin chains.

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MATHEMATICAL PHYSICS AND GENERAL RELATIVITY

The Mathematical Physics and General Relativity group of the Physics Department includes Department's members Dr. G. Weinstein, Prof. Y. Levitan, Adjunct Prof. L. Horwitz, Dr. I. Ben Dayan, Dr. M. Schiffer and PhD student Yehuda (Igor) Itkin. The scientific interests of the group are concentrated in the following fields of research:

- Initial conditions, constraints, and Penrose type inequalities.
- Stationary black holes in 3+1 and higher dimensional classical gravity.
- Alternative theories of gravitation.
- Entropy in general relativity and cosmology.
- Classical and relativistic fluids.

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ASTROPHYSICS

Dr. Kashi's research involves the theoretical study of various astrophysical objects, focusing on very massive stars and giant eruptions. As we are dealing with systems that involve complicated physical processes and non-linear instabilities, studying them requires 3-D numerical simulations, and the use of powerful supercomputers. We use advanced hydrodynamical and stellar evolution codes that run on hundreds of processors in parallel.
Selected research topics:

- Stellar evolution in very massive stars.

- Instabilities that lead to the giant eruptions in very massive stars and the recovery process from such eruptions.
- Simulations of binary wind interactions in very massive stars.
- Modeling the physics of optical transient eruptions – stellar outbursts with luminosities between those of novae and supernovae.
- Accretion and feedback processes in various astrophysical objects – from stars to supermassive black holes.

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PHYSICS IN MEDICINE GROUP

The Physics in Medicine group includes Prof. Tuvia Schlesinger (emeritus) and Dr. Dan Gamliel, and the Ph.D. students Avi Malki (Nuclear Medicine Engineer from Sheba Medical Center) and Moshe Menshes (Director of the School for X-ray Technicians in Assaf Harofe Medical Center).
Main researcher's interests of the group:

- Protection of workers and patients in hospitals from ionizing radiation
- Dosimetry applications to X-ray imaging, nuclear medicine imaging and radiotherapy
- Planning and simulations of various magnetic resonance experiments

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CHAOS AND GEOMETRY

The Chaos and Geometry group includes Prof. J. Levitan, Prof. A. Yahalom, Prof. L.P. Horwitz and Dr. Y. Strauss
The group utilizes the methods of symplectic geometry to establish the existence of a canonical transformation from potential model Hamiltonians of standard form in a Euclidian space to an equivalent geometrical form on a manifold, where the corresponding motions are along geodesics curves. The advantage of this representation is that it admits the computation of geodesic deviation

as a test for local stability, which the group has shown in recent studies to be a very effective criterion for the stability of the orbits generated by the potential model Hamiltonian.

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MATERIAL RESEARCH CENTER LABORATORY OF COMPOSITE FILMS FABRICATION

Staff members and students from the Physics and Chemical Engineering Departments teamed up in the Laboratory for the projects in the field of materials engineering. Research activity of the laboratory is concentrated in the field of photoelectric conversion elements composed of thin films of semiconductor materials. The scientific interests of the group include:
novel ink-jet printing technologies for fully printable solar and fuel cells;
scandium-doped materials for photovoltaics;
optical up- and down-converting elements.

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REMOTE SENSING LABORATORY

The research is focused on the combination of various techniques and measurements for studying ionospheric responses to both natural and anthropogenic triggering sources. Specifically, the researchers in the Remote Sensing Laboratory are interested in remote sensing and data analysis from ground and space based measurements such as ULF/ELF/VLF electromagnetic radiation and GPS satellites. One major aspect of this research is to study different lithospheric-tropospheric-ionospheric coupling mechanisms.
The work of the Remote Sensing Laboratory involves research and development for a broad range of earth science applications including the improvement and use of GPS with attention to measuring tectonic motions and Ionospheric Total Electron Content (TEC), which involve algorithm and analysis technique improvement (filtering theory, mathematical model improvement, and computational methods), in addition to a considerable interpretive science component. These improvements are accomplished by reducing the key sources of error due to diurnal effects from path delays caused by

reflections and refractions of the GPS signal near the receiver (multipath) and from tropospheric and ionospheric delays.

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THE BIO-ELECTROMAGNETISM LABORATORY

The Bio-electromagnetism Laboratory under the supervision of Dr. Refael Minnes explores the interactions of electromagnetic waves, specifically in the UV-Vis-IR range, with biological tissues and cells. The Laboratory works on several topics. These include :

- Using Second Harmonic Generation (SHG) to improve Photodynamic therapy (PDT), a treatment of various diseases and especially cancer.
- Developing an IR spectroscopic method to determine the metastatic potential of cancer cells.
- Developing an indirect method for analyzing the composition urinary stone.

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DEPARTMENT OF COMPUTER SCIENCES

Head of Department:

Prof. Boaz Ben Moshe
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The Department of Computer Science at Ariel University offers an undergraduate curriculum towards the Bachelor's degree, as well as a graduate program culminating in Master's and Doctorate degrees. The department is a young and vibrant one, with faculty focused on such areas as computer

vision, machine learning, data mining, compression, artificial intelligence, computational geometry, graph theory, approximation algorithms, cryptography, robotics, bioinformatics and combinatorics.

DATA COMPRESSION LABORATORY

The Data Compression Lab's approach tightly couples theoretical and empirical investigations to develop research in the field of lossless data compression, with applications to information retrieval, algorithm approximations, and cyber. In particular, the research interests include compact data structures, compression crypto systems, compressed pattern matching, compression of DNA sequences, compressed data bases and edit distance problems.

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KINEMATICS AND COMPUTATIONAL GEOMETRY MULTIDISCIPLINARY LABORATORY (KANDCG)

Research interests of the Lab encompass both theoretical and applied aspects of Computational Geometry and Facility Location Optimization, including: Approximating Radio Maps, Locating Wireless Back-bone, Frequency Allocation, Visibility Graphs, Terrain Simplification, Allocation Problems, Vehicle Routing Problems, and Geographic Information System (GIS) expert systems. Currently our primary research is in advanced algorithms for GPS-like devices.
We cooperate with the following research groups:

- Computational Geometry, Prof. Matya Katz and Dr. Paz Carmi (BGU);
- Medical Imaging Simulation, Prof. Ronnie Tepper (Meir Hospital);
- Human Vision, Dr. Michael Vagner (Ariel University).

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ROBOTICS AND KINEMATICS LABORATORY

Research interests of the Lab encompass both theoretical and applied aspects of robotics. This includes: Medical robotics, Motion planning, Motion planning under uncertainties, flexible robotics, autonomous vehicles and robotic research using topological tools.
We cooperate with the following research groups:

- Computational Geometry, Prof. Boaz Ben Moshe;
- Medical Imaging Simulation: Prof. Ada castler.
- Robotics: Prof. Amir Shapiro, Prof. Moshe Shoham, Prof. Shraga Shoval.
- Topology: Prof. David Blanc

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AUTONOMOUS AGENTS AND MULTI-AGENT SYSTEMS LABORATORY

The research focus of the lab is in artificial inteligence (AI) and specifically in the field of autonomous agents and multi-agent systems. The lab focuses on how to build inteligent agents that can interact efficiently, and we study both cooperative and conflicting situations. Here are some topics the lab is currently investigating; they include issues in computational social choice, non-cooperative and cooperative game theory and stochastic search:

- Voting manipulation using a social network
- Approximation for manipulation and bribery of elections

- Persuasion during elections
- Security voting games
- Intra-team voting for negotiation
- Coalition formation based on a social network
- Stochastic search on general graphs
- On-demand shared public transportation

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ULTRA SUPERVISED LEARNING AGENTS LABORATORY

The Lab caries research on different aspects in which autonomous agents can benefit from interaction with humans. Lab interests include human aided Machine Learning, Human-Agent interaction, Instructable Agents, Modeling and Predicting Human behavior and Decision Making, Natural Language Processing and Knowledge Bases. The lab is application oriented and has developed several autonomous agents that can interact with humans by natural language, by demonstration and by other means. The lab carries the following goals: allowing autonomous agents to learn from humans in some domains just as humans may learn from other humans, given only a small set of examples or instructions; allowing autonomous agents to learn from human implicit feedback such as specific wording a human has chosen for a given command or voice intonation; building agents that can aid humans in conveying their ideas in a more efficient manner, for example by filling out missing information left out by the human.

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RESEARCH LABORATORY FOR CRYPTOGRAPHY AND PRIVATE COMPUTATION

Research interests of the Lab are focused on the theoretical foundations of cryptography and private data analysis. In the area of cryptography, we are specifically interested in secure multiparty computation and understanding the complexity of different cryptographic primitives. In the area of private data analysis, we are mostly interested in distributed settings and complexity of differentially

private protocols as well as the way they relate to more classical cryptographic primitives. In addition, we collaborate with the Center for Cyber Technologies at Ariel University on issues of applied cryptography and efficient secure multiparty protocols.

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THEORETICAL FOUNDATIONS LABORATORY

This laboratory focuses on the broad spectrum of the mathematical foundations of metric algorithms, with special emphasis on low-dimensional metric and l_p spaces. Particular attention is placed upon the problems of

- Nearest neighbor search in low-dimensional spaces
- Proximity algorithms for machine learning
- Fundamental structures of metric spaces, such as spanning and Steiner trees and minimum weight tours.
- Metric and l_p-space embeddings.

Research in the laboratory is partially funded by a 4-year grant from the Israel Science Foundation, in close collaboration with fellow researchers at Ben-Gurion University of the Negev.

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COMBINATORICS LABORATORY

The members of the Combinatorics Laboratory are Dr. Elad Aigner-Horev, Prof. Dan Hefetz, and Dr. Gabriel Nivasch. Their research covers many areas of Combinatorics and its relation to Theoretical Computer Science. In particular, the following fields are considered:

- Random and pseudo-random graphs and hypergraphs
- Random processes and algorithms
- Positional games

- Extremal Combinatorics
- Ramsey Theory
- Additive Combinatorics
- Algebraic and probabilistic methods in Combinatorics
- Discrete Geometry
- Combinatorial Game Theory

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THEORETICAL FOUNDATION LABORATORY

My research focuses on several main topics: approximation algorithms, network coding, diabetes, live streaming networks, communication networks, and sublinear algorithms.
I have a broad interest in theoretical computer science and its relations with various branches of computer science such as network coding, communications networks, data compression, probabilistic physical search, and live streaming networks. In addition I integrate theoretical computer science with topics outside the scope of computer science, such as diabetes, and identifying bacteria. Among the topics I work on are: Approximation Algorithms, Network Coding, Closing the Loop Towards Artificial Pancreas, Identifying Bacteria, Live Streaming Networks, Testing Algorithms, AS-graph Models, Social Networks, and Hardness of Approximations of coloring problems on Interval Graphs.

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AEROSPACE AND NANO SATELLITE RESEARCH CENTER

The Aero-Space and Nano Satellite Research Center focuses on nano and pico satelites (1-10 kg / sub kg) as tiny platforms for a wide range of research. The Research Center focuses on swarms of tiny satellites as an alternative for a single "big bird."
The research involves several disciplines including:

- Free Space Optical Communication: Offload alternative to traditional RF communication;
- GNSS in space: Tiny platform time accuracy and positioning in space;
- Space Robotics: Ability to inspect, fix, and repair satellites in space

The Center provides the following services:

- Technology and Engineering Unit + electronics;
- Laboratory - Team of engineers with knowledge in construction and assembly of electronics along with terms of space;
- 3D printers;
- Vacuum chambers and thermal analysis tools and cameras;
- Laboratory for reliable integrated electronics;
- Ground Station (RF);
- Robotic Phoneescope (2016 Q4) – for FSO Ground Station;
- STK – Simulators

The Center has research collaborations with the SkyFi.tech organization (optimizing RF flexible reflectors).

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DATA MINING (DM) LABORATORY

One of the main streams of ***Data Mining*** is ***Text Mining*** including ***Natural Language Processing (NLP).***
Investigating ***Natural Language Processing***, especially in English for various social purposes, such as ***CCBT – Computerized Cognitive Behavioral Therapy***; retrieving the personality profiles of social network members for customizing advertising; homeland security – searching for suspicious information in the social media (***Textual Data Mining***), analyzing the candidate's personality for special purpose tasks (such as army recruiting); matching suitable fiscal investigating options and potential customers according to their personality; matching of couples; testimony analysis - verifying the witness's reliability, and more.

NLP is based on creating a computerized semantically classified thesaurus and performing special pattern matching, according to the required application. Some of the applications are ***Expert System*** oriented and embedded in ***smartphones***.
Another aspect of ***NLP*** research is ***Literacy***, namely***, Homeland Language Acquisition*** by technological means, based on Expert Systems.
The laboratory treats ***DNA*** – various tracks frequency analysis, especially ***ternary*** and ***palindromes***.

Body Movement Identification (***BMI***) is an additional ***DM*** subject treated by the laboratory; it is an additional tool in the ***biometrical*** spectrum of identification and gesture analysis. ***Body Language*** analysis, using the ***Image Processing*** methods, is another option in looking for suspicious individuals in a crowd.
The ***DM*** laboratory is a platform that serves many students in developing their final projects, using the ***Data Mining (DM)*** and ***Expert System (ES)*** techniques, which can be implemented in various applications. One such application is finding medications quickly in an ambulance for the team's convenience. Such an application plays a crucial role in emergency situations.

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COMBINATORIAL OPTIMIZATION

Prof. Levit has taught and researched in combinatorics and algorithms for over 30 years. He has published around 160 research papers.

His major achievements are in the development of a combinatorial theory of cluster analysis and knowledge representation in multidimensional feature spaces; a combinatorial framework for dynamic programming and local-optimal search based on matroids, antimatroids and greedoids; new insights in combinatorial and algorithmic properties of the families of critical and maximum independent sets of a graph.

His recent findings concern well-covered graphs, König-Egerváry graphs, the independence polynomial of general graphs, uniquely restricted matchings, violator spaces, the Krein-Milman property, groups of balanced labelings on graphs, Hultman numbers, and generalized commuting probability in finite groups.

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LABORATORY OF ALGORITHMIC ECONOMICS, SOCIAL CHOICE AND GAME THEORY

This laboratory conducts multi-disciplinary research combining computer science and social sciences such as economics and politics. In particular, it studies topics such as:

- Algorithms for fair division.
- Algorithms for auction design.
- Algorithms for information elicitation.
- Algorithms in game theory.

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COMPUTER VISION LAB

The Lab is focused on fundamental research in computer vision based on machine learning tools. We develop both theoretical approaches and practical solutions for various problems in the field such as depth recovery from stereo, camera calibration, novel view synthesis, video analysis, motion-based features for multiple view geometry applications and robust estimation of geometric models.

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DEPARTMENT OF MATHEMATICS

Head of Department:
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Department of Computer Science and Mathematics was established in 2003, in 2015 these two parts were separated, since 2015 Mathematics exists as independent department. The three-year program leads to a BSc degree recognized by the Council for Higher Education in Israel. Since 2016 there exists master Program on Applied Mathematics (second degree). There are many PhD students (third degree) on Mathematics.
The members of the department are involved in research in the following areas: ordinary, partial and functional differential equations, algebra, mathematical logic, numerical methods, real and complex analysis, numerical methods, optimization, applications of mathematics in technology, biology, medicine, navigation, economics, finance.

APPLIED MATHEMATICS CENTER

The Center deals with applications of ordinary differential , impulsive, integro-differential and functional differential equations in navigation, technology, biology and medicine. Control, stability, oscillation/nonoscillation, optimalimization, existence and uniqueness of solution to boundary value problems, computer implementation are studied.

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MATHEMATICS

Prof. Flicker's research areas of interest are Number Theory, Representation Theory, Arithmetic Geometry, and in particular Automorphic and Admissible Representations, Automorphic Forms over function fields, Lifting of Representations, Hecke-Iwahori algebras, p-adic automorphic forms, Galois Cohomology, Local-Global Principles, Motives, Algebraic Groups, Covering Groups, and Shimura Varieties.

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MATHEMATICS

The research interests are concentrated in Partial Differential Equations and Complex Analysis. In particular, they include integral equations of boundary value problems in domains with non-smooth boundaries, criteria for validity of maximum principles and invariant sets for elliptic and parabolic systems, sharp estimates for solutions of equations and systems of mathematical physics, sharp real-part theorems and their analogues for partial differential equations in multidimensional domains.

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MATHEMATICS

Research focuses on two issues:

- Independence relations in abstract elementary classes, a branch of model theory and
- Combinatorial principles for uncountable sets.

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MATHEMATICS

My main research area is Model theory, the branch of mathematical logic. Specifically, geometric stability and simplicity theory with applications to algebra and number theory. Main research subjects: The independence theorem over algebraically closed sets, elimination of hyperimaginaries, representation of canonical bases, stability in simple theories, description of the interaction between a type and an invariant set, classification of regular types, Kueker's conjecture for simple theories, unidimensional simple theories.

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APPLIED MATHEMATICS RESEARCH

Applied Mathematics is the development and the application of mathematical methods for solving real-world problems, and/or problems derived from science and technology. Applied Mathematics has become essential in achieving progress in all areas of science and technology.
My research in Applied Mathematics is concerned with numerical methods for partial differential equations, with a particular interest for problems arising from models in the field of computational electromagnetism, wave equation and plasma physics, originated from the need to compute precisely the motion of charged particles for plasma physics applications.
In recent years, I have also intensively worked on inverse problems, by proposing a new time reversed method with potential industrial applications. I am also interested in studying the relations between different fields (cross-disciplinary research), as for instance applications of mathematical and numerical methods to fracture mechanics or the use of data mining methods in the numerical solutions to mathematical models.

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LABORATORY OF MATHEMATICAL MODELLING IN BIOLOGY AND MEDICINE

The Laboratory under the supervision of Dr. Svetlana Bunimovich develops mathematical models of the biological processes, and specifically models of the cancer growth and treatment. The laboratory collaborations with biologists and doctors to find the best protocol of the treatment of the diseases. The main research directions can be summarized as follows: Models of treatment of chronic myeloid leukemia in the chronic phase; Combined treatment BCG and IL-2 of bladder cancer and predictions for successful therapy; Stability analysis of some treatment models; Early diagnostics of colon cancer based on natural history of patients.

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CENTER OF APPLIED MATHEMATICS

Professor Alexander Domoshnitsky is the head of the laboratory and Dr. Oleg Kupervasser and Dr. Roman Yavich are associated with him.
The scientific interests of the group are concentrated in the following fields:

- Image Processing and Computer vision
- AI and deep learning
- Robotechnics, Robotics
- Visual navigation and visual SLAM
- Inertial navigation
- TRIZ theory of problem solving
- Bioinformatics computer drug design

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DEVELOPMENT OF A.I. BASED PLATFORM FOR E-COMMERCE

The foundation of the platform is an imitation mathematical model that establishes links between parameters of the object (product). The transition from a universal model of a class of objects to particular models requires an ontological approach. This problem, in general, can be solved using qualitative analysis of solutions of systems of differential equations, or, in most practical applications, solutions of systems of binomial equations. On the basis of these solutions, a working ontological algorithm is being developed to create a software product.

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SCHOOL OF HEALTH SCIENCES

Dean: Prof. Ruth Birk
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The School of Health Sciences focuses on academic education qualifying broad and multi-systemic professionals, which views the individual from various and integrated aspects including: clinical, basic scientific research and mind-body integration. The education and research in the School of Health Sciences focuses on both professionalism and in-depth learning with multi-system approach in order to achieve optimal; health, treatment, healing and prevention. The accelerated progress of research in the past few years has brought about a revolution in the way health and illness of the individual and society are viewed.
The School of Health Sciences is comprised of 6 undergraduate degree departments: Nutrition, Health system management, Communication disorders, Physiotherapy, Nursing and Pre-medicine and graduate degrees in health system management and Physiotherapy.for master's degree.

Health Science Clinicis Center serve the population and involved in active teaching of health Sciences programs students combining hands-on practical teaching approach from early stages of undergraduate programs. In addition, the advanced Simulation Center acts as a focal point of practical integration in all the departments as a part of integrating advanced professional aids of health professions. The School of Health Sciences includes two centers for knowledge, excellence and multi-system research, in physiotherapy and communication disorders in addition to research laboratories of researchers in all fields.

DEPARTMENT OF HEALTH SYSTEMS MANAGEMENT

Head of Department:
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The health system in Israel is a public system based primarily on a range of organizations providing medical services to all of Israel's citizens. These health services are characterized by great complexity which creates gaps between health service consumers and health care providers. Added to this are challenges such as an aging population, insufficient medical staff, inequalities in health and health care access, and gaps between the various medical funds (HMOs) and hospitals. As a way of dealing with these complex processes, a degree in health systems management was developed by Ariel University. The degree focuses on training students to cope with the many challenges faced by the health system.

The Department of Health Systems Management is involved in a wide range of research: health promotion, consumer preferences, medical ethics, gerontology, health quality indicators, medical informatics, and more.

LAW, HEALTH AND MEDICAL ETHICS RESEARCH

Research interests are concentrated in the following areas:

- Law and health: Patient rights and legislation;
- Medical ethics: End-of-life issues and the physician-pharma relationship;
- Health policy.

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SOCIOLOGY OF HEALTH AND HEALTH PROMOTION RESEARCH

Research interests in Sociology of Health and Health Promotion concentrate on the following areas:

- Health risk behaviors of children, adolescents, and young adults;
- Risk factors and resilience factors in personal and social environments.

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RESEARCH ON METHODS FOR EVALUATING SOCIAL UNDERSTANDING

The research focuses on developing methods for evaluating social understanding and vocational competences for Autistic Spectrum Disorders (ASD) and Attention Deficit Hyperactivity Disorders (ADHD) based on eye-tracking of participants with novel collaborative virtual environments and remote viewing technologies.

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SOCIOLOGY OF HEALTH AND HEALTH PROMOTION RESEARCH

Research on Sociology of Health and Health Promotion concentrates on the following areas:

- Health behaviors, physical activity, and nutrition;
- Planning and implementation of intervention programs to promote healthy behavior;
- Case study of identification of social and well-being changes in social capital of Mamanet net ball league participants.

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RESEARCH INTERESTS IN SOCIOMEDICAL SCIENCES AND HEALTH POLICY

Concentrate on the following areas:

- The relationship between cultural factors, in particular ethnicity and religion, on health behaviors
- Access to health care among vulnerable populations
- Mental health service utilization among religious populations
- Cancer prevention and control, especially among immigrants

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HEALTH MANAGEMENT, PATIENT'S ORGANIZATION AND HEALTH DECISION-MAKING

Research interests are concentrated in the following areas:

- Health Management - Influence of the Health System and its Workers on Health Consumer's Behavior
- Patient's Organization - Characteristics of Patient Organizations' Activities and their Impact on Patients

- Health Decision-Making - Active Patients in the Dynamic Environment and their Decisions

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EXERCISE PHYSIOLOGY, ENVIRONMENTAL PHYSIOLOGY AND HEALTH PROMOTION

Research interests are concentrated in the following areas:

- Cognitive and physiological evaluations during stress
- The effect of food supplements on cognitive assessment and physical performance
- The physiological basis for active and healthy lifestyle

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PHYSICIAN ASSISTANT WORKFORCE AND HEALTH SERVICES

I am interested in the expansion of the medical workforce and increasing access to care through the development of Physician Assistants (PA) in Israel and around the world. I am a certified PA who practiced neurosurgery and critical care medicine for over ten years in the USA. I co-founded a master's program to educate PAs at Boston University School of Medicine where I was an Assistant Professor of Medicine and the program's Director of Research. I am also an epidemiologist who has studied the development of PAs in areas of healthcare where there are gaps in access and quality. I have been involved in the development of PAs in Israel and was recruited to Ariel University to continue my work researching and developing PAs in Israel.

Specific areas of research interest currently include:

- Global expansion of PA workforce
- Clinical quality improvement and patient safety
- Medical education

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DEPARTMENT OF PHYSIOTHERAPY

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Physiotherapists assess, diagnose and treat people with movement problems caused by a wide variety of disorders. Physiotherapists use wide range of techniques to treat and prevent injuries and assist to maintain fitness and health.
The Department of Physiotherapy at Ariel was founded in the year 2000. The health policy perception by physiotherapy organizations in Israel and in other parts of the world today is that physiotherapists are central and leading professionals in programs for the promotion of health and physical activity. In this spirit, the Department of Physiotherapy at Ariel University espouses the emphasis of student knowledge in the field of physical activity and health promotion among various populations.
Physiotherapy studies at Ariel University are available at both bachelor and master's level.
The Bachelor study program is spread over four years, at the end of which graduates are provided with certification recognized by the leading health organizations in Israel and in the rest of the world.
The goal of the Master's Degree Program is to train physiotherapists to engage in research and to develops the ability to use highly-developed clinical reasoning skills. The Master's Degree studies Program is spread over two years, and it offers the choice of two study tracks: research track with a thesis or a track with a final paper (without a thesis).

NEUROMUSCULAR AND HUMAN PERFORMANCE LABORATORY

The Laboratory works on identifying innovative rehabilitation and prevention approaches targeting muscle weakness, biomechanical asymmetries, and performance limitations.

Current research:

- Optimizing of pulse characteristics of neuro-muscular electrical stimulation for muscle strengthening;

- Functional electrical stimulation following sports and orthopedic injuries (e.g., post ACL reconstruction);
- Nerve conduction block using surface kilohertz frequency alternating current;
- Sensorimotor control on gait and posture in people with chronic ankle instability;
- Gait variability as a predictor of lower limb injuries in soldiers.

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NEUROBIOLOGY OF EXERCISE TRAINING LABORATORY

The research in our lab concerns mainly on neuroimmunological and neuroregenerative effects of exercise training on neurodegenerative diseases, particularly on Multiple Sclerosis (MS) and its animal models, such as Experimental Autoimmune Encephalomyelitis (EAE).
The studies are conducted on animal models and involve clinical evaluations, histopathological analyses, cell cultures and molecular biology techniques.

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TITLE OF RESEARCH/LABORATORY

Areas of research in Physiotherapy Services include the following specializations:

- Physiotherapy services in Israel;
- Implementation of the International Classification of Functioning and Health (ICF);
- Lower back pain epidemiology;
- Use of outcome measures in physiotherapy settings;
- Post-polio treatment

Intervention to reduce the risk of side effects after breast cancer treatments.

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LABORATORY OF HUMAN MOTION ANALYSIS (KINESIOLOGY)

The main purpose of the lab is to analyze normal and pathological movement and to apply the findings to rehabilitation of individuals with neurologic and orthopedic impairments.
Representative Research Topics:

- Three dimensional analysis of the lower extremity kinematics during the step down test;
- Analysis of functional activities of individuals with neurologic disorder;
- Analysis of muscular activity during various balancing tasks.

The lab is equipped with 3D motion capture system (Qualisys, Sweden) synchronized with an electromyography system of 8 channels (Mega, Finland), in-shoe pressure measuring system (F-Scan, USA), two hand-held dynamometers (Lafayette, USA), and a treadmill (Pro Life, USA).

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MUSCULOSKELETAL PAIN RESEARCH

Areas of research on specialization in Musculoskeletal Pain include:

- Musculoskeletal pain, especially chronic lower back pain;
- Lower back patients with psychological risk,
- Health Promotion Intervention Programs;
- Behavioral intervention for increased physical activity using the Trans-Theoretical Model;
- Motivation interviewing and economic burden related to musculoskeletal pain.

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POST-STROKE MOTOR RECOVERY RESEARCH

Research on principles underlying motor recovery after stroke focuses on devising new modes for directing brain plasticity to promote optimal motor rehabilitation. Key elements of research program methodology are:

- Use of electrophysiological biomarkers for monitoring motor system response to experimental rehab interventions;
- Use of kinematic analyses of movement in addition to standardized behavioral motor tests;
- Use of normalization and voxel-based lesion symptom mapping (VLSM) procedures in the analysis of brain lesion impact on recovery;
- Use of Transcranial Direct Current Stimulation (tDCS);
- Application of principles driven by motor-control theory.

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VIRTUAL REALITY LABORATORY

The Laboratory works on employing advanced technology such as a SeeMee VR gaming system and The BOBO (A new balance board invented by physical therapists previously students at Ariel University) to enhance participation and adherence of individuals with intelectual disability (IDD) and with Autism (ASD) to participate in physical activities.
Current research:

- Improving balance in individuals with IDD through VR gaming
- Improving physical fitness in individuals with IDD through VR gaming
- Improving physical fitness in individuals with ASD through VR gaming
- Improving balance in individuals with ASD through VR gaming
- Possibility of improving balance, physical fitness, shopping skills, walking ability, shoulder range of motion, reaction time with other populations

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AUTISM RESEARCH

Areas of research within physiotherapy and Autism (ASD):

- Improving physical fitness in individuals with ASD through VR gaming
- Improving balance in individuals with ASD through VR gaming
- Improving jumping ability in children with ASD
- Investigating toe walking in ASD
- Applying ESDM principles in physiotherapy with children with ASD
- Motor learning in children with ASD
- Physiotherapy in adults with ASD
- Motor screening in children with ASD

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VIRTUAL REALITY, MOTOR LEARNING, AND NEUROPLASTICITY LABORATORY

Research the constraints on learning balance and stability skills, as well as volitional skills in typical adults and following lesions of the Central Nervous System.

- Develop a paradigm for complex motor-perceptual skill acquisition and applying it to study populations with balance impairments; especially those with CNS lesions (people e.g. Stroke, Traumatic Brain Injury (TBI), Parkinson's Disease (PD)).
- Develop a fall prevention paradigm for testing and for intervention in people who are prone to falls.
- Investigate the effects of attention demands on stability and on the acquisition of motor skills, as well as on the performance of daily functions. These studies should lead to guidelines for training in dual/multi-tasking conditions; especially in the older population and people with impaired balance and recurrent falls.
- Explore the effect of functional Virtual Environments (e.g., city streets, shopping malls) to enhance functional capability and independence in populations with CNS lesions (e.g. Stroke, TBI, PD).
- Study the effect of peripheral input on central control of posture, (e.g., manipulating visual input, proprioceptive input as well as augmenting lower limb sensory reception and central excitatory state through noise on the ability to maintain postural stability in quiet stance and walking even while performing a cognitive task in patients with CNS impairments and in recurrent fallers.
- Use advanced technologies of Virtual Reality and Motion Capture for both research and training

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DEPARTMENT OF NUTRITION SCIENCES

Head of Department:
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Nutrition Sciences studies associations between diet and human health. This extensive area of study ranges from reductionist associations between nutrients and genetics to broad societal associations between policy and public health. Clinical studies and translational research provide the required evidence base for therapeutic nutrition interventions.
The focus of nutrition sciences today has shifted from deficiency-related diseases to prevention of chronic disease, reflecting changes in demographics and increases in overweight and obesity prevalence, even in developing nations. Thus, the role of food and nutrition in human health, disease prevention and treatment is critical in facilitating optimal health and wellness for individuals and populations. Areas of ongoing nutrition research include:

- Wellness and lifestyle nutrition – nutrition in healthy individuals and populations, to maintain and promote optimal health
- Nutrition in occupational health – nutrition in the workplace, to facilitate worker health
- Medical nutrition therapy – nutrition interventions in disease states, both acute and chronic, to restore health and reduce complications
- Community nutrition in public health – nutrition policy and interventions for the general population
- Food service – the management and delivery of nutritionally sound meals in institutions and other settings outside of the home
- Molecular nutrition – the role of genes in determining response to nutrients, and the effect of nutrients on gene expression

Nutrition science is integral in the provision of health services in all settings; thus, there is a growing need for highly educated nutritionists in hospitals and clinics, the food industry civil and military institutions (army, police, sports societies etc.) as well as in academic and educational institutions

NUTRIGENETICS AND NUTRIGENOMICS – PERSONALIZED NUTRITION AND MEDICINE RESEARCH

The science and health applications of genomic information in clinical and basic nutrition is a novel field which combines medicine, genomic research, and the science of nutrition, examining the complex interactions between diet and the human genome.
More specifically, the main research focus of the Laboratory is nutrition-dependent molecular and genetic mechanisms of lipid metabolism in the mammalian body, with special emphasis on studies of obesity and fat storage in adipose tissue and fat digestion by the exocrine pancreas. Additional issues include nutrigenetics of athletic performance and nutrigenomics of male and female fertility.

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NUTRITION EPIDEMIOLOGY RESEARCH

Nutrition Epidemiology is the study of associations between food/nutrient exposures and disease outcomes. Areas of ongoing research include:

- The role of nutrition in the prevention, treatment and outcomes of obesity and type 2 diabetes
- Nutrition patterns and malnutrition in patient populations, particularly hospitalized adults and hemodialysis patients
- Development/evaluation of food/nutrient intake assessment methods

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PUBLIC HEALTH NUTRITION

Dr. Vered Kaufman-Shriqui is a registered dietitian and an epidemiologist her research employs a transdisciplinary approach, in which she integrates the socioeconomic and contextual correlates of nutrition-related chronic diseases. She has investigated the development of methods to evaluate interventions among disadvantaged populations that included scales to measure children's health perceptions, eating behaviors and food consumption. Her research is policy driven thus she is involved in disseminate key insights to the relevant stakeholders. Kaufman-Shriqui has been

member of national and international committees for developing health quality indicators and food policy advisories.

Research areas:

- Childhood obesity
- Community-Academic strategies for promoting healthy lifestyles and reducing health disparities.
- Food purchasing behaviors of school aged children.
- Public health considerations for food policy development
- Quality indicators in healthcare

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DEPARTMENT OF COMMUNICATION DISORDERS

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The Department of Communication Disorders was established by Prof. Esther Ben-Itzhak in 2007. The program aims to shape Speech – Language Pathologists and Audiologists with extensive theoretical and practical knowledge and diverse skills, who are sensitive therapists. Studies in the Department of Communication Disorders focus on four main domains: basic sciences, language and speech, hearing sciences, and basic courses in research. Special emphasis is placed by the department on the fields of language, speech, and hearing in special populations, such as children on the Autism spectrum, those with learning disabilities, aging adults, individuals with hearing disability and more. The department faculty is extensive and includes professionals and researchers from various fields of communication disorders and other fields. As part of its overall approach, the Department of Communication Disorders considers itself obligated to contribute to the community, and operates a hearing, language, speech and voice disorders clinic that assists patients from the general population in the area, and take part in many other additional projects.

AUDITORY PERCEPTION LABORATORY

The primary focus of research comprises three main subjects: temporal processing, speech perception, and sound localization. The studies test the individual's ability to use auditory information presented in the environment at the perceptual level, and reveal phenomena related to the way we perceive sounds. Studies are conducted both on normal hearing control participants and on different sub-populations such as aging adults, dyslexic readers, and sleep-deprived students.

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SPEECH PERCEPTION AND PRODUCTION RESEARCH

The research centers on speech perception and production of both hearing and hearing impaired (with cochlear implants) populations. In addition, the contribution of the visual modality to the auditory modality in speech perception is evaluated. Another type of study evaluates the acoustic cues in the Hebrew language that affect production and perception.

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COGNITIVE – LINGUISTIC LABORATORY

This research center explores internal mental processes, such as memory, attention and perception, and their relation to language and linguistics. Our research focuses on language structures, acquisition and pathology, in cognitive contexts. We aim to link the theoretical assumptions to the clinic, offering clinical implications. Different populations, such as children, older adults, cochlear implant users, dysarthric adults, etc. are involved in the research.

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BRAIN AND LANGUAGE LABORATORY

In the Brain and Language Laboratory, the non-invasive tool of transcranial Direct Current Stimulation (tDCS) is used to facilitate language processing in healthy adults and adults with speech and language impairments due to neurological diseases such as Stroke, Parkinson's disease, Aphasia, etc.

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COGNITIVE ELECTROPHYSIOLOGY LABORATORY

Research focuses on information processing related to cerebral activity in several clinical populations (Autism, PTSD, Sleep deprived). We use Electrophysiological (EEG) as well as behavioral measures in order to explore cognitive processes. Research examines the effects of cognitive and emotional factors on processing of incoming stimuli. Additionally, we study effects of stimuli properties such as valance, threat level, and arousal on basic perceptual processes.

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ARIEL VOICE CENTER

This multidisciplinary center focuses on diagnosis and treatment of voice and voice-disordered population. It offers a team-approach in evaluating and treating problems related to the human voice. Our staff actively involved in research projects related to voice science and disorders. Current

research focuses on identifying and characterizing voice and voice problems among special populations, and development of prevention programs.

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RESEARCH IN AUTISM SPECTRUM DISORDER LABORATORY

The research focuses on autism spectrum disorder (ASD) which is a neurodevelopmental disorder. Within this area the following aspects are investigate: diagnosis and intervention; examine ASD risk factors, gender differences, familial factors, ASD frequent comorbidities such as anxiety, attention deficit disorder, feeding problems; short and long term follow-up studies on children diagnosed early on with ASD, as well as on older students with ASD.

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DEPARTMENT OF NURSING SCIENCE

Head of Department:
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GERONTOLOGY AND GERIATRICS RESEARCH

The fields of research focused on in Gerontology and Geriatrics include:

- Intergenerational Relationship
- Intergenerational Family Solidarity
- Formal and Informal Support Systems
- Ageism
- Quality of Life in Old Age

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FACULTY OF SOCIAL SCIENCES AND HUMANITIES

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The Faculty of Social Sciences was established in 1995 and currently has approximately 4000 students and offers studies in eight departments:

1. Economics and Business Management
2. Social Work
3. Behavioral Sciences and Psychology
4. Middle Eastern Studies and Political Science
5. Socialogy and Anthropology
6. Criminology
7. Jewish Heritage studies
8. Multideciplinary Studies

All departments offer graduates vocational training as well as the option to pursue a higher academic degree. The teaching, training and research staff is varied - from research students and young faculty members with master's and doctoral degrees at the start of their careers to highly experienced professors.

DEPARTMENT OF ECONOMICS AND BUSINESS MANAGEMENT

Head of Department:
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In today's complex and dynamic economic environment, the key to success is the ability to combine specialized knowledge with relevant insights from multiple disciplines. The Department of Economics and Business Management at Ariel University strives to develop this ability within its students, so as to produce outstanding managers who will make a significant impact on the Israeli and global business scenes. Our highly stimulating and challenging programs, equip students with both practical and theoretical tools, and train them to apply these tools to contemporary problems. The department has approximaPhoney 40 faculty members and 1,500 students at the B.A., M.B.A. and Ph.D. levels. Faculty members are engaged in teaching, research, professional and public activity.
In addition to the B.A. in Economics and Business Management, the department also offers dual B.A. programs in economics and a second discipline, such as Economics and Accounting, Economics and

Mathematics, Economics and Computer Science, Economics and Psychology or Economics and Criminology.

MACRO ECONOMIC POLICY

The research focuses on macro-economic policy in Israel, fiscal or monetary. A special focus is being given to the labor market, the capital market and pension savings. The researcher is the head (with Prof. Ben David) of the Interdisciplinary Center of Aging Study in Israel.

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CRIMINAL AND DISHONEST BEHAVIOR RESEARCH

The research involves theoretical modeling of economic crimes (e.g., tax evasion, money laundering, welfare fraud, minimum-wage underpayment, and shoplifting) and experimental study of dishonest behavior among students, business customers and lottery gamblers.

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INTERNATIONAL LAW RESEARCH

Research in International Law includes the following scholarly areas:

- Private International Law
- Comparative Private Law
- International Business Transactions
- International Economic Law
- Cultural Heritage Law
- International Commercial Arbitration

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ORGANIZATIONAL BEHAVIOR RESEARCH

Research deals with the fields of Organizational Behavior and Human Management.
Specific topics in Organizational Behavior research include:

- Counter-productive work behavior;
- Motivation and performance;
- Leadership and crisis;
- Commitment and escalation of commitment.

Human Resource Management research topics include:

- Personnel selection;
- Discrimination and fairness in HR.
- Procedural and distributive justice;
- HR ethics;
- Compensation.

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SCHEDULING THEORY RESEARCH

Research on Scheduling Theory can be grouped into the following interests: combinatorial optimization, exact algorithms, heuristics, and non-linear optimization.

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ECONOMIC HISTORY AND HISTORY OF ECONOMIC THOUGHT RESEARCH

Dr. Schiffman specializes in Economic History and History of Economic Thought. His is currently studying the impact of economic advisors—both foreign and Israeli—on Israeli economic policy, using archival material from Israel, the US and the UK.

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PUBLIC HEALTH IMPROVEMENT RESEARCH

Research on Public Health Improvement focuses on the following areas:

- Inequality in treatment between different sectors of society;
- Health Risk awareness and treatment, especially for diabetes patients;
- Efficent financial management in public health organisations.

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HEALTH ECONOMICS RESEARCH

The primary research interest is Health Economics with a special focus on the Economy of Fertility.

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INTERNATIONAL MARKETING RESEARCH

The following areas form the focus of International Marketing Research:

- International retailing;
- Food retailing, in particular, shopping behavior of consumers in emerging countries;

- Consumer behavior with a special focus on the adoption and use of innovations in modern marketing: new technologies (e.g., biometric technology and mobile T.V), and social networks.

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GAME THEORY RESEARCH

Game Theory research is concentrated on the following topics:

- Applications of game theory to political economy;
- Bargaining in legislatures and coalition formation;
- Game-theoretic analysis of security issues.

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TRADITIONAL AND DIGITAL ADVERTISING RESEARCH

The following areas form the nucleus of research on Traditional and Digital Advertising:

- Marketing communication;
- Branding: store brands and service sector;
- Experiential marketing and consumer behavior.

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EXPERIMENTAL ECONOMICS RESEARCH

Research on Experimental Economics also focuses on behavioral finance and the economics of tourism.

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ORGANIZATIONAL BEHAVIOR AND HUMAN RESOURCE MANAGEMENT RESEARCH

Research is carried out primarily on the following effects of Human Behavior in Organizations: organizational social capital, organizational gossip, human resource development, management and TMT (top management team), and employee performance and performance evaluation.

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EMPIRICAL ASSET PRICING RESEARCH

Research on Empirical Asset Pricing represents an interest in the cross-section of stock returns in the US market. Recent research was conducted on demonstrating that operating leverage affects the cross-section of stock returns only when returns to scale are high.

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DEPARTMENT OF ECONOMICS AND BUSINESS ADMINISTRATION

Research interests focuses on these major areas:

- Structuring of Human Resource Management (HRM) Processes.
- Leadership.
- Positive Organizational Behavior.
- Creativity and Innovation at Work.
- Developing a Professional Identity.

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RESEARCH ON ENTREPRENEURSHIP WITH SPECIAL FOCUS ON ENTREPRENEURIAL PROCESSES, MOTIVATIONS, AND IDENTITIES

Main research interests include:

- Startups' accelerations processes
- Social entrepreneurship
- Psychology of entrepreneurship
- Entrepreneurial cognitions and opportunity recognition.
- Entrepreneurship in the third age

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ECONOMICS OF POVERTY AND INEQUALITY

Research on Economics of Poverty and Inequality focuses on the following areas:

- Poverty
- Income and social inequality
- Income and social mobility
- Income and social polarization
- Middle class
- Occupational segregation

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INFORMATION SYSTEMS AND BIG DATA RESEARCH

The following areas form the nucleus of research on Information Systems and Big Data:

- Machine learning applications: Cyber Security and Recommender Systems.
- Cyber Economy and Cyber Awareness.
- Cyber Law and Intellectual Property.
- Web Analysis: Analysis of Consumer's behavior in Social Networks.
- Decision Support Systems in Health Care Systems, Agriculture and Business.

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ORGANIZATIONAL BEHAVIOR AND ENTRAPERNEUERSHIP

Dr. Klein-Liberman's research deals with the field of Intrapreneurship and the factors that contribute to intrapreneurial activities, such as organizational climate and social capital. Other research interests include decision-making and social psychological processes during the establishment of new ventures (entrepreneurship) and investor decision-making.

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DEPARTMENT OF ECONOMICS AND BUSINESS ADMINISTRATION

I am interested in microeconomic theory and especially (but not only) in contest theory and its applications to political economy topics such as rent seeking contests and conflict resolution. I am also interested in public economics and provision of public goods

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BUSINESS ADMINISTRATION

Research in Business Administration including the following areas:

- Organizational Behavior
- Quality Management
- Participatory Programs
- Internet and E-Commerce
- Business Games
- Measurement Scales

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SCHOOL OF SOCIAL WORK

Head of School:
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The Department of Social Work at the Ariel University was established in 1998. The Department of Social Work is committed to teach and train students, at both undergraduate and graduate levels, to take the lead in fomenting social change in various welfare agencies, and to provide more effective social services to families and communities. The Department sees the family as the primary framework for mediation between family members and their environment, and for maximization of the potential of each of the family members. Thus, emphasis is placed on the family as a unit of study and point of intervention.
Social work is attentive to social change: The Department is committed to training professional social workers who provide, develop, and promote professional services to meet the essential needs of the 21st century in Israel. As part of the University, the Department of Social Work is committed to provide a high level of instruction for both beginning students and graduate students, and encourage research that reflects the social needs of Israel as a whole as well as of the local communities and the various groups within Israeli society.

In the year 2006 the department established the center for training and treatment. Specifically designed for people in the Judea and Samaria, to accept help in psychosocial problems and co-existence.

THE LAB FOR PSYCHOLOGICAL TRAUMA

My main research activity is focused in the fields of:

- Psychological trauma and stress syndromes ranging from adjustment disorders to complex PTSD.
- Study of large disasters across the globe and its clinical correlates to various psychosocial and psychiatric indices
- Establishing and validating the ICD-11 stress disorders
- Psychometic scales for use in epidemiological psychiatry targeting adjustment disorder, stress disorders and worldviews
- History of psychological trauma prior to the 19th century

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HEALTH PSYCHOLOGY RESEARCH

Research work in Health Psychology focuses on the following areas:

- Health psychology: psychological factors and psycho-social interventions that might promote coping and adjustment to cancer; reactions and coping with prenatal loss (i.e., stillbirth, miscarriage); personal resources that might affect coping and adjustment to illness; psychosocial aspects of organ donation; psychological reactions of medical personnel;
- Psychological trauma: post-traumatic stress disorder (PTSD) and post traumatic growth following terror events and natural disasters; gender differences relating to psychological trauma;
- Grief and bereavement.

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GERONTOLOGY AND POVERTY AND DISTRESS RESEARCH

Research work on Gerontology and Poverty and Distress highlights:

- Intergenerational relationships: Grandparents and grandchildren;
- The role of great-grandparents;
- Offspring caregivers of older parents;
- Quality of life of older adults and social support;
- Ageism;
- Sexuality in later life;
- Online health services for the elderly;
- Intervention with families in extreme distress;
- Food insecurity.

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COMMUNITY SOCIAL WORK RESEARCH

The fields of research in Community Social Work encompass the following areas:

- Community social work, volunteerism, and philanthropy;
- Third sector organizations;
- Cross sector collaboration;
- Social work as a profesion.

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PARENTING RESEARCH

Research on Parenting is concentrated on the following topics:

- Parenting, parental involvement;

- Parenting roles and child well-being;
- Self-efficacy, collective efficacy, participation, family, and community.

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LOSS AND BEREAVMENT RESEARCH

Research work in Loss and Bereavement focuses on the following areas:

- Loss and Bereavement: Meaning (re)construction to the death of a loved one; Processes of meaning (re)construction; reactions to and coping with prenatal loss; psychosocial aspects of organ donation.
- Psychological trauma: Traumatic loss, post-traumatic stress disorder (PTSD) following terror events and natural disasters.

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TRANSITION TO PARENTHOOD

Research on transition to parenthood is concentrated on the following topics:

- Changes among parents from pregnancy to postpartum
- Preterm births and infants, Breastfeeding expiriences, postpartum depression and parental well-being
- Parental Self-efficacy, parenting style, parental attachment, parental child-centrism, parental role

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SOCIAL ASPECTS OF AGING

Research work regarding the social aspects of aging focuses on the following areas:

- The establishment and effects of negative attitudes toward older adults ("ageism")
- Subjective perceptions of age and time remaining to live and their relevance to quality of life
- Personality factors associated with enhanced/reduced psychological well-being in old age
- Terror Management Theory and the aging process

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COMMUNITY SOCIAL WORK INTERVENTIONS

Research on Social Work Interventions is concentrated on the following topics:

- Guiding community activists, volunteerism
- Group work in community interventions
- Processes of policy changing
- Designing macro-level interventions with multi-discipliners work teems

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DEPARTMENT OF BEHAVIORAL SCIENCES AND PSYCHOLOGY

Head of Department:
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The Department of Behavioral Sciences was established in 1994. The faculty members' fields of study include:

- Experimental Psychology and Brain Sciences
- Organizational Psychology
- Educational Psychology
- Clinical Psychology
- Rehabilitation psychology and neuropsychology

Students working towards their BA degree may specialize in 4 areas of Psychology:

- Experimental Psychology and Brain Sciences
- Organizational Psychology
- Educational Psychology
- Criminology

BRAIN AND COGNITION LAB

My research incorporates behavioral and electrophysiological (EEG/ERP) methods aimed to foster our understanding about the way numerical information is represented and processed throughout development and in adulthood. I am particularly interested in the mental representation of numbers as symbolic representations of quantities and the brain mechanisms underlying the processing and development of such representations. This includes research on more sophisticated forms of number or numerical concepts, both conceptually and syntactically (e.g., zero, negative numbers, trillions, infinity). I am also interested in how symbolic representations become rooted in nonverbal representations of number which emerge early in human development and are shared by nonhuman animals. Other interests include neural correlates of number processing, the malleability of numerical representations, individual differences in numerical competence, spatial-numerical associations and automatic processing of numbers.

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MEMORY AND ATTENTION RESEARCH

The research is focused on the Stroop effect and the emotional Stroop effect. Another main research topic is the production effect in memory – the advantage in memory for words read aloud relative to words read silently.

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LABORATORY FOR FORENSIC AND CLINICAL NEUROPSYCHOLOGY

The main focus of the researchers in the Laboratory is Forensic Neuropsychology. More specifically, the aim is to enhance current tools for the detection of sub-optimal effort and malingering in neuropsychological assessments. To achieve this goal, psycho-physiological measurements (e.g., eye behavior measurements in collaboration with Dr. Michael Wagner from Ariel University) are utilized. Studies in the Laboratory also include assessment of frontal-lobe related functions (i.e., executive functioning and awareness of illness) in psychiatric patients (i.e., patients with affective disorders).

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HIGHER EDUCATION, ACADEMIC INSTRUCTION AND PERFORMANCE RESEARCH

The research under the supervision of Prof. Davidovitch deals with academic curriculum development, development of academic instruction, Holocaust awareness and Jewish identity, student exchange programs with Germany and Poland, preservation of the heritage of Jewish sects, and moral education.

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PSYCHOSOCIAL ADJUSTMENT TO ILLNESS RESEARCH

Psychosocial Adjustment research focuses primarily on the impact of serious and life-threatening illness on children and families. This includes descriptive and predictive studies of factors associated with adjustment and the development of psychological interventions to enhance coping and reduce distress.

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PSYCHOLOGICAL, PHARMACOLOGICAL AND BRAIN IMAGING ASPECTS OF ADDICTION RESEARCH

Addiction research deals primarily with psychological, pharmacological and brain imaging methods as well as treatment of drug, alcohol, and behavioral aspects. Studies have been conducted on the effects of "ecstasy" and marijuana on cognition, motor function, and brain activity in recreational users. The effects of pharmacological-psychological treatment of nicotine, cocaine, and cannabis dependence - including cannabis induced psychosis - were also investigated. Now the research focuses on the effects of synthetic cannabinoids on executive function and the brain. Studies on behavioral addictions such as internet and videogame addiction, sex addiction, compulsive buying, eating disorders, and food addiction are presently being conducted.

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CAREER/WORK AND POSITIVE PSYCHOLOGY RESEARCH

The research areas include career/work psychology, positive psychology, and the interplay between them. The research focuses on career counseling, vocational psychology, positive interventions and psychotherapy, character strength deployment at the workplace, meaningfulness at work, work relationships, and various professional issues.

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STRESS AND BURNOUT RESEARCH

Research under the supervision of Dr. Lior Oren deals with occupational stress at work, work attitudes, work and family conflict and enrichment, and minority stress.

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PERSONALTY AND CLINICAL PSYCHOLOGY RESEARCH

Research projects are at the intersection of personality and clinical psychology. Studies are informed by psychodynamic concepts and are concentrated on the following topics: Depression and suicide in adolescents and elders; alexithymia and wellbeing in children and adults; subjective experiences in interpersonal relationships and in the therapeutic relationship in psychotherapy.

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PSYCHOLOGY OF RELIGION AND SPIRITUALITY RESEARCH

Research on the Psychology of Religion and Spirituality (R&S) includes the following interests:

- Developing and validating empirical measures for R&S multidimensional constructs;
- Relations between RandS and psychological and physical health as well as R&S and sexuality;
- Psychology of prayer, religious motivation, and religious and spiritual experience.

In contrast to most research in the field which draws on samples of North American Christians, our work is based on Israeli Jews and Muslims – religious, traditional, and secular – living in Israel.

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SUBSTANCE USE AND PSYCHOPATHOLOGY RESEARCH

The research focuses on the relationship between substance use, particularly cannabis and alcohol, and psychopathology. This is explored from both clinical and epidemiological perspectives. Collaboration is with Dr. Shaul Lev-Ran from the Lev-Hasharon Medical Center and Prof. Jürgen Rehm from the Center for Addiction and Mental Health, Toronto, Canada. The research employs data from Waves 1, 2, and 3 of the National Epidemiologic survey on Alcohol and Related Conditions (NESARC), a survey designed by the American National Institute on Alcohol Abuse and Alcoholism.

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VISUAL AND COGNITIVE NEUROSCIENCE LABORATORY (VCN LAB)

The research concentrates mainly on Brain Plasticity in the congenitally blind and the ability to use sensory substitution devices. These are devices that can send visual information through other modalities, such as touch or sound. The researchers contribute to the understanding of brain plasticity in the visual system and the neural processes involved in navigation in the blind. This research has the potential to substantially alter the quality of life of blind people.

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PSYCHOPHYSIOLOGICAL RESEARCH LABORATORY

Research in the psychophysiological laboratory is concerned with psychological processes that affect physiological responses of the autonomic system. Specifically,
The focus is on electrodermal, cardiovascular and respiration changes. We are interested in memory detection (the polygraph Concealed Information Test), lying and lie detection, motivation,
Self-assessed biases, as well as personality, demographic, and situational aspects that affect such responses. The laboratory operates under the management of Prof. Eitan Elaad.

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ORGANIZATIONAL AND SOCIAL PSYCHOLOGY

My research interests include personnel selection techniques, predicting various aspects of organizational behavior including lateness and social loafing, and several issues in social psychology including social power, stress-strain relationship, and work-family conflict. I also specialize in methodological techniques including multivariate analysis, SEM, HLM, power, and meta-analysis
Recent research projects include palliative care techniques, Feurstein Institute research on raising cognitive functioning in several minority groups, ethical issues among psychologists and physicians, and Rimon institute research on infertility.

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NEUROPSYCHOLOGICAL RESEARCH LABORATORY

The Neuropsychological Research Lab combines cognitive tools with objective assessment tools (eye movements, skin conductivity, and others). Research topics focus around and changes in objective and subjective memory and connection with cognitive style and awareness. The study populations are healthy (young and at a normal aging process); Neurological pathologies (eg MCI, Alzheimer's, Asperger's, etc.) and later psychiatric populations will be researched as well.

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POSTTRAUMATIC STRESS DISORDER RESEARCH

Our research focuses on the understanding of psychic trauma and identification of risk and resiliency factors for posttraumatic stress disorder (PTSD) among diverse populations such as veterans who experienced combat stress reaction (CSR), former prisoners of war captivity (ex-POWs) and helping professionals (e.g., psychiatric nurses). We also study the phenomena of 'secondary traumatization'

among trauma victims' relatives, the effect of trauma and PTSD on victims' family environment, and the intergenerational transmission of traumatic events and PTSD symptoms.

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FAMILY DYNAMICS AND SIBLING RELATIONSHIP RESEARCH

This research program at the intersection of developmental and clinical psychology examines the predictors and outcomes of sibling relationship quality across the lifespan. Particular attention is given to variations based on culture, family dynamics, atypical families, disability, and life transitions. Utilizing both quantitative and qualitative techniques the specific ongoing studies include:

- Parenting behaviors and sibling relationships.
- Sibling dynamics and psychological well-being.
- Siblings of individuals with disabilities.
- Integration of sibling issues in therapy.
- Integrating sibling issues in adoption decisions.
- Sibling visitation rights.

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CLINICAL NEUROPSYCHOLOGY RESEARCH

The research concentrates mainly on executive functions in clinical populations. I utilize neuropsychological assessment tools in order to better evaluate brain damaged populations (e.g. traumatic brain injury, stroke patients, and multiple sclerosis). In addition, I also explore cognitive characteristics of eating disorders and individuals with blindness for purposes of improving treatment methods and cognitive evaluation tools.

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PSYCHOTHERAPY OUTCOME AND PROCESS RESEARCH

This line of research focuses on factors predicting successful therapeutic process and the effect of incorporating empirical measurements in psychological interventions. Additional fields of interest include severe psychopathology, delusions in social contexts, and crisis intervention.

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THE COGNITIVE LABORATORY

My lab conducts research in the areas of perception and cognitive psychology. I am specifically interested in attention, face recognition, and numerical cognition. I use behavioral methods such as reaction time and accuracy measurements. In addition, I apply various state-of-the-art stochastic mathematical models to behavioral data. Examples for research questions are: (a) the level to which faces are processed holistically (b) integration of categorical facial attributes (e.g., gender, age) by observers, (c) serial and parallel processing of numerical information, and (d) how multicolor targets are searched. Examples for mathematical models of perception and cognition used in my lab are: (a) the General Recognition Theory (Ashby & Townsend, 1986), (b) the System Factorial Technology (SFT, Townsend & Nozawa, 1995), and (c) the logical rule based models of categorization (Fific, Little, & Nosofsky, 2010).

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PROCESS OF CHANGE IN EDUCATION – USING COMPUTER IN EDUCATION

My main research subject is methods of using the Distance Learning System in education. In 37 studies conducted during the last 45 years, different variables were defined, isolated, and evaluated. These variables are connected to the teacher's and learner's personality, attitude, and ability as well as to the subject and methods of teaching, individual and group learning, cost effectiveness of training systems, sex, age, aims of learning, etc.

The information collected by researchers is used to define models, which can help the process of decision-making and finding strategies concerning methods of operating technology in education. As the amount of information collected increased over the years of research, the models became more accurate. Models of cooperation between teachers and technology were drawn: how and where technology can be an effective aide to the teacher in achieving the aim of education.

Evaluating the personality of the teacher and the attitude towards using computers in learning, and evaluating the connection between change and personality variables show that the risk-taking trait seems to be necessary in order to embrace a new and innovative instruction and teaching method. Low-level risk taking seems to indicate conservatism in the teacher's perceptions of teaching and instruction, and as such, impairs the low-level risk-takers' ability to come to terms with novel classroom methods. When the use of computers in the classroom situation is universally perceived to be successful, then innovations can be introduced into classrooms.

It was found that computers would be used in the process of teaching when this would not harm the teacher's status. The teacher's willingness to use computers in the process of teaching can be influenced by different factors, such as methods of using computers, aims of teaching, roles of teachers, roles of computers in the process of learning. The defined model presents the changes in teacher and computer roles in the process of learning and how this change depends on the aims of learning and the method of using computers. Such a model, which is based on collected information, can direct our decision making concerning the method of operating technology and using a Distance Learning System as an aide to the teacher in achieving the aim of teaching.

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DEPARTMENT OF MIDDLE EASTERN STUDIES AND POLITICAL SCIENCE

Head of Department:
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The new and innovative program of the department combines Middle Eastern studies, Arabic, Political Science and Israel studies. The program is unique among Middle East and Political Science programs in Israel since it offers an interdisciplinary approach that combines studies in both the humanities and social science. The program provides the student with the most modern scientific research tools to understand and research contemporary policy issues faced by countries in the Middle East. Electives in Political Science offer a rich variety of courses relating to Israel's politics, government, and minorities and the challenge of Palestinian nationalism.

MIDDLE EASTERN STUDIES AND POLITICAL SCIENCE

- **Iranian Studies :** The main focal of my research is the Islamic Revolution of Iran and within it, the research of clandestine, religious and non-religious revolutionary movements, that were all together, the core factors that initially fought the Pahlavi monarchy and later fought Khomeini and his Islamic republic. Some of these movements are unfamiliar to the academic world and my effort is to unsurfaced them and to find their part bringing the most important revolution in the Middle East, the Islamic Revolution of Iran.
- **Modern Shi'a:** Nowadays, the main struggle in the Islamic world is between Shi'is and Sunnis. The historic background says that each side claims to rule the Islamic world and by that to rule the entire world. This clash of religions is based on the conceptualization of governance and therefore, is too deep and rooted in the common history of the fighting side. My researches are dealing with the interpretation of the clerics to the governance concept, and the role of them in this political system.
- **Middle Eastern Politics:** The Arab Spring that spread in the Middle East since 2011, actually was another part in the local evolution of the Islamic and Arab regimes, to find practical yet legitimate political order. This system is actually different from one country to another, yet, all are based on the same formula of legitimization – the Islam. How these countries will combine Islam in their modern life is the real debate and currently, while the fogs are still blur our sight, we do research on the causes and motifs that led these nations into the Arab Spring chaos. That will give us the right components that were destroyed and those whom survived during this time.
- **Revolutions and Social Protest in the Middle East:** Ever since, the Middle East was plateau of social protest and revolutions. The extreme dynamic of political Islam, secular regime and the rise of the radical Islam, all combined into prominent steam of protests and revolutions. The outbreak of the Arab Spring actually changed and still changing the Middle Eastern

society and politics. My researches are asking to find the main causes and the outcomes of several.

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ISRAEL NATIONAL SERVICE POLICY RESEARCH

The research relates to the politics behind the formulation and implementation of a national service policy in Israel over the last seven decades. The changes in policy which gradually incorporated religious Zionist women, haredim, and Israeli Arabs into the service framework reflect the gradual changes in political culture and ethos that are changing values in Israeli society, a movement from republican values to liberalization and then to a form of communitarianism.
A second area of the research is focused on the nature and development of civic religion in general and in the state of Israel in particular.

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MODERN HISTORY OF THE MIDDLE EAST

Research on the Modern History of the Middle East, conducted under the supervision of Bosmat Yefet, is mainly concerned with authoritarianism, political liberalization and democratization, human rights, state-civil society relations, Arab political thought, Middle Eastern diasporas in the West, and influence of political exiles on their homeland.

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PUBLIC POLICY AND ECONOMIC RESEARCH

Policy research mainly concentrates on Public Policy, the Israeli Economy, Economic Policy, Political Economy, and Economic Crises.

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LEGISLATIVE STUDIES RESEARCH

The research on Legislative Studies deals primarily with issues of parliament, parliamentary oversight, legislation, the committee system, and the Israeli parliament – specifically, the Knesset, women in the Knesset, and the Israeli electoral system.

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MIDDLE EASTERN STUDIES AND POLITICAL SCIENCE

- **Lebanese Studies:** The main focal of my research is Lebanon, its politics and society. Lebanon is somehow a unique entity in the Middle East. It is an arena of struggles between religions and between elite families. My goal is to research this arena and its endurance in front of many challenges. Also I'm interested in the role of Hizbullah in Lebanon. Is it a Lebanese organization or a Shi'ite Iranian one? Does its supporters considered themselves as Lebanese people or Mujahidin in the name of Islam?
- **The Israeli Security Zone in Lebanon, 1985-2000:** In June 1985, the Israel Defense Force (IDF) withdrew its forces from central Lebanon, and settled into a "Security Zone", a strip of land of approximaPhoney 10 kilometers in length that runs along the Israeli border. The formation of the Israeli security zone, and the fifteen years of the Israeli rule in south Lebanon are scarcely mentioned in the academic field. My research will trace the origins of the security zone, the evolution of Israel's policy towards south Lebanon, the motives and affiliations of the residents of the security zone and its militia, the South Lebanon Army (SLA).

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MIDDLE EASTERN STUDIES AND POLITICAL SCIENCE

The main purpose of my research is to map the prominent writers and themes of Iraqi literature of the twentieth century and later, with an emphasis on the writers of the 1950s. Iraq has been long culturally isolated from its surroundings; for that reason, Iraqi literature remained under-researched, compared to other Arabic literatures. The aim of my research is to bridge this huge gap of knowledge which was and is still facing those who wish to explore Iraqi culture and society during the second half of the 20th century.
My work relates to both thematic and linguistic aspects of Iraqi literature, while taking into account the economic, political, demographic and religious backdrops against which these works were written, and adopting a comparative point of view. One focus of my studies is the exploration of important writers that were a part of the Iraqi literary scene during the 1940s and 1950s, but never received the scholarly attention they deserved, although they were among the pioneers of the modern Iraqi literature and paved the way for others.
The themes that I explore include metaphors which reflect the relationship between Iraqi intellectuals and the Iraqi authorities; attitudes towards the status of women and the way society treats them, including the theme of so-called "honor killings"; motifs that serve the writers' criticism against the authorities or against clerics; artistic reflections of the turbulent relations between the state and society in the middle of the twentieth century; and identity politics as reflected in the poetry of Kurdish-Iraqi writers, against the backdrop of the massacre in the Kurdish town of Halabja.

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MIDDLE EASTERN STUDIES AND POLITICAL SCIENCE

- **Social Protest and Political Violence:** The main focal of my research is social protest and political violence. These topics contain a various types of sub-research such as: the

relationships between majority and minority in multi-cultural societies; the ramifications of the Arab Spring in in the all-region including minorities and women status; and the new (relative) phenomenon of the Islamic Caliphate. My aim is to develop theoretical thought and models in order to provide a new perspective to the current situation in the Middle East.

- **Ethnicity and Nationalism:** One of the prominent questions today regarding the Middle East is whether nationalism is still relevant. My research in this field already suggested (2016) a fresh angle on this issue and upcoming study will focus on different states in the region and their national identity. This question is related to ethnicity and religious affiliations, which is also under my scope.
- **Arab States and Israel:** Despite traditional position and declarations against normalization with Israel, changes in Arab regimes patterns of activity towards Israel have occurred in recent years. Those changes alone supply both theoretical and empiric research questions regarding the term normalization. My research asks what normalization is, and tries to provide a new analytical frame work to it by suggesting various types of normal ties between number of Arab States and Israel.
- **Arab Citizens of Israel and the Palestinian:** The geo-political splitting within the Palestinian arena back in June 2007 had forced Israel to change its policy towards the Palestinians. This combined policy of security and expanding of Jewish grip in the West Bank influenced on the Palestinian society as well as Israeli Arabs, who share the same national identity. The response of the two Palestinian societies (perhaps three) supply a research opportunities to find out what are the major narratives of the Palestinians. My upcoming book and article are dedicated to this issue.

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POLITICAL PSYCHOLOGY AND COMPARATIVE STUDIES

The research in this field developed at our department focuses on constructing models in different areas. Each of the following topics has been academically published worldwide and presented, accordingly, in the annual association meetings of the appropriate professional disciplines.

- **National resilience-** A cross-cultural investigation of the social components of national resilience, relying on data from large-scale national surveys and on findings that have been taken from different historic case studies.
- **National ethos-** Inquiries into the narratives of nations, in present and throughout history, attempting to comprehend the meaning and significance of different types of ethos.

- **Civil religion-** Research into the functions of this latent social construction, often used in order to successfully manipulate the masses. Civil religion is inquired in a comparative manner, using accumulated scholarly knowledge in this field so as to understand allegedly different phenomena that occur all over the world.
- **Israeli politics-** Developing new paradigms that shed light on some of the basic enigmas within domestic matters and social internal problems of Israeli society. Some of these paradigms, inquired in cooperation with the department's experts of Islam and the Arab world, enable us to understand better various issues of the Arab-Israeli conflict.

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DEPARTMENT OF SOCIOLOGY AND ANTHROPOLOGY

Head of department:
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Combined studies in Sociology and Anthropology equip students with the tools to understand society in a methodical way, and provide them with insights into seemingly new and unknown aspects of man and society. Studies in the department emphasize various aspects of day-to-day life in Israel that stem from contradictions inherent to the State of Israel - a nation state on the one hand, and a multitude of ethnicities on the other. In addition to theoretical background in various sociological and anthropological disciplines, students will be acquainted with aspects of the reality in Israel.

MILITARY SOCIOLOGY AND MILITARY ANTHROPOLOGY

Uzi Ben-Shalom is the chair of the Department of Sociology and Anthropology and the head (joint) of the Military and Security Community in the Israeli Sociological Society. Uzi is interested in topics as unit cohesion, unit and soldier performances in combat and female soldiers in operational units. He is currently conducting field studies on all of these topics. Uzi also supervising students for Ph.D. on topics as religion and military service, military leadership and sense making in combat.

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SOCIAL ASPECTS OF PLANNING AND COMMUNITIES RESEARCH

Research on Social Aspects of Planning and Communities focuses on the following interests:

- Sense of place: Place attachment, place identity, and place branding;
- Community: Social capital and community resilience;
- The 'Community Settlements' and the Kibbutz;
- Living under pressure and threat: Examining mental stress and health condition of groups in stressful situations, coping with displacement, and the sense of loss;
- Coordinating the needs of the elderly and disabled populations with the residential environment.

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SOCIOLOGY OF GAMBLING AND CHANCE RESEARCH

The fields of research focused on in the Sociology of Gambling and Chance include the following:

- Formulating a neo-Weberian theory of gambling;
- Political sociology of gambling in Israel;
- Representations of gambling in the mass media and public discourse;
- Sociology of sport.

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ORGANIZATIONAL, POLITICAL AND ECONOMIC SOCIOLOGY

Research deals with the fields of Organizational Sociology, Political Sociology, Economic Sociology and Public/Social Policy.
Specific topics in Organizational and Political Sociology include:

- Social capital and organizational politics
- Emotional labor/regulation and organizational politics
- Organizational politics and organizational culture

Specific topics in Economic Sociology and Public/Social Policy include:

- Comparative research of tax/fiscal policy and tax/fiscal protest in OECD countries
- Comparative research on the investigative methods deployed by governmental commissions of inquiry and parliamentary committees

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SOCIOLOGY OF EMOTIONS, TIME, MEDIA, CULTURE, ANTHROPOLOGY AND SOCIETY

The fields of research focused on in the sociology of emotions, time, media, culture anthropology and society include the following:

- Theoretical and practical aspects of emotions;
- Advanced Studies in time media, culture anthropology and society;
- Multicultural and global celebrity culture and consumption;
- Gender media, culture and society;
- Discourse analysis media, culture and society.

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DISCOURSIVE PROCESSES IN PROTEST AND SOCIAL CONFLICTS

Research on discursive processes in protest and social conflicts includes the following areas of interest:

- Social movements rhetoric and discourse of protest

- Construction of social problems and claims-making activity
- Collective identities and presentation of self in conflicted societies
- Verbal aggression and linguistic behavior in public controversies and social conflicts

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ORGANIZATIONAL BEHAVIOR

- Leadership
- Organizational culture
- Organizational Conflict resolution

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MIGRATION, ETHNIC COMMUNITIES AND VOLUNTARY ORGANIZATIONS

- Dynamics of Immigrant Organizations
- Migrant Worker Communities from the Philippines
- Latin American Immigration
- Third sector and civil society organizations

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ANTHROPOLOGY AND SOCIOLOGY OF CONTEMPORARY SPIRITUALITY AND JUDAISM

Research on contemporary spirituality and Judaism includes the following topics

- New Religious movements in Israel
- New Age Judaism and Jewish spirituality in Israel and US
- Invention of tradition and authenticity
- Contemporary spirituality and class relations

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DEPARTMENT OF CRIMINOLOGY

Head of Department:
Prof. Mally Shechory- Bitton
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The studies in the Department of Criminology are designed to provide basic knowledge in the field of crime and deviance. The program incorporates practical field work, which complements the theoretical studies and provides a deeper understanding of the knowledge gained in the classroom. The field work provides an opportunity to explore various jobs, and helps students choose their future path and qualify for masters programs.

CRIMINOLOGY AND VICTIMOLOGY RESEARCH

Research on criminology and victimology focuses on:

- Sexual offences (victims and offenders);
- Ideological offenders;
- Victims of terrorism (PTSD and PTG);
- Domestic violence;
- Issues in forensic psychology.

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VICTIMOLOGY RESEARCH

Research on Victimology is concentrated on the following areas:

- Theoretical, practical, and legal frameworks and issues;
- Treatment of offenders: especially sexual offenders; elders as offenders and victims;
- Trauma and recovery: fear of crime and illness.

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AGEING AND CRIMINOLOGY RESEARCH

The main research areas in Ageing and Criminology include topics such as elder abuse, ageing criminals and prisoners, violence within the ageing family, and ageing with mental illness and disability.

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YOUTH, WOMEN AND CRIME RESEARCH

Research is primarly focused on social deviance, juvenile delinquency, religious youths at risk, meaning in life, and women and crime.

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DEVIANT BEHAVIOR AND SUBSTANCE ABUSE RESEARCH

Under the supervision of Dr. Hagit Bonny-Noach, the research specializes in deviant behavior, substance abuse, and prevention and addiction with a primariy focus on young adults and backpackers.

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TERRORISM RESEARCH

The main focus of Terrorism research is fear of terrorism and coping with terrorism along with terrorist characteristics. Additional research interests include criminal profiling and fear of crime.

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CRIMINOLOGY AND FORENSIC PSYCHOLOGY RESEARCH

- Biases in forensic judgments
- Detection in the Concealed Information polygraph Test
- Sex offenders
- Social deviance

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LinkedIn Profile: https://il.linkedin.com/in/liza-zvi-phd

CRIME PREVENTION RESEARCH

The main research areas in Crime Prevention are local crime prevention, morality and crime, at risk religious youth, and drug and medicine abuse (including Ritalin and steroid misuse).

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GREEN CRIMINOLOGY AND CULTURAL CRIMINOLOGY

Dr. Levy's current research interests include issues in Green and Cultural Criminology. Her research projects focus on food fraud and cultural differences, and examine how different media outlets construct and reconstruct rape and other type of crimes. In addition Dr. Levy's studies explore criminal patterns among immigrants, victim blaming tendencies, attitudes toward whistleblowers, narratives of rape victims and narratives of alienated parents and grandparents. To explore these issues Dr. Levy uses quantitative and qualitative methods.
Specific research interests:

- Victim blaming
- Attitudes toward food fraud
- Ideal victim in food fraud
- Attitudes toward whistle blowers
- Rape victims' narratives
- Alienated parents' and grandparents' narratives

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DEPARTMENT OF JEWISH HERITAGE

Head of Department:
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The Israel Heritage Department epitomizes the worldview on which the Ariel University was founded. The Department serves as an academic center of research on Jewish Heritage and center of teaching all students attending the Ariel University topics related to Israel heritage.
In addition to academic research in various fields of Jewish Heritage, our vision is to establish a national center and a cultural platform of Zionist identity in the heart of Judea and Samaria to promote learning and cultural activities related to Jewish Heritage.

The Department aspires to teach all students about the abundant intellectual wealth of the Jewish people over history. In addition to its courses, the Department also organizes and sponsors cultural activities and publication of "Moreshet Israel', a journal on Judaism, Zionism, and Israel, and dissemination to academic institutions in Israel and overseas.

HISTORY OF NATURE AND MEDICINE RESEARCH

The focus of research is on diverse topics in history of nature and medicine over the ages:

- History of animals and plants.
- Ethno-medicine and Materia Medica.
- History of food and nutrition.
- Ecology and environment in the heritage of Israel.
- Ancient Reality
- Rabbinic Literature on nature and medicine (Bible, Sages literature, halakhic issues, Responsa).

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JEWISH COMMUNITIES IN THE OTTOMAN EMPIRE RESEARCH

Research on Jewish Communities of the Ottoman Empure is focused on the following areas of interest:

- Community life, religious and political leadership of the Jewish communities in the Ottoman Empire;
- Rabbinical literature in the Ottoman Empire;
- The Jewish family in the Ottoman Empire;
- Jewish names of the Ottoman Empire;
- Religious conversion to Islam and Christianity in Jewish Ottoman society and missionary work in these communities;
- Relations between Jews and Gentiles in the Ottoman Empire: Aleppo, Istanbul, and Salonika communities.

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JEWISH INTELLECTUAL HISTORY RESEARCH

Research on Jewish intellectual life and activity is focused on the following areas of interest:

- Jewish historiography and historical thought
- The Protestant Hebraism and Jewish Studies in Europe
- Jewish currents and movements of Eastern Europe in the 17th to 19th centuries
- Karaite literature and thought in Eastern Europe and the Crimea
- History, culture, and modernization of Ashkenazic and Oriental Jewish communities in the Russian Empire.

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JEWISH LAW IN THE MIDDLE AGES RESEARCH

The research on Jewish Law in the Middle Ages is mainly devoted to Talmudic insights of the rabbinic sage, Nahmanides. In recent years, the research focus has also shifted to include editing of the Tosafot. An additional research area is that of Family Planning in the Jewish Communities of France and Catalonia in the Middle Ages.

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MODERN JEWISH ORTHODOX RESEARCH

The research on Modern Jewish Orthodoxy focuses on the following areas: Modern Jewish Orthodoxy, German Jews, Religious Zionism, Modern Jewish Thought, Rabbi Samson Raphael Hirsch, Eliahu Benamozegh, Isaac Breuer, and Joseph Carlebach.

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TALMUD AND RABBINIC RESEARCH

Research on Talmud and Rabbinic studies focuses on the redaction of sugyot in the Babylonian Talmud, Halakhic issues of talmudic sugyot, Halakhic principles, logic and methodology of sugyot, designation of forms and style in sugyot, tripartite structure, calculation in sugyot - Talmud and math, Genizah and binding fragments, the study of the Aramaic language, and general subjects in Jewish Studies.

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MEDIEVAL JEWISH PHILOSOPHY RESEARCH

The field of research focuses on diverse topics in Medieval Jewish Philosophy and Jewish legal thinking. Recently published works discuss the influence of Aristotelian philosophy on Jewish law in the Middle Ages, the legal-halakhic thought in the writings of Saadya Gaon, the Karaite-Rabbanite controversy, Maimonidean philosophical and legal thought, and Jewish philosophy in Provence in the 14th Century.

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LABORATORY FOR THE ANALYSIS OF THE FINDS FROM THE EXCAVATIONS AT TEL HEBRON AND BARKAN WINEPRESSES

The focus of research on archaeological sites in the Levant includes the following fields:

- The Philistines, the Phone Hebron Archaeological project;
- New excavations and research projects at the early Iron Age site of El Mastara;
- Community archaeology (Ariel and Barken);
- Archaeometry and artifact analysis: petrographic and chemical analysis of pottery and ceramic finds. Pottery production in the kingdom of Judah and Israel.

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ECONOMIC AND SOCIAL HISTORY OF THE ANCIENT NEAR EAST IN THE 2ND AND 1ST MILLENNIUM

The fields of research included in History of the Ancient Near East in the Second and First Millennium BCE encompass Social and Economic aspects of Assyria and Babylonia, Archival Studies, Historiography, Assyriology, Cuneiform Studies, Akkadian, and Hittite.
The Israeli Science Foundation funded the Project (2015-2019), "Foreign Families and Community Boundaries under the Babylonian and Persian Empires (626 - 331 BCE): Patterns of Social Mobility, Group Interaction, Integration, and Identity."

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MODERN HEBREW LITERATURE RESEARCH

The research on Modern Hebrew literature is conducted under the supervision of Dr. Ofra Matzov-Cohen with a special focus on Agnon's literary corpus, Medieval vs. Modern Hebrew Poetry, the representation of adolescents in modern literature, women's literature, as well as the literary corpus of writers, Gil Ilotovich, Meir Shalev, and Asher Barash.

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JEWISH PHILOSOPHY RESEARCH

The subject of Jewish Philosophy is researched in a plethora of aspects through study of Jewish Philosophy, Philosophy of Halakha, Religious Zionism, Jewish Ethos, and Jewish Identity.

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Department of Jewish Heritage
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HISTORIC AND LINGUISTIC STUDIES

- Jewish Languages
- Bible translations
- Principles of research of Jewish Communities
- The History of Zionism movement in East Europe
- The History of Jews in Russia and Soviet Union
- The modern History of the Caucasus
- Georgian Language and Literature

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HISTORY OF THE ANTI-SEMITISM AND THE HOLOCAUST; USSR, RUSSIA AND THE JEWS

The research is focused on various topics related to various periods:

- Anti-Judaism
- Contemporary anti-Semitism
- Anti-Zionism
- Holocaust
- Holocaust denial
- Jewish history in the Soviet Union and Russia

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THE LABORATORY OF GEOARCHAEOLOGY AND HERITAGE LANDSCAPE CONSERVATION

Field of Research:
Geoarchaeology, Environmental Archaeology, Ecogeomorphology, Paleoanthropocene

Research Activity:

- The paleoanthropocene of the East Mediterranean, ancient human activities and their long-term impact on the current landscape design
- Reconstruction of the ancient heritage landscape of Israel, in association with archaeological sites
- Study the effe cts of climate changes/fluctuations during the Holocene on ancient societies and the landscape of Israel
- Ecogeomorphology, the relationships between geomorphology and vegetation

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THE ORIGINS OF JUDAISM ARCHAEOLOGICAL PROJECT

The project recruits data from archaeology in tandem with textual evidence with the goal of studying how ancient Judaism originated and subsequently developed over time. Among the most salient topics analyzed under the aegis of The Origins of Judaism Archaeological Project are :

- stepped immersion pools ("mikva'ot ")
- chalkstone vessels
- ancient tefillin (phylacteries) from the Judean Desert
- archaeozoological evidence of kashrut (dietary law) observance.

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SCHOOL OF COMMUNICATION

Head of school:
Prof. Ilan Tamir
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The mass media fulfil a key role in modern society. The School of Communication offers a programme of study for the first degree in mass communication which combines a wide range of academic courses with rich professional occupational training. The purpose of the programme is to produce professionals in the field of communications and in the sphere of government public relations, who are also well versed in the intellectual academic literature on mass communications, and to produce academic graduates who are qualified for higher degrees and research in mass communications.
Professional studies are divided into five specializations:

- New and Digital Communication
- Television and Film
- Radio
- Journalism
- Strategic Communication: Advertising & Public Relations

SPORT SOCIETY AND THE MEDIA

Research on Social and Media Aspects of Sport focuses on the following fields:

- Politics of sport;
- Sport and technology;
- The history of sports media;
- Gender aspects of sports media;
- Minorities in sports;
- Sport as a religious phenomenon.

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JUDAISM AND MASS MEDIA RESEARCH

The research on Judaism and Mass Media is primarily concentrated on the following areas:

- Religion and news;
- Judaism and mass media;
- Foreign correspondents;
- Defence and mass media;
- Israeli governmental policy on the Temple Mount question of Jerusalem.

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SOCIAL AND POLITICAL EFFECTS OF THE INTERNET RESEARCH

Research on the Social and Political Effects of the Internet is conducted in the following fields:

- Political communication;
- Collective action and political organization;
- Social movement organizations and entrepreneurs;
- Communities on the Internet;
- E-campaigns;
- E-government (public involvement online);
- Lab experiments, particularly the effects of communication on trust and cooperation;
- Deliberation and exposure to opposing views on the Internet;
- Political theory, particularly democratic theory.

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SOCIO-ECONOMIC IMPLICATIONS OF THE INTERNET RESEARCH, MIGRATION AND MINORITIES STUDIES

Internet Studies research focuses on the following:

- Digital divide and inequality;
- Intercultural relations;
- Online contact in social media

Migration and minorities studies focus on the following:

- Migration and education

- STEM study
- Social stratification
- Ethnic and national minorities

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INFORMATION WARFARE, CYBERWAR, PSYCHOLOGICAL WARFARE, DECEPTION AND MILITARY INTERFACE RESEARCH

Under the supervision of Dr. Ron Schleifer, reseach deals with Information Warfare which includes cyberwar, psychological warfare, deception, and military-media interface. Specific research interests focus on the applications of INFOWAR to the Arab-Israeli Conflict from the British Mandate Period until the present.

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STRATEGIC COMMUNICATION IN TRADITIONAL / DIGITAL MEDIA RESEARCH

The research on strategic communication in traditional and digital media specializes in integrated marketing communications, crisis management communications, media strategy, embedded content marketing (without full disclosure), and public relations theory and practice.

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POLITICAL COMMUNICATION RESEARCH

The primary research focus in the study of Political Communication is on Phoneevision audiences in an age of new media. Additional areas of interest include the impact of mass media, media institutions, and national narratives on political communication.

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MARKETING COMMUNICATIONS AND MEDIA RESEARCH

The fields of research that form the focus of Marketing Communications and Media Content include the following:

- Strategic communications and media;
- Advertising theory and practice;
- Advertising history;
- Public relations;
- Digital content marketing.

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PSYCHOLOGY AND SOCIOLOGY OF MOBILE PHONE USAGE RESEARCH

The fields of research focused on in the study of the Psychology and Sociology of Mobile Phone Usage include:

- Teacher-student communication on social networks;
- Media usage in children and teens;
- Religion, religious groups and media.

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MARKETING COMMUNICATIONS AND MEDIA RESEARCH

The fields of research that form the focus of Marketing Communications and Media Research include the following:

- Native advertising;
- Digital content marketing;
- Advertising planning;
- Public relations;
- Marketing communications ethics;
- Marketing communications and media;
- Myth, advertising, and culture.

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POLITICAL AND SOCIAL IMPLICATIONS OF THE INTERNET RESEARCH

Research on the Internet concentrates on the following topics:

- Online privacy-related user behavior;
- Online deliberation and platforms for collective action;
- Developing new software tools;
- Network analysis, online experiments, and eye tracking.

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ISRAEL'S MEDIA MAP AND HISTORY

The research of various aspects of Israel's media map, past and present, focuses on:

- Current developments in Israel's media map.
- Media and politics in Israel.
- Israel's Prime Ministers and the media.
- The IDF and the media.
- Israel's public diplomacy.

- Sectoral media in Israel.
- The history of Israel's media.

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CONTEMPORARY ISRAELI CULTURE

- Israeli Cinema
- Identity Politics in Israeli Culture
- Minority literature in Israel
- Minority Cinema in Israel
- Holocaust in Israeli Cinema
- Yiddish Literature in Israel
- Mizrahi literature
- Adaptations from Hebrew Literature into film.

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RADIO AND AUDIO CONTENT AND BEHAVIOR

My main area of research is Radio content and behavior, in which I have various research directions, such as convergence and adjustment to various new media platforms.
I also examine vocal content, such as Podcasts, and all radiophonic vocal activity in different aspects, emphasizing new media.

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SCHOOL OF ARCHITECTURE

Head of School:
Prof. Arch. Beni R. Levy
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Established in 1995, The Ariel School of Architecture is a vibrant, energetic and involving environment that furthers substantial, advanced, innovative, rich and relevant architectural thinking. The school distinguishes itself by its unique approach in contributing to the architectural fabric of Israel and its global context, turning ideas into words and matter.
The first dean and founder of the school, Prof. Yossef Schweid, saw an opportunity to return to historic architectural roots by establishing a school in the geographic location of Judea and Samaria. His predecessor, Prof. Saadia Mandel, also recognized this potential and emphasized the preservation of the historic geographical fabric of the area. The third dean, Prof. David Cassutto, integrated advancements in the academic system. The current dean, Prof. Beni Reuven Levy is devoted to putting the school at the forefront of architectural learning and teaching and making it a leader of its class while developing and shaping its uniqueness.
Ariel School of Architecture prides itself on the pluralistic diversity of its students and staff that come from different backgrounds and cultures from all over the country and from abroad.

THE R&D CENTER FOR ECOLOGICAL AND SUSTAINABLE ARCHITECTURE

The Randd Center for Ecological and Sustainable Architecture emphasizes research in cost-effective infrastructure, healthy environment, natural and built, recycling, and energy-efficient architecture and construction.
The Center is directed by Prof. Arch. Beni R. Levy, whose research and professional practice specializes in Sustainable Architecture, Urban Design and Planning, Landscape Architecture, as well as Preservation and Rehabilitation of historic and archaeological sites. Projects include rehabilitation of the City of David project in Jerusalem, The Kings Valley sustainable landscape architecture of Jehoshafat Valley, and Top Ramat Sharet, a 204 unit housing project of green terraced buildings.

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DESIGN THINKING RESEARCH

Design thinking refers to the creative strategies that designers employ during the process of designing. Research into design thinking facilitates gaining insight into how designers work individually or as a team to resolve problems.

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ARCHITECTURAL AND ENVIRONMENTAL AESTHETICS RESEARCH

Research into environmental aesthetics, architectural aesthetics, and architectural studies is premised on the foundation that aesthetic feelings help humans overcome evolutionary challenges.

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ARCHITECTURAL HISTORY AND THEORY

History of Western Art and Architecture from the 19th century to the present, against the background of social history with a chronological division and a comparative view of the changes in perception and theory in architecture in Israel and abroad. With an emphasis on the visual fields (architecture, design, sculpture, painting) periods and styles, biographies, works and theory.

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