Linked in to Research

Inspiring Young Researchers at the University of Haifa
As home to a unique composition of faculty and students, the University of Haifa models excellence in research and teaching. Jews, Arabs and Druze; new immigrants and veteran residents; secular and religious; diverse perspectives and viewpoints; create a special atmosphere for study. We encourage a sharing of ideas and insights across disciplines and through international collaborations to take full advantage of the multilayered culture and knowledge that the University represents.

Our researchers value collaborative work between departments, faculties and institutions. They welcome new initiatives for joint research projects at home and abroad and develop innovative approaches to research and teaching. Research is enriched with the active involvement of undergraduate and graduate students in the classrooms and labs, who inspire fresh thinking and a spirit of discovery.

We are excited to introduce you to a few of our young researchers whose work strives to better the environment, human wellbeing, social equality and intellectual discourse. Their dynamic networks of people and ideas, beliefs and views, knowledge and data enable them to explore pioneering directions across academic disciplines.

We are linked into research and touching people’s lives.

We invite you to take part in supporting the groundbreaking research underway in these and other fields.

A gift of $500,000 will enable the dedication of a fully equipped science laboratory in your name.

A generous gift of $1 million will support a returning scientist for a period of five years at the University of Haifa and advance Israel’s standing as a leader in scientific research.

Amos Shapira
President, University of Haifa

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As an illness frequently masked by a façade, many of us are unaware of how much depression is around us. Yet depressive disorders affect 9.5 percent of adults in the United States each year, which translates into over 18 million people. Similar statistics can be found in Israel and many other countries. The World Health Organization maintains that by 2020, depression is expected to become the second most common illness disrupting everyday life, after heart disease.

Sigal Zilcha-Mano of the Department of Psychology was training as a clinical psychologist and treating students suffering from depression, when she began questioning the standardized approaches to therapy. “I was seeing patients of similar ages, lifestyles and backgrounds and yet each individual was experiencing depression very differently from the other. I witnessed how psychotherapy methods were being applied for patients based on average patient responses to treatment – and the rest were left behind,” she says. “I couldn't come to terms with the fact that so many individuals continue to carry the burden of depression and that lost productivity weighs so heavily on societies and economies.”

At that point Zilcha-Mano decided to take up empirical study to support new approaches to personalized therapy for depression. She points out that decades of research have focused on generalized approaches to depression and therapies for the “average” patient. Research has primarily demonstrated what is known as the “Dodo bird verdict”, which asserts that regardless of the type of therapy used for any group of patients, the average person will always reach the same results.

Her research examines the mechanisms behind changes that take place in the patient over the course of therapy to understand how and why patients improve during treatment. “Understanding the mechanisms of therapeutic change in psychotherapy is crucial for maximizing treatment efficacy,” she explains. Her primary focus is on the therapeutic “alliance”, the bond that develops between patient and therapist.

One of her recently published studies has shown that therapeutic alliance is indeed one of the most promising mechanisms of change. One group of patients diagnosed with high levels of depression was given anti-depressant medication, while a second group was treated with a placebo. Both groups underwent the same individual sessions with the therapist. Zilcha-Mano found that in both groups, many of the patients experienced positive change. A patient questionnaire revealed that the alliance mechanism had more relevance in bringing about therapeutic change for placebo patients than for medicated patients, and it could be that this factor can actually compensate for some of the effects of medication.

Another study that Zilcha-Mano has recently published addresses the high dropout rate. “Although one in five patients drops out before treatment completion, little is known regarding which patient characteristics are most relevant to reducing dropout rates. We have found that patient's age and pre-treatment interpersonal characteristics – including therapeutic alliance expectations – can contribute to reducing dropout through targeted treatment assignment.”

Zilcha-Mano's current research project is a four-year study funded by the Israel Science Foundation. Her multidisciplinary team of researchers will be gathering data from hundreds of therapy sessions and examining which techniques are most effective for which patients, and which data requirements apply to create the right treatment pattern per patient. “Undertaking such a diverse study is only possible with a diverse infrastructure. The University goes out of its way to enable researchers to collaborate with a greater pool of resources. For this study I am working with other experts in statistics, personality and social psychology, communication science, neuroscience, cognitive science and developmental psychology,” she says.

“The idea is to create the right cocktail and build the appropriate model of treatment for each individual.”
An episodic memory is a mental reconstruction of an experience. It is a complex process that merges multiple cognitive and emotional factors of the experience: temporal, spatial, contextual, semantic, emotional and sensory. Studies have shown that memory is not saved passively like a snapshot. Once it is consolidated as a long-term memory, it is susceptible to change upon retrieval and can be re-stored in a new form.

“Our memories become notoriously inaccurate and unreliable as time goes by and we’re often pretty bad at remembering episodes. Without realizing it, we even implant false memories that never occurred.” He asserts that this is no mistake of nature. “A memory system of this kind enables us to develop novel and flexible ideas relating to the future. In his story ‘Funes the Memorious’, Borges portrays a man who, following a head injury, acquires the remarkable ability to recall every memory precisely, but who has no imagination or original ideas. By using acquired knowledge and constructing something new, we are simulating and adjusting the way we see ourselves and how we can cope with future scenarios.

“We want to understand what biological mechanisms rule these processes. Our research involves teaching episodes to subjects – the encoding of an event, and then using functional MRI to examine activations of regions in the brain and co-activations among different regions when the subjects are prompted to reenact the episodic memories at different time points thereafter.” Mendelsohn recently led and published a study demonstrating that the degree to which specific brain regions activate during memory retrieval is indicative of one’s sense of accurate recollection, whether in fact correct or fabricated.

“The results of our research give hope for some types of memory-related conditions. People suffering PTSD endure snapshots of memories that cannot be repressed and that trigger strong emotional responses. We are uncovering how and where in the brain a memory’s dynamic process is taking place in correlation with the other cognitive and emotional factors that come into play when a memory is being retrieved.” This may enable adapting memories after trauma, modifying emotional experiences associated with a memory, enhancing confidence in changed memories and alleviating the symptoms of PTSD.
A couple of decades ago, meditation was considered fringey. Today it is progressively being embraced by all walks of life. Its beneficial effects for general wellbeing have become widely acknowledged, especially for improving emotional regulation and the immune system, reducing depression and increasing concentration.

Dr. Aviva Berkovich-Ohana trained to be a meditation instructor, but she wanted to take its impact one step further. Drawn to the academic world and with a desire to bridge her interest in the natural sciences (she has an MSc in Biology), she knocked on many doors to broaden and fortify scientific study of meditation. “I am driven by a curiosity to understand consciousness and sense of self, as well as altered states of consciousness and self, which can broaden the understanding of such experiences available to the human mind,” she explains.

At a time when the academia was still largely unfamiliar with the field, she was repeatedly turned down by researchers who then saw no place for a meeting of the two worlds. She finally achieved collaboration and conducted a PhD in Neurobiology on meditation at Bar-Ilan University, and completed a post-doctoral fellowship at the Weizmann Institute of Science. Since then she has opened many doors to researching aspects of meditation and its Western version known as “mindfulness.”

Now she is balancing interconnected applications of study, researching and teaching at the University of Haifa’s Edmond J. Safra Brain Research Center, and in the Departments of Counseling & Human Development, and Learning, Instruction & Teacher Education.

“I am conducting neurobiological studies that employ a broad spectrum of tools, including EEG, MEG (magnetoencephalography) and functional MRI, to learn how mindfulness – a trained contemplative state of nonjudgmental awareness of the present moment – and self-transcendence, change brain structure and activity.” This work is conducted in collaboration with proficient meditation practitioners, who undergo neuroimaging while practicing varying levels of meditation.

Her research has shown that the primary change in brain activity during meditation is in the default mode network (DMN) of the brain. This network of interacting regions of the brain is usually most active when a person’s mind is wandering and concerned about self and the past/future, which can trigger stress and anxiety. “When a person is practicing mindfulness, DMN activity is reduced, giving the individual a calmer state of mind and a way to experience the here and now better,” Berkovich-Ohana explains.

Another study that she has led explored the experience of dissolving the sense of self-world boundary, from both phenomenological and neuroscientific directions. The MEG results indicated neural plasticity in several regions of the brain known to mediate the experiential unity of self and body and the self’s representational system. This data may hold clinical implications for populations with post-trauma and ADHD,” she says.

Berkovich-Ohana is also studying possible applications of mindfulness in the field of education. “I am very keen to see the practice infused in schools and informal education environments and believe new research will help bring it into the fold,” she says and adds that a number of case studies have already shown the benefits of meditation for children with and without pathological symptoms. “It increases attention, creativity, metacognition and even altruism. My current research of mindfulness intervention for children with ADHD builds on this point. In people with ADHD, the DMN is more active. So reducing that activity may help them focus and reduce mind-wandering.”

She also trains students of teacher education in mindfulness meditation, contemplative pedagogy and their neurobiological effects, enabling them to advance the practice in their work.

“The University of Haifa is truly pioneering in its openness to this field, to influencing broader research and developing new models for wellbeing. The bottom line,” Berkovich-Ohana emphasizes, “is that empirical research is opening doors to mindfulness training that can benefit just about anyone. And what is really exciting is its potential contribution to therapy for behavioral and neurological disorders.”
The Rhythm of Finance

Dr. Mahmoud Qadan of the Faculty of Management examines asset pricing models and behavioral finance to discover relationships and patterns that can affect financial management.

A whiteboard is penned with neat rows of financial formulas and a Vivaldi concerto plays softly from the laptop nearby. Dr. Mahmoud Qadan enjoys the rhythmic structures of both.

In terms of musical form, we won’t argue. But in this world of unstable global markets and financial turbulence, could there be reconciliation with pattern and rhythm? Qadan recently joined the senior faculty at the Department of Business Administration after completing his postdoctoral studies at Columbia University, New York, and is researching two different, if somewhat related financial fields. One is asset pricing models and the second is behavioral finance; and in both he examines relationships between variables that indicate systematic patterns.

When I was a teen, I allocated part of my pocket money to buy newspapers so that I could improve my Hebrew. I was always asking myself what the small numbers were that appear on the last pages of the newspaper. My father told me it was something to do with the stock exchange. But even the local banker who came to our school to encourage pupils to open bank accounts did not give me an answer that could satisfy my curiosity. That was when my financial trek began and I chose an academic path that would eventually enable me to examine the dynamics and forces, behaviors and patterns that manipulate those numbers.

Growing up in a home with wall-to-wall bookshelves and as the son of an English teacher, Qadan developed a passion for study, instruction and the arts. He enjoyed physics lessons, intrigued with how the entire universe, the sun and stars, can be modeled by mathematical equations. He fell in love with music; and to him, mathematical and financial modeling formulas too are like sheet music. “I am glad to have found my academic home at the University of Haifa. Here I am able to pursue international collaboration, research and instruction that can follow original and creative trajectories in a field that is relatively restrained,” he says.

Generally, asset pricing is concerned with explaining the reasoning behind the price of financial assets such as stocks, bonds and derivatives, under uncertain conditions. Behavioral finance posits psychology-based theories to explain asset price movements and repeated patterns in capital markets, he explains.

With regard to asset pricing, Qadan seeks to model the relationship between real economic variables (GDP or industrial production) and financial variables (such as share and corporate bond prices). In parallel, he examines the impact of investor sentiments on asset prices when classical asset pricing theory fails to explain price movements. “I devote a great deal of attention to exploring the dynamics of asset pricing and how information is transmitted under extreme conditions such as market panics and extreme volatility in market returns.” This work indicates patterns of investor behavior as influenced by the way financial charges are communicated.

In the wake of the 2008 sub-prime crisis and the 2010 debt crisis, financial asset pricing theory has come under serious fire, presenting an opportunity for consideration of other perspectives, he says. “In a recently published work co-authored with Prof. Yossi Yagil, former Dean of the Faculty of Management, we take up one aspect of this challenge. We examine the nature of international co-movements of real economic activity and financial variables in many OECD countries.”

Management of mutual and pension funds depends on research such as this,” Qadan adds. “Both industries are at managing long-term public savings and this research can help them understand the interaction between the real economy and the capital market, given the behavior patterns of retail and institutional investors.” Something like a concerto for four violins.
The ocean offers exciting opportunities, but also poses terrifying dangers. Harnessing ocean-wave energy, for example, is a promising environmental solution; yet the world is threatened by tsunamis that can take the lives of thousands in one fell swoop.

Dr. Usama Kadri of the University of Haifa’s Hatter Department of Marine Technologies studies what is called acoustic-gravity waves. These are sea waves that have properties of both surface waves (gravity waves) and sound (acoustic) waves. The presence and power of acoustic-gravity waves, as Kadri’s research is discovering, could influence approaches to developing technologies for wave energy generation and tsunami alert systems.

Surface-gravity waves are the waves visible to the eye and create dynamic pressure down to a few meters below the surface. As their name suggests, they are governed by the restoring force of gravity. Acoustic waves are longitudinal waves that travel in water by means of compression and decompression. Kadri explains that science traditionally relates to surface-gravity waves and acoustic waves as separate entities. His research focuses on the interaction between the two wave types.

A theory suggested by Kadri establishes a concrete relationship between acoustic and gravity waves. His research has found that 20 to 90 percent of the energy initially within the surface-gravity waves can travel below as an acoustic-gravity wave, which is capable of traversing the depths. “The propagating acoustic-gravity waves result in drifting which may explain the movement of deep-sea marine biology, salts, nutrients, carbon-dioxide, and ocean circulation, which are all necessary for a healthy ocean life and sustaining the environment,” he explains.

One implication of this relates to harnessing energy from gravity waves. He cautions that “harnessing energy from gravity waves may reduce the generation of acoustic-gravity waves, in turn affecting the ocean’s ecosystems.” But we are ahead of the game, he reassures. “While harnessing energy from the sea is still in its infancy, the system should be designed to prevent damage and maintain harmony in the seas’ depths.”

A second research project examines the propagation and detection of acoustic-gravity waves, which travel hundreds of times faster than surface-gravity waves, and span the entire ocean depth. Here too, practical implications are immense. Take, the Indian Ocean earthquake of 2004, for example, which released acoustic-gravity waves along with a destructive tsunami. Three minutes before the resulting tsunami hit the shores of Indonesia, killing tens of thousands, acoustic-gravity waves had already traveled over 1,000 km from the earthquake’s epicenter carrying information about the approaching tsunami. Early detection of acoustic-gravity waves coupled with a warning alarm could have increased evacuation time and potentially saved lives. For Sri Lanka, which was hit by the tsunami over an hour later, such an early warning system could have significantly reduced the number of casualties.

Kadri has set up a collaborative project with the Woods Hole Oceanographic Institution, and more recently with peers from the European scientific community, preparing the ground for the first early detection warning system based on monitoring acoustic-gravity waves. “We would like to be able to develop this application globally to protect all high-risk tsunami zones. About two dozen stations would provide a global warning system and monitoring of deep water transportation. In fact, many such stations already exist, but only need to be operated accordingly,” he says.

After earning his PhD at Delft University of Technology in the Netherlands, Kadri completed a post-doctoral fellowship at MIT. At present, Kadri is dividing his time between the University of Haifa and MIT. His newly constructed state-of-the-art laboratory at the University was built with the generous support of the Helmsley Charitable Trust. “There is a good opportunity here. The University is encouraging local and global collaboration, and there’s lots of room for scientific teamwork within the University that will positively impact our environment.”
Philosophy, She Wrote

Dr. Lior Levy and Dr. Natasha Gordinsky of the Faculty of Humanities unite literature and philosophy in a program that is a first for Israel’s academia.

“It’s a natural connection. There is such a powerful affinity between the two.” When discussing the new Program for Philosophy and Literature that they established at the University of Haifa, Dr. Natasha Gordinsky and Dr. Lior Levy say it in unison.

The two young researchers met at an orientation session for new academic staff at the University of Haifa, and found themselves holding a passionate discussion on the expansive common ground between their chosen fields of literature and philosophy. By the time orientation was over, Levy, who researches 20th-century European philosophy, and Gordinsky, whose interests focus on Hebrew and comparative literature, had decided to submit a proposal to set up Israel’s first Program for Philosophy and Literature.

“Philosophers turn to literature for an analysis of the human condition, and many great writers are philosophers par excellence. So the idea for this program just fell into place naturally,” says Levy. “We felt a bit presumptuous as new kids in town coming along with such a proposal,” adds Gordinsky, “but it was received with remarkable enthusiasm and support from the faculty and departments as an opportunity to expand the circle of students who are gaining exposure to other disciplines.” The proposal received the support of department heads and the collaboration of other members of faculty to devise and teach courses.

The program also required new resources. As a first in Israel, it was granted support from the Israeli Council for Higher Education and the Yad Hanadiv Foundation, and was awarded a grant for innovative curricula. Leading scholars from international Philosophy and Literature programs at Harvard, Duke and other universities in the US and Europe are academic board members for the program.

Undergraduate students from the Department of Literature and the Department of Philosophy as well as other departments are given the option of including the Program for Philosophy and Literature in their course of study. “Our courses provide these students with a basis for dialogue on the parallels and contrasts, mutual influences and historic intersection between the two disciplines,” explains Gordinsky. “The students examine philosophical dimensions in literary works, and focus on how philosophers use literature to address ethical questions as well as questions about meaning and beauty.” Working with basic and advanced texts, they develop critical and analytical thinking skills.

The opening course for all students in the program, Introduction to Literature and Philosophy, challenges the common structure of courses taught by one lecturer and following a set curriculum. Gordinsky and Levy teach this course in the classroom together. They bring texts that illustrate the common ground between literature and philosophy, such as Sophocles, Shakespeare, Tolstoy and Kafka, Plato, Aristotle, Sartre and Nietzsche. The course opens with a discussion between them on the possibilities and limits of a dialogue between the disciplines, which quickly opens up into a spontaneous classroom dynamic, prompting students to propose texts to read and analyze.

The program is structured with an emphasis on student involvement. Students are given a wide choice of elective courses and are also included in the choice of subject matter for many classes. They participate in workshops with leading scholars in the field. In the third and final year of studies, each student will conduct independent research, preparing them for advanced study in the field.

“In today’s world, it’s important to have a place to think, to ask questions and to listen to others. We are excited to have this opportunity to share our own areas of research so that other students can define that place for themselves and continue it forward,” they agreed.
Synergy for Social Change

Dr. Tammy Harel Ben-Shahar of the Faculty of Law takes the University of Haifa’s legal clinics to higher levels of empowerment.

While focusing on marginalized groups in need of equality and legal representation, the Clinics for Law and Social Change at the University of Haifa’s Faculty of Law are taking empowerment well beyond that.

As Academic Director of the legal clinics, Dr. Tammy Harel Ben-Shahar has defined a broader mission statement. She recently joined the Faculty having completed post-doctoral fellowships at Columbia Law School and NYU School of Law. “Our clinics work to heighten equality and protect rights for minorities, the disabled, women and the elderly; in education, criminal law, technology, housing and the environment. Our faculty and students aim to give marginalized groups the opportunity to gain access to legal procedures. But this is indeed only the first of three pillars that define the clinics’ activity,” she asserts.

Second is the profound impact that work with the clinics has on the students’ outlook and horizons. Each student working with a legal clinic gains insight from interacting with people from different populations and from first-hand experience in the law courts. For many, work with the legal clinics presents their first opportunity to meet people from disadvantaged communities. For example, some Arab students are introduced to Jewish communities for the first time and Jewish students learn to help Druze and Arab populations in the north of Israel. Students develop diverse skill sets in legal action and problem solving, while deepening social sensitivity and a commitment to justice. “Our students conduct real clinical practice and bring their experience back to the classroom, contributing to reflective legal education and discourse. They learn what their true responsibilities and roles are as lawyers.”

Thirdly, the academic management, staff and students view the legal clinics as a research lab that offers authentic insight into current social developments and legal doctrine. “Our field work presents an extensive and reliable study of society and the law, making it an intrinsic part of the excellence in research that our students and faculty create,” says Harel Ben-Shahar.

The integration of these three aspects really distinguishes the University of Haifa’s legal clinics from many others, she emphasizes. “The clinics rely on outside funding to operate,” explains Prof. Gad Barzilai, Dean of the Faculty at Law. The Faculty is home to eight clinics, many of which have been operating for more than a decade. Each clinic takes on projects proposed by faculty and students, often resulting in successful petitions, appeals and court cases on behalf of discriminated individuals and groups, position papers, policy papers, and legislation initiatives.

The synergy between faculty members and the legal clinics is very powerful, as Harel Ben-Shahar’s own work reveals. Her research of educational justice and equality interfaces with projects in the Clinic for Law and Educational Policy. One such research project involves examining the regulation of private involvement in public schools. “While the law in Israel does not regulate the involvement of private entities in public schools, the phenomenon is becoming increasingly widespread,” she explains. “This allows for a loophole in the educational system that enables private entities to determine factors such as tuition fees, enrollment criteria, and even pedagogical issues, with hardly any supervision. Utilizing various measures, including multiple petitions under the Freedom of Information Act, the Clinic has collected data regarding the scope and nature of involvement of private entities in public schools. Based on a legal and textual analysis of these data, the study aims to shed light on the nature of regulation that currently applies to these private entities, and to critically assess its sufficiency to promote the aims of public education. We also aim to draw up a policy paper for transparent public school management that promotes equal educational opportunities.”

Enabling distinctive social impact, student and faculty engagement, and informed research, the Clinics for Law and Social Change are creating a cycle of individual and social empowerment. It is no wonder that students, past and present, have said that working with the University of Haifa’s Clinics for Law and Social Change has been one of their most meaningful and life-altering experiences in their legal education.
How people cope with one-time or ongoing trauma has been widely discussed by psychologists, therapists and academics. But Dr. Michael Weinberg, Director of Graduate Studies at the University of Haifa’s School of Social Work, is approaching the field from new angles, spotlighting the effects of a traumatic event not only on the survivor, but also on their partner or spouse; and how their individual coping strategies affect one another.

A traumatic experience could be a road accident or tragedy; it could also be exposure to violence, war or terrorism. “By studying personality traits and responses to a traumatic event in survivors and their partners in what is called a dyadic approach, we can identify which personality factors may aggravate or alleviate reactions to an event over the course of time.”

While studying for a degree in law, Weinberg wanted to contribute his skills to helping others. He began working as a legal consultant with OneFamily, a non-profit organization providing assistance to terror victims. He began giving legal advice to victims of terror, counselling them about their rights and navigating bureaucratic and legal systems. “I had realized from the start of my studies that my place was not in the halls of law but with people. The work with OneFamily made me realize that the field of trauma is where I want to contribute most of all,” he says.

To make the career shift, Weinberg chose the MA program in Social Work at the University of Haifa, which was then the only one offering a special MA program for students who have academic degrees in other subjects. “I was able to form a very strong basis for research in my chosen field thanks to the supportive Research Authority and first-class experts that I worked with during my graduate and doctoral studies at the University of Haifa, including the late Professor Ora Gilbar, who was head of the School of Social Work, and Dr. Sharon Gil, who was then director of Social Work graduate studies.”

Here he embarked on his new perspective of research, at first examining interventions for trauma victims along with their spouses. “These studies provided an understanding of the bidirectional relationship and mechanisms by which trauma survivors and spouses affect each other’s psychological state following traumatic events,” he says.

Empowered to expand on his approach for post-doctorate research at Columbia University, New York, he examined predisposing variables such as capacity for forgiveness and self-esteem; humor, hope, optimism, social support and dissociation among terror victims and their spouses. “We examined how these traits are associated with a person’s and their spouse’s post-trauma coping strategies and psychological functioning, as well as the effect that they have on one another. These characteristics can serve as protective or risk factors while coping with exposure to terrorism and psychological outcomes such as PTSD, anxiety and depression.”

Weinberg also reaches beyond couple dynamics. A recent study surveyed communities that were in the line of fire during Israel’s Operation Protective Edge in 2014. It examined how personality, social and emotional factors influenced wellbeing during and after the war. The study found that while receiving social support was associated with increased wellbeing during the war, those who received more social support during the war expressed a lower level of wellbeing after the war. “This was possibly due to the drop in interest and support once Operation Protective Edge ended which could not be adequately replaced by formal support systems,” he explains.

Wall painting based on a work by Yosl Bergner (University of Haifa Honorary Doctorate 2013), reproduced by Harry Weiss at the University of Haifa, 1974.