

The Boris Mints Institute for Strategic Policy Solutions to Global Challenges The Gershon H. Gordon Faculty of Social Sciences Tel Aviv University

THE BORIS MINTS INSTITUTE FOR STRATEGIC POLICY SOLUTIONS TO GLOBAL CHALLENGES

9th ANNUAL REPORT 2024

http://www.bmiglobalsolutions.org



Sector States of BMI's Advisory Board and Academic Committee: Armenia, Bulgaria, Czech Republic, Finland, Germany, Kenya, Luxembourg, Montenegro Russia

- 🌻 BMI Research: California, India, Kenya, OECD, Rwanda, Nepal, Tanzania
- BMI Conferences: Armenia, Finland, France, Georgia, Italy, Malta, Montenegro



Letters Founder and President, Dr. Boris Mints 2 Head of BMI, Prof. Itai Sened 3 **BMI Vision** 4 **BMI Structure** 5 Research 13 **Climate & Energy Lab** 14 Water 15 Sustainable Development 21 Future of Cities 23 Human Development Lab 26 Demography 27 Inequality 29 **Conflict Resolution** 30 Institutions Lab 34 **Research Updates and Graduating Fellows** 39 **BMI Annual Conference** 40 **Other BMI Activities** 41

>>> LETTER FROM FOUNDER AND PRESIDENT, DR. BORIS MINTS



Very difficult year has passed. Russia's military aggression in Ukraine continues, Operation Iron Swords has been underway in Israel for over ten months, the IDF is conducting military operations in the Gaza Strip against Hamas, on the border with Lebanon against Hezbollah, and in Judea and Samaria against Islamic Jihad and other terrorist organizations. All these events have once again exposed the fundamental problems of the modern world order. We see the escalation of a global conflict between civilized countries and autocracies, totalitarian regimes. We never cease to be taken by surprise at the unpreparedness of international organizations to confront modern global challenges, the weakness of the international legal field with regard to the resolution of armed conflicts

and the fight against terrorist organizations.

All of the above seriously narrows the possibilities for conducting and disseminating objective, scientifically based research, not only for academia members from Israel, but also from other countries. We are witnessing a breakdown in the relationship between universities and outstanding scientists, only because their scientific views and nationality irritate pro-Islamic student organizations, which are present today in many European and American universities. Despite the difficulties and the service of fellows in the reserves, we continued scientific work and held our annual conference with international participants, thereby demonstrating our resilience to global challenges. These difficulties do not frighten us and we will continue our work with even greater diligence and persistence. We are preparing a strategy for our research for the next five years. We are forming the main research areas, we are strengthening scientific ties with our partners.

Six of our students graduated this year: Shayna Bernstein (post Doc), Eve Guterman (PhD), Nora Meissner (PhD), Yosef Perlmutter (PhD), Assaf Cohen (MA), Yasmeen Shamshoum (MA). I would like to wish them outstanding success in the scientific field and great human happiness. This year, eight more students have joined us. I really hope that their research will be interesting and profound.

In conclusion, I would like to thank Professor Itai Sened for the excellent work, everyone who takes part in the work of the institute, and the management of Tel Aviv University for supporting BMI.

Dr. Boris Mints

Founder and President of the Boris Mints Institute for Strategic Policy Solutions to Global Challenges

>>> LETTER FROM HEAD OF BMI, PROF. ITAI SENED



his has certainly been one of the most challenging years in the history of the institute. The massacre of October 7 and the war that followed created multiple new challenges. As Dr. Mints noted in his letter, the ongoing war in Ukraine and the multiple focal points of conflict around the globe make it difficult to conduct and disseminate research and professional knowledge more generally.

But we remain undeterred. Science has this remarkable characteristic to it that it really cannot be deterred. The human mind and the minds of outstanding researchers in particular, has been known in the human history to remain steady patient and persistent in its

research for the truth, regardless of numerous political and social challenges.

Thanks to the generosity of Dr. Boris Mints, and his persistence and insistence that we continue our work, the Institute has continued, exactly as in years past, on its course of the undeterred pursuit of strategic policy solutions to global challenges. The bigger the challenges the more urgency we, at the institute feel in our sacred labor to pursue practical knowledge that can improve the welfare of communities in this troubled world.

Six Ph.D. students are graduating this year and all of their work is significant and important in this regard. We follow in our effort to support students who work on sustainable development. We continue our work on how to predict the emergence of conflicts and how to mitigate if not curb their damaging effects. Our students explore the aftermath of the Covid – 19 epidemic and the way we can provide clean water to impoverished communities around the globe.

Besides being conflict prone, we live in a period of amazing technological leaps forward. Some argue that, at least to some degree, the emergence of these conflicts is due to increasing inequality that results from the uneven control, by few, over significant advantages in acquiring and putting the necessary skills to use these new technologies. How do these technological advances affect global inequality and how should we prepare to address these consequences?

The current annual report is full of significant insight arrived at by the most talented young scholars at Tel Aviv University and so many students that institute attracts from so many other countries around the globe. We owe an immense gratitude to generosity of Dr. Boris Mints and the hard work of our researchers that produce this significant body of knowledge that we make every effort to put to good use as soon as it is produced so that it has a significant impact on making this world a better place to live in.



Professor Itai Sened

Dean Emeritus of the Gershon H. Gordon Faculty of Social Sciences Head of the Boris Mints Institute for Strategic Policy Solutions to Global Challenges



Founded in 2015, The Boris Mints Institute for Strategic Policy Solutions to Global Challenges at Tel-Aviv University encourages innovative thinking, research and planning to promote a significant positive change in the world. We focus on designing innovative, multidisciplinary and sustainable strategic and operational plans to enhance welfare around the globe.

The Institute brings together top-tier academics, world leaders, and talented and passionate researchers from Tel Aviv University and other leading universities to;

- Analyze pressing issues from an interdisciplinary, broad systemic perspective;
- Draw on TAU expertise, across various faculties, confronting contemporary challenges of inequality, democracy, economics, human development, environmental engineering, sustainability and welfare;
- Formulate novel and practical solutions backed by rigorous scientific methodology;
- Deliver strategic policy recommendations and detailed blueprints for implementation to decision-makers worldwide.

The Institute currently operates six research labs, conducting collaborative research involving technological, social, and policy factors.

A significant part of our research is based on a Startup-like methodology, including a "hands-on" approach, creating economically logical, sustainable, and fair policy solutions.

Starting 2022, the Institute has aimed to confront two significant global challenges that pose a substantial threat to global stability and sustainability: The Structure of Democratic and Economic Institutions.

BMI STRUCTURE | Steering Committee



Dr. Boris Mints, President

Dr. Mints has been one of the most influential businessmen in Russia in the 2004 – 2017. Currently Boris Mints is the Vice President of the World Jewish Congress, which is one of the largest and most significant organization that represents Jewish people from over 100 countries, representing their pluralism. He is also the Chairman of the Council of Patrons of the Conference of European Rabbis (CER), which is the primary Orthodox rabbinical alliance in Europe. Awarded the Dashkova's Prize "Philanthropist of the Year" and Honorary Fellow of Tel-Aviv University.



Prof. Milette Shamir, Vice President for International Affairs at Tel Aviv University

Milette Shamir's research focuses on U.S. literature and culture in the nineteenth century. She is the author of Inexpressible Privacy: The Interior Life of Antebellum American Literature (Penn University Press, 2005) and the editor of Boys Don't Cry? Rethinking Narratives of Masculinity and Emotion in the US (with Jennifer Travis, Columbia University Press, 2002). Her work appeared in several journals and essay collections devoted to the study of American literature and cultural history. Shamir is the editor-inchief of the journal Poetics Today (with Irene Tucker of UC Irvine). From 2015 to 2019 she served as Vice Dean of the Humanities for Academic Affairs. She co-founded TAU's American Studies program in 2006, and served as its head for thirteen years.



Prof. Tami Ronen-Rozenbaum, Dean Emeritus of the TAU Faculty of Social Sciences, Founding Head of the MA program for Sustainable Development

A researcher in the field of the Cognitive Behavioral approach and Positive Psychology. Her research focuses on the function of self-control skills, positive emotions and social support as a way of overcoming stress and developing happiness. In her work, Prof. Ronen-Rozenbaum links a complex theoretical model of understanding human strengths and coping abilities to techniques for developing useful interventions in the field.



Ms. Natalia Borovik, Advisor to the Committee

Previously, Ms. Borovik has worked as deputy director of the Institute for Complex Strategic Studies, directly under Prof. Oleg Vikhansky. Gathering many years of high-level professional experience in strategic consulting to research bodies and various non-governmental organizations - she advises the steering committee to make sure that the decisions taken correspond with the long-term vision of the Institute in addressing global challenges.



Prof. Itai Sened, Head of BMI, Dean Emeritus of the Gershon H. Gordon Faculty of Social Sciences

Prof. Sened is the Dean of the Gershon H. Gordon Faculty of Social Sciences at Tel-Aviv University. He returned to TAU after serving for 12 years as director of the Institute for New Institutional Social Sciences at Washington University, which was established by Nobel Laureate Douglass C. North. He is the founding head of the Boris Mints Institute for Strategic Policy Solution to Global Challenges and the founding Head of the School of Social and Policy studies at TAU.

BMI STRUCTURE | International Academic Committee



Prof. Yossi Rozenwaks, Dean Emeritus of the Faculty of Engineering, Tel Aviv University

Prof. Rozenwaks is a leading researcher in various fields, including nanotechnology, electrostatic force microscopy, atomic force microscopy, nanoscale charge injection in memory devices, solar cells, organic semiconductor devices, biological field effect transistors, charge carrier dynamics in semiconductors, and recombination processes.



Prof. Miranda Schreurs, Professor of Environment and Climate Policy, Bavarian School of Public Policy, Technical University of Munich

Previously the director of the Environmental Policy Research Center and professor of Comparative Politics at the Freie Universität in Berlin and an associate professor in the Department of Government and Politics at the University of Maryland. Prof. Schreurs' focuses on comparative environmental politics and policy in Europe, the United States, and East Asia. She is a member of the German Advisory Council on the Environment.



Dr. Segenet Kelemu, Director General of the International Center of Insect Physiology and Ecology (ICIPE) Nairobi, Kenya

Dr. Kelemu is the Director General of the International Center of Insect Physiology and Ecology (ICIPE) in Nairobi, Kenya. She is a molecular plant pathologist whose work focuses on the elucidation of molecular determinants of host-pathogen interactions, development of novel plant disease control strategies—including genetic engineering—biopesticides, pathogen population genetics and dynamics, and endophytic microbes and their role in plant development. She has first-hand experience with both the challenges and successes associated with African agriculture, from tending to fields to directing world-class laboratories.



Prof. Itai Sened, Head of BMI, Founding Chair School of Social and Policy Studies at TAU and Dean Emeritus of the Gershon H. Gordon Faculty of Social Sciences

Prof. Sened's specializes in the study of institutions and how they affect policy at all levels. These institutions include not just formal institutions at the national and local level, but also the informal institutions which determine social norms and cultural habits and may enhance or impede economic development and social prosperity. In recent years his research has become less technical and more applied to the fields of renewable energy and institutions that protect the growing inequality in income and assets around the globe.

BMI STRUCTURE | International Advisory Board



Mrs. Joelle Aflalo, Co-Founder of the Matanel Foundation

In 2006, she founded, together with Mr. Gad Boukobza, the Matanel Foundation. This charitable institution encourages social entrepreneurship and is a testament to Mrs. Aflalo's sense of responsibility, spirituality, dedication to philanthropy, and constant desire to help create a better world.



Prof. Armen Darbinyan, Chairman of the Board, Rector of the Russian – Armenian University, Yerevan, Armenia

Prof. Darbinyan is an initiator of economic and political reforms in Armenia, including the development of the private sector and the formation of new governmental institutions. He led important reforms in the fields of telecommunication, agriculture, infrastructure and tourism. In addition, he is the author of national legislation regarding banking, stock companies, anti-trust provisions, and state regulation of public services. He is renowned as an international expert on transition economies and was granted the Young Global Leader award by the World Economic Forum.



Dr. Simeon Djankov, Senior Fellow, Senior Fellow, Visiting Professor, London School of Economics

Dr. Djankov was deputy prime minister and minister of finance of Bulgaria from 2009 to 2013. Prior to his cabinet appointment, Djankov was chief economist of the finance and private sector vice presidency of the World Bank, as well as senior director for development economics. In his 17 years at the Bank, he worked on regional trade agreements in North Africa, enterprise restructuring and privatization in transition economies, corporate governance in East Asia, and regulatory. Dr. Djankov was declared "Bulgaria's Most Successful Politician" and awarded the President's Award of the World Bank.



Prof. Jacob A. Frenkel, Chairman, TAU Board of Governors, former Governor of the Bank of Israel

Prof. Jacob A. Frenkel serves as the chairman of the TAU Board of Governors and chairman of JPMorgan Chase International. In addition, he serves as Chairman of the Board of Trustees of the Group of Thirty (G-30), a private, non-profit, consultative group on international economic and monetary affairs. In addition to filling executive positions for international investment and financial services companies, Prof. Frenkel is also the former head of the Bank of Israel.



Hon. Václav Klaus, Former President of the Czech Republic, Head of the Václav Klaus Institute

An economist by training, Prof. Klaus was forced out of the Czechoslovak Academy of Sciences after the Soviet invasion in 1968. He returned after the Velvet Revolution of 1989 as one of the founders of the Civic Forum Movement. He was the country's first non-Communist Finance Minister and served from 1992 to 1997 as Prime Minister of the Czech Republic. In 2003 Klaus was elected President of the Czech Republic and won reelection in 2008. Since 2012 he has headed the institute which bears his name, a think tank based in the Czech Republic. He is a member of the Mont Pelerin Society, has published more than 30 books, and is the recipient of numerous honorary degrees and international awards.



Igor Luksic, University of Donja Gorica, Former Prime Minister of Montenegro

Prime Minister of Montenegro 2010-2012, Deputy Prime Minister and Minister for Foreign Affairs and European Integration 2012-2016, Minister of Finance 2004-2010, Member of Parliament of Montenegro 2001-2003, Member of Parliament of Serbia and Montenegro 2003-2006. A candidate for the UN Secretary General in 2016 advocating more efficient and effective UN in response to the SDG agenda and peace operations. He also advocated a stronger voice for youth. World Economic Forum's Young Global Leader 2013 class. He holds a PhD in economics transition and is a full professor of the University of Donja Gorica Podgorica. Luksic is a Senior Peace Fellow at the PILPG Washington DC and the Nizami Ganjavi International Centre.

BMI STRUCTURE | International Advisory Board



Prof. Itamar Rabinovich, Founder and President of the Israel Institute, Former Ambassador of Israel to USA and President Emeritus of TAU

Prof. Itamar Rabinovich is the president of the Israel Institute (Washington and Jerusalem), Israel's former Ambassador to the United States and the former president of Tel Aviv University (1999-2007). He is professor emeritus of Middle Eastern History at Tel Aviv University, Distinguished Global Professor at NYU and a Distinguished Fellow at the Brookings Institution. Prof. Rabinovich has been a member of Tel Aviv University's faculty since 1971 and served as the Ettinger Professor of the Contemporary History of the Middle East, chairman of the Department of Middle Eastern Studies, director of the Dayan Center for Middle Eastern and African Studies, Dean of the Humanities Faculty, and Rector. Prof. Rabinovich's book "Syrian Requiem" was recently published by Princeton University Press: https://press.princeton.edu/books/hardcover/9780691193311/syrian-requiem



Seppo Remes, Co-Founder and Chairman of the Board, EOS Russia

Mr. Remes is a Finnish citizen and holds a Licentiate of Economics degree from the Turku School of Economics. Working in Russia from 1993-2015, he is the former CEO of the Investment Company Vostok Energo and director of Vostok Nafta, both of which operate in the Russian energy sector. He was selected as the Director of the Year in 2013 by the Independent Directors' Association and the Russian Council of Industrialists and Entrepreneurs. In 2007 he was among the founders of the EOS investment firm and has been company chairman since its inception. He was awarded an honorary Doctorate from the Plekhanov Academy of Economics in Moscow and Turku School of Economics in Finland. He was member of Boards of UES, Rusnano, Rosseti, OMZ, Sollers and Sibur Holding.

BMI STRUCTURE | Management



Prof. Itai Sened, Head of BMI, Dean Emeritus of the Gershon H. Gordon Faculty of Social Sciences

Prof. Sened is the Dean of the Gordon Faculty of Social Sciences at Tel-Aviv University and founding head of the Boris Mints Institute for Strategic Policy Solution to Global Challenges and the Academic Institute for Structural Reforms.



Dr. Alexander Pesov, Representative of BMI President

Dr. Pesov hold a Ph.D. in biology and is the author of several scientific publications. Dr. Pesov has previously worked as a journalist, writer, and editor of several top journals and newspapers and served as vice president of the International Press Center in Moscow. From 1998 to 2012 Dr. Pesov was an advisor to the prime minister of the Russian Federation Eugene Primakov, chief of staff of the Ministry of Agriculture of the Russian Federation and vice governor of the Voronezh region.



Dr. Haim Ben-Yaakov, Representative of TAU President

Ben-Yaakov is a senior executive for regional development and public affairs at Tel Aviv University. He served as CEO of the Euro-Asian Jewish Congress, head of the Jewish Agency for Israel in Russia and the Baltic States and as an educational adviser for the Jewish Agency for Israel.



Petr Pesov, Director of BMI

Petr received his dual MA degree in International Affairs from Johns Hopkins University and Conflict Resolution at TAU. He is currently the director of BMI and a PhD candidate at the Social Sciences faculty of the university. He specializes in creating, developing, and managing interdisciplinary education and research projects with a particular focus in security and international relation. Petr is also a strategic consultant at the Blavatnik Interdisciplinary Cyber Research Center.



Each of our research labs is comprised of a Lab Leader – a senior TAU faculty member who is an expert in the relevant field, and a group of research students under his/her supervision. BMI labs are the operative channel of co-operation with BMI's partners, both within TAU and international partners. The research seeds BMI has sown have grown into academic and policy publications, international academic collaborations and additional funds from several foundations and sources.



Lab Heads:





Prof. Hadas Mamane Head of the Environmental Engineering Program, Faculty of Engineering

Prof. Asher Tishler Professor & Dean Emeritus, Coller School of Management

Prof. Vered Blass Department of Environmental Studies

Our experts from diverse disciplines work together to confront urgent climate change challenges and ensure sustainable development in the energy field; our research focuses on sustainable development through renewable, hydrogen, and energy, investigating the various applications of water, planning food security in times of uncertainty and climate crisis, and exploring the nuances of future cities. Our work is geared towards ensuring a greener future for future generations. The work is a strategic partnership between BMI and the Archimedes Institute.



Water Eitan Yosef Benson, BMI Fellow

Academic Advisor: Prof. Hadas Mamane, Faculty of Engineering

Research project: Heavy Metal Contamination in Developing Countries & Affordable Self-maintaining Ultrafiltration Home Water Treatment

Currently, the vast majority of commercial Lithium (Li) originates in a very small number of highly limited mines, rendering the Li supply chain highly vulnerable to both commercial depletion and geopolitical instability. As Li reserves in conventional mines are depleted, the costs involved in extracting usable Li from said mines becomes exponentially more expensive and dangerous. The combined effect of these limitations is that Li represents a significant economic bottleneck to the transition to the sustainable economy. Whilst conventional mining activity may concentrate in Li reserves underground, the majority of Li in the earth's crust is actually dissolved in the ocean. Absorbing this Li from seawater, and generating Li-containing battery materials therefrom, is an attractive route to forcing open the bottleneck to this critical resource. The main challenge for feasible Li-recovery from seawater is the highly similar chemistry of Li to competing ions sodium (Na), potassium (K), magnesium (Mg), and calcium (Ca), and the extremely high ratios of these competing ions relative to Li, which is typically found in concentrations on the order of 100 parts per billion (ppb). By way of example, the ratio between Na and Li in most regions of the ocean is approximately 32,000:1. In order to produce Li-containing battery materials with suitably low Na contamination for feasible use in commercial batteries, a Li-selective adsorbent would require a Li-selectivity on the order of 3,200,000. The best adsorbents reported in the literature perform at a maximum of 1800x, though under more realistic conditions a maximum selectivity of 60x is more likely. Furthermore, conventional approaches to selective Li recovery from seawater rely on highly ecologically demanding processes, not least the requirement to produce Li₂CO₂ directly, from which the highly energetically demanding calcination process is required to produce Li-containing battery materials. The research developments Eitan has made with respect to selective mercury (Hg) removal from high matrix water present a similar problem: selectively adsorbing a target ion from a highly mixed and competitive solution by utilizing a hierarchical porosity to maximize physi-sorptive potential, and integrating said porosities technology into an electrically conductive platform (the MOF@foam) capable of employing electro-sorption to further enhance adsorption. Since beginning work on lithium recovery, it was demonstrated the potential of this platform to adsorb Li in a manner that allows for a significantly streamlined downstream production of Li-containing materials. In collaboration with Dr. Manohara Halonur, a postdoctoral student in the Professor Hadas Mamane laboratory, they have developed a Li-transmissive multi-layer reverse osmosis (RO) membrane capable of drastically improving the ratio of Li to competing ions. A combination of this novel membrane technology and the adapted MOF@foam platform could provide the means of converting RO desalination plants into battery factories, whose byproduct would be RO-filtered water. Both the Li-selective MOF@foam platform and the Li-transmissive multi-layer reverse osmosis (RO) membrane are the subject of two patent applications, currently in internal review, planned for submission in the coming months. Following from the advances made in the research of the Kodaikanal pollution case in South India, in collaboration with IIT Madras in Tamil Nadu, he took an opportunity to collaborate with researchers from UPES in Uttarakhand to investigate Hg pollution in the Kullu valley in Himachal Pradesh. Over January and February 2024, he tracked down elders of the Daola tribe, who were reported in previous decades to have been engaged in artisanal gold mining (AGM) practices, in which Hg is used to purify gold particles panned from rivers. Hg emissions as a result of AGM are well reported to constitute the largest single source of Hg emissions worldwide, and particularly since the UN's 2011 Minamata convention. The Daola elders pointed to the Beas river in the Kullu valley as a site of seasonal AGM practice, and following their instructions himself and collaborating researchers travelled there to collect samples. Over a 40 km stretch of the Beas river from Solang to the confluence with the Parvati river, Eitan collected 120+ solid samples and a similar number of water samples, finding three particular locations of significant Hg contamination. Samples were also collected from a local rubbish dump and a sewage treatment plant in Kullu town. In the Kodaikanal research completed in the 2022-2023 academic year, the failures of environmental policy with respect to Hg-monitoring policy were evaluated in light of the study (and meta-study) conducted. In the Beas case, the Hg-pollution data was used to evaluate the potential of a number of Hg clean-up policy interventions. One of the most important interventions is the use of indigenous plants for phytoremediation, and as such the most common annual and biennial riparian plants found in the Beas were also collected and assessed for their Hg-phytoremediation potential. The reporting of Hg-



Water Ronny Erdan, BMI Fellow

Academic Advisor: Prof. Hadas Mamane, Faculty of Engineering

Research project: Integrated Assessment of Water Quality in Sewage Ponds

Water scarcity and pollution present critical challenges for sustainable agriculture and human health, particularly in regions like Punjab, India, where water resources are overexploited, and wastewater management is suboptimal. This study addresses the urgent need for effective water quality assessment methods by integrating field sensor measurements, satellite imagery, and visual analysis to evaluate the water quality of 100 sewage ponds around Patiala, Punjab, India.Key water parameters such as dissolved oxygen (DO), oxidation-reduction potential (ORP), chlorophyll, pH, temperature, nitrate, and ammonia were measured on-site. Significant correlations were observed: positive between pond temperature and ORP, pH, DO; negative

between pond temperature and chlorophyll, ammonium, nitrate. The Modified Normalized Difference Water Index (MNDWI) confirmed pond identification, while the Normalized Difference Vegetation Index (NDVI) and visual assessments guantified vegetation cover and pond guality. Visual analysis highlighted the presence of algae, water plants, and duckweed, which were used to classify ponds into "green" and "nongreen" categories. Ponds with vegetation (green ponds) exhibited higher DO, chlorophyll, and NDVI values than non-vegetated (nongreen) ponds. The positive correlation between temperature and DO, ORP, and pH indicates healthier and more oxygenated water conditions, which are beneficial for aerobic aquatic life and pollutant degradation. The negative correlation with chlorophyll, ammonium, and nitrate suggests that higher temperatures can reduce nutrient levels and algal blooms, improving water quality. Additionally, the negative correlation between ORP and chlorophyll indicates that as algal respiration increases, oxygen levels and ORP decrease, which can help in managing algal blooms and maintaining a balanced ecosystem. This integrative method enhances the accuracy and comprehensiveness of environmental assessments for sewage ponds. This research aims to develop an efficient, cost-effective method to assess water quality in sewage ponds, addressing a global issue. Furthermore, the study discusses the limitations on water quality intended for agriculture in relation to the measurements conducted in the field. The results emphasize the importance of multi-method approaches in environmental monitoring, offering a cost-effective tool for improving the management and quality of water resources. Ronny successfully completed her thesis.





Water Suzan Kagan, BMI Fellow

Academic Advisor: Prof. Hadas Mamane, Faculty of Engineering

Research project: Hybrid Course on Water Quality: Approach to People's Water Data

The vision of the project is to create "People's Water Data" through a course initiated by IIT Madras, India, and Tel Aviv University, Israel, along with KMCH Research Foundation, India. This initiative aims to enhance water literacy and build water professionals. The course is designed to provide students with a comprehensive understanding of important aspects of water quality and the analysis of key parameters determining quality. The students will be introduced the theory of water quality parameters first and analysis of those parameters, followed by measurements in the field with hand-held instruments, field test kits, etc. The assessments involve the examination of water quality parameters, including free chlorine, total chlorine, alkalinity, pH, oxidation-reduction potential (ORP), conductivity, total dissolved solids (TDS), temperature, turbidity, as well as the detection of E. coli and total coliforms in the water. This course was built based on a pilot study done during the last semester in different places across India (such as Chennai,



Figure 1. Social data for housejolds using RO compared to non-treated water

Erode, etc.), Israel and Uganda. The data from this endeavor will be collated to create online data on water quality with spatial coordinates, and inputs from surveys on a "People's Water Data" platform. As a hybrid course, the participants can learn from the experts online (live) or at a flexible time suitable for them. However, the practical session is conducted in-person at 10 chosen center-points, based on a preliminary survey conducted to let the interested participants enroll in it. Particularly E. coli and total coliforms, in both treated (RO) and non-treated drinking water raises important considerations regarding the effectiveness of reverse osmosis systems and the overall safety of drinking water. Interestingly, as indicated below, even the treated water revealed the presence of biological contaminants. The results show that 31% of RO-treated drinking water contains E. coli, while 74% of the RO-treated drinking water contains only total coliforms. In the households with non-treated drinking water, 71% contain E. coli, while 88% contain only total coliforms. The data suggests a lower percentage of biological contaminants in RO-treated water compared to non-treated water, but the presence of these contaminants in treated water raises concerns. It seems that RO reduces biological contaminants but can be doubted if is it the right solution for the disinfection of drinking water quality. It is essential to assess the factors contributing to these findings, regular monitoring, proper maintenance, water source quality, system design and a comprehensive approach to water treatment are essential to ensuring that households have access to clean and safe drinking water.



Water Roman Belykh, BMI Fellow

Academic Advisor: Prof. Hadas Mamane, Faculty of Engineering

New UV LED technology has enabled the production of compact UV disinfectant reactors in various shapes and sizes. To ensure the effective deactivation of viruses, bacteria, and protists, thorough measurement of UV dose and its spatial distribution should be performed, and technological standards should be developed. This work focuses on developing micron-sized probes for Lagrangian actinometry. These probes will emulate bacteria in water flow and record the dose of UV irradiation. The data obtained in this manner will be useful for modeling irradiation and mixing in the reactor, and can further be applied to the standardization of UV LED reactors. A preliminary experiment was conducted using a standard uridine actinometer. Roman observed that the decrease in uridine absorption intensity was negligible, which was attributed to the very short exposure time in the flow reactor — only 1.2 seconds. In batch experiments, significant changes occur after 300 seconds of exposure. Roman concluded that optimization of the experimental setup is required: the exposure time needs to be increased by allowing multiple passes of the actinometer through the reactor. Additionally, an actinometer

with higher sensitivity should be used. For the development of a more sensitive actinometer, Roman proceeded to Chapter 2, in which 2 branches of research were initiated: silica particles and polyacrylamide particles. These particles have fundamentally different mechanisms for actinometer stabilization: surface binding to silica particles and encapsulation in a polymer mesh for polyacrylamide particles. Surface binding affects the fluorescent properties of the dye molecule but ensures the stability of the probe. Encapsulation within the polymer sphere is expected to have a milder effect on fluorescence. Silica particles with diameters ranging from 100 to 300 nm were synthesized (see SEM picture). They were coated with Rhodamine 6G, and the signal was checked using a flow cytometer. Polyacrylamide particle synthesis is still in the optimization process. Pickering emulsification, the method for stabilizing spherical droplets of water solution in oil with solid nanoparticles, was investigated. An optimal solvent was found for silica nanoparticles.



further work. Carbon Quantum Dots (CQDs) were synthesized as a candidate for actinometry dye. They are known to be stable in water, non-toxic, and inert under common conditions. This fluorescence map shows that CQDs have one fluorescence peak with an excitation maximum around 335 nm and an emission maximum around 425 nm.

The photodegradation of Rhodamine 6G coated on silica particles was studied under different irradiation sources and with varying concentrations of H_2O_2 . The dye in water and H_2O_2 solutions undergoes a rapid change in fluorescence intensity immediately after mixing, and then stabilizes. Under UV irradiation in the same solutions, it reaches a different stabilization level and then remains relatively stable. When the dye is deposited onto a silica sphere, the initial rapid change is not observed. However, the subsequent decay is almost independent of UV irradiation and H_2O_2 concentration. Based on these observations, Roman concluded that Rhodamine 6G is not a suitable dye for actinometry. Carbon Quantum Dots (CQDs) are stable in water



and H_2O_2 solutions. Under UV irradiation, CQD fluorescence in water decreases linearly with UV dose, while in the presence of H2O2, it decreases exponentially. The higher the concentration of H_2O_2 , the faster the intensity decreases. The decomposition products do not exhibit significant fluorescence signals. This behavior is ideal for an actinometer, and further development of the CQD-based system is ongoing.



Sustainable Development

Dr. Yaela Golumbic, BMI Postdoctoral Fellow

Academic Advisor: Prof. Vered Blass, Department of Environmental Studies

Dr. Golumbic's work centers around the study of citizen science – public engagement in scientific research, considering the various human dimensions of this growing phenomena. Her research lies on the intersection of science communication, science education and citizen science, with an aim to make science more accessible and relevant to peoples' day-to-day lives and focusing on co-creation processes and examining its benefits and challenges for science and society. In the past year she has had two publications in prestigious journals and had four presentations at conferences. At the moment she is leading 4 research projects:

- Volunteer Participation Patterns in Biodiversity Monitoring This study examines the motivations, preferences, and frequency of participation
 of the most active participants on the iNaturalist citizen science platform for monitoring biodiversity. By interviewing 17 volunteers on this platform,
 she was able to identify unique participation patterns: Novices Participate mainly for pleasure and personal interest. They enjoy the process of
 observation, discovering new species or documenting findings, as well as connecting to the natural world and have a passion for learning. Experts Participate in the project as an addition to their professional activity and out of commitment to contribute to science, and love for nature. Self-taught
 specialists This are serious hobbyists without a formal background in biology, but with extensive knowledge acquired through self-ambition
 and intensive learning.
- 2. A Community of Practice Approach for Novice Self taught specialist Expert **Facilitator Engagement in Citizen Science** - a project in collaboration with researchers No formal background •With formal background •No formal background, from life science and education investigating lay expertise Participate out of •Participate out of the role of volunteers in facilitator roles, enjoyment responsibility and •Participate out of passion to the field ambition to perfect their Outcome is to obtain warranting positive outcomes for youth expertise knowledge Outcome is to contribute engagement in citizen science projects. to the field •Outcomes are to obtain Grounded in a community of practice knowledge and approach Dr. Golumbic and her colleagues contribute demonstrate how facilitators' engagement

Figure 1. Participation patterns of iNaturalist super users

in co-design processes triggers rich interactions among project designers, enables them to leverage their expertise in shaping and refining the project, and ensures its youth-centric design. This work has been submitted to the International Journal of Science Education.

- 3. **Mainstreaming citizen science in the classroom** This is a conceptual study integrating empirical data and literature, to discusses the challenge of incorporating citizen science in schools and propose a framework for making citizen science more accessible and adaptable for teachers. A book chapter summarizing this work has been provisionally accepted to the book "Citizen Science Contributions to Biology and Environmental Education: Realities, Impact and Opportunities" Editors: Tsybulsky, D., and Tal, T. Springer Nature.
- 4. **Citizen Science as a Tool for Connecting People to Nature** A study funded by the KKL that examines ways to develop citizen science projects which promote nature connectiveness among diverse audiences and increases public awareness of the environment and its protection. Over the past year Dr. Golumbic has been working on a systematic review to identify key characteristics of citizen science projects around the world that have led to pro-environmental outcomes. Working with the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRIZMA) framework, she has so far identified 360 candidate research items. These are currently being filtered and matched to her research questions to reach a final pull of research items for in-depth analysis.



Future of Cities Eyal Sasson, BMI Fellow

Academic Advisor: Prof. Itai Sened, Dean, Faculty of Social Sciences

Research project: Optimization of the electricity grid: long-term planning for 2030-2050

Planning future electricity networks is a preliminary, necessary, step for the assimilation of renewable energies and transition of electricity markets into decentralized renewable-oriented electricity production. The transmission network design of any electricity market depends, among others, on the location of the generation facilities and final demand for electricity, as well as other geographical, technological, and social characteristics of each country and its existing electricity market. This study introduces an economic model for the optimization of future electricity networks by solving a linear programming (LP) optimization problem. The model provides a framework for a multi-period optimization of transmission networks, essential for long-term planning. In 2018, Israel began to reform its electricity market by gradually transforming it from a centralized to a more competitive structure study. Eyal assesses the case of the Israeli electricity market to illustrate the use of the model that he developed, under three scenarios that set out to achieve a zero-carbon competitive electricity suppliers offer to sell electricity in an electricity exchange, operated by an independent system operator; ISO, and retail suppliers bid for that electricity to meet customers' energy demands; and (3) a decentralized wholesale electricity market that includes microgrids that serve stand-alone local power grids as (full or partial) substitutes for expanding the transmission and distribution infrastructure. The objective of

this study is to provide an economic model for the optimization of future electricity network in Israel. Eyal applies a linear programming model to simulate the optimal electricity network in Israel for 2030-2050. The contributions of this study are numerous. First, it develops an economic model for electricity network optimization by solving a linear programming optimization problem. Second, using Israel as a case study, provides feasible solutions for minimizing the costs of Israeli future electricity network for 2030-2050. The model is designed to outline long-term planning based on five-year development plan horizons Fig. 1. Eyal's research proposal has been accepted.



Figure 1. Illustrating a Long-term planning based on five-year development plans





Academic Advisor: Prof. Asher Tishler, Professor Emeritus, Coller School of Management & Prof. Itai Sened, Dean, Faculty of Social Sciences

Research project: On the Economic Feasibility of Using Nuclear Energy to Produce Electricity in Israel

Lior completed writing his research proposal and submitted it for feedback. Lior presented his research proposal at the IIASA summer school, which enabled him to expose his research to a diverse audience and receive comments from researchers in other disciplines. He also presented it at the IAEA Workshop on Modelling the Contribution of Nuclear Power to Net Zero Transitions and the BMI Annual Conference. This experience was invaluable for broadening the scope and improving the quality of his research. Lior also actively participated in The Israel Futuristic Electricity System Research Lab, contributing to discussions and research activities related to Israel's electricity policy as well attended the IIASA summer school, which focused on system modeling. This experience enhanced his modeling skills, particularly in relation to energy systems.



Future of Cities

Aviram Ohad, BMI Fellow

Academic Advisor: Prof. Itai Sened, Dean, Faculty of Social Sciences & Prof. Asher Tischler, Coller School of Management

Research project: A feasibility study & building a model for managing storage and a virtual power station using electric vehicles in long-term parking lots at airports

The research deals with the ability to balance the electricity grid using a fleet of electric vehicles that will allow the shifting of loads from the grid and electrical energy stored in the batteries of private electric vehicles. A fleet of electric vehicles constitutes a virtual power station which, in times of high consumption in the electricity network, may provide reserve energy which is stored in the vehicles' batteries. Managing the energy economy in a way that will make it easier for the fossil power stations, may significantly improve their efficiency and thus save energy and reduce greenhouse gases. These issues have been studied in the past in the electrical grids which also include wind turbines, energy generated by wind is not a significant factor in the Israeli electricity grid. Other research investigated and managed the cases of rental or transportation companies.

The innovation in the proposed research is the model's dealing with a competitive market of distributed electricity producers that offer changing prices over 24 hours. In addition, the boundaries of the proposed academic research were defined generally, and rules were established for the quantification of the numerical values in the model, the algorithm proposed in the research proposal includes reference to several players, among them, the power grid, photovoltaic systems, power generation systems, physical and virtual parking lots as well as individual electric vehicle owners.

In addition, a mathematical model was built which characterizes the objective function for maximizing the profitability of the management company of the model. The objective function includes the profit of the management company and the payments that will be given to the vehicle owner for the use of his vehicle, it is determined that 3 types of compensation will be given for 3 types of battery use. The proposed mathematical model is a relatively simple model which during the research will add more players and specify the constraints and restrictions that will be added to the model. As the research progresses, it will be expanded and will deal with changes in the price of electricity throughout the day, changing interests of car owners, long-term parking, parking lots and virtual parking lots, and all psychological and social constraints and especially engineering in order to examine the possibility of flavoring such a model for use by owners of private electric vehicles.





Lab Heads:





Prof. Isaac Sasson Department of Anthropology and Sociology

Prof. Adriana Kemp Department of Anthropology and Sociology



Dr. Nimrod Rosler Department of Public Policy

We collaborate with diverse organizations and professionals to address global challenges related to human well-being and socio-economic progress. Our objective is to develop policy solutions for a more balanced and capable society through rigorous, interdisciplinary research and evidence-based analysis that addresses demography, conflict resolution, inequality, and the future of labor.



Demography

Dr. Yan Zheng, BMI Postdoctoral Fellow

Academic Advisor: Dr. Isaac Sasson, Department of Anthropology and Sociology

Yan's research project: Looking beyond differences in life expectancy: Lifespan inequality between Jews and Arabs in Israel notes that while studies documented Jewish-Arab differences in life expectancy over time, none has examined trends in lifespan variability. By analyzing vital statistics data from 1981 to 2022 and using contour decomposition method, they find that life expectancy increased more rapidly among Jews than among Arabs in Israel. By contrast, declines in lifespan variation were greater among Arabs, which nevertheless remains high relative to their Jewish counterparts. This study reveals two disparate phenomena. First, Jewish-Arab disparities in infant and child mortality have shrank over the study period, which was the main reason for their narrowing gap in life disparity, particularly among men. Second, the Arab old-age mortality advantage, which existed in 1981–1983, had reversed by 2017–2019. Lower old mortality among Jewish people increased their life disparity, and thus halted the Jewish-Arab life disparity gap from further declining, as shown

in Figure 1. Her second project is How epidemiological changes shape lifespan inequality: An observational study of select high-income countries. Since 2010, the patterns of mortality (by age and cause of death) have experienced substantial changes among a number of high-income countries including Israel. Although the impacts of these changes on life expectancy have been well addressed, it is unknow how they affected life disparity in major high-income countries. In this study, they found that unlike the temporary setback on life expectancy performance, almost all high-income countries experienced declining life disparity before 2019 when COVID occurred, although the magnitude of the reductions differed greatly across countries. Even after the pandemic, most high-income countries continued their declining trends in life disparity, while





a few countries experienced increases, e.g., Canada and the USA. More detailed analyses (as shown in figure below) find that changes in life disparity are the combined effects of the 'early' component (changes in premature mortality) and the 'late' component (changes in mortality after average threshold ages), and the contributions from these two components varied significantly across countries and periods. In 2010-2019, declines in life disparity in nearly all observed countries could be mainly explained by notable declines in premature mortality from multiple causes of death including cardiovascular diseases, neoplasms and external causes of death, which were more obvious among men. However, after 2019, rising mortality from COVID-19 pandemic among older people played a more important role in reducing life disparity. Lastly, she is also working on inequalities in life expectancy in the Western Pacific Region: The role of metabolic and behavioral risk factors. Using data from the Global Burden of Disease 2019 study and the Arriaga decomposition method, this study emphasized the important role of reductions in old-age mortality and non-communicable diseases (NCDs) related mortality on life expectancy gains in high- income countries. For most of the low- and middle- income countries, reductions in mortality at infant and adult age groups and mortality from communicable diseases were mainly responsible for their increases in life expectancy, while in China and Malaysia, declines in old age mortality and NCDs mortality were also important contributors. Age- and cause-specific mortality changes in observed countries within the WPR were closely associated with different risk factors, e.g., metabolic risks (e.g., high blood pressure and high cholesterol) and behavioral risks (e.g., dietary risks and tobacco). This study underscores the need for further public health efforts to achieve health equity in this region.



Inequality Dr. Oren Danieli, BMI Senior Fellow

Research project: Skill-Replacing Technology and Bottom-Half Inequality

In his new paper, Dr. Danieli proposes a new theory for how new automation technology has affected the bottom of the U.S. wage distribution in recent decades. His theory diverges from previous Routine Biased Technological Change (RBTC) models by arguing that automation technology is skill-replacing (SR-RBTC). Instead of assuming that new technology is replacing workers, he assumes that it replaces their skill. For example, calculators replace the need for arithmetic skills, enabling workers with limited arithmetic abilities to perform calculations just as effectively. This model can explain recent trends of bottom-half inequality. He supplements this model with new empirical evidence showing the predicted decline in the return to skill in routine occupations. Furthermore, he finds that routine occupations are increasingly filled by low-skilled workers, as skill becomes less necessary in these roles. Finally, he uses a "skewness decomposition" to quantify that SR-RBTC can explain 93% of the discussed wage trends. The decomposition results indicate that RBTC is skill-replacing. He finds that 78% of the overall increase in skewness is driven by the correlation component. The correlation component increases mainly due to the decrease in inequality in routine occupations, predicted by the SRRBTC model. For comparison, trying to decompose the increase in skewness by industries or education generates a much larger increase in the within component. This implies that the rise in skewness is

driven primarily by occupational trends, in industries and education categories. The results of skewness decomposition are distinct from previous decomposition attempts of wage polarization because it does not rely on the "ignorability assumption". Previous attempts to decompose wage polarization found that technological changes and occupational trends in general, do not generate wage polarization (Autor et al., 2005; Firpo et al., 2013). The most common decomposition methods (e.g., Juhn et al., 1993; DiNardo et al., 1996; Firpo et al., 2009) rely on an assumption called ignorability (Fortin et al., 2011)., i.e. these decomposition efforts only quantified the decrease in average routine wages. Yet the increase in skewness is driven by the decline in inequality in routine occupations. This trend was previously documented by Lemieux (2007), and causally identified by Gaggl and Wright (2017). Using skewness decomposition, Dr. Danieli finds that the decrease in inequality in routine occupations is the main driver of wage polarization. Skewness decomposition was previously discussed in labor economics (Mincer, 1974) but was never applied to economics data.



Figure 1: 90/50 and 50/10 Log Hourly Wage Ratio Quantiles are calculated for all workers with positive earnings at the hours level, using sample weights multiplied by hours worked. Source: CPS Outgoing Rotation Groups (N = 4, 40, 711)



Conflict Resolution

Dr. Boaz Hameiri, BMI Senior Fellow

Dr. Hameiri published five papers. The most important amongst them is a review paper he coauthored with Samantha Moore-Berg (University of Utah). The paper was published in the highly prestigious Trends in Cognitive Sciences. In this paper, they introduce a new framework for classifying metaperception correction interventions, including direct and indirect interventions, and critically assess these approaches. Moreover, a paper that he has been working on for several years was finally accepted and published in the leading journal Psychology of Violence. In this paper, he found that the tendency for interpersonal victimhood—a psychological contract and measure he previously developed (Gabay, Hameiri et al., 2020)—served as a strong driver of support for, and willingness to engage in, political violence in among Democrats and Republicans in the U.S. Based on this original research, he has initiated a large-scale project that replicates the initial model in a large-scale multi-cultural global study in, at least, nine different regions. In addition, he conducted a massive intervention tournament to develop an effective intervention(s) to reduce victimhood beliefs in order to reduce support for political violence in the U.S., among Republicans and Democrats. This is currently being written and would likely be submitted for publication in the next couple of months. The plans for next year include running an additional intervention tournament in Israel, among Jews and Arabs. To support this ongoing project, he obtained a BSF grant with Rebecca Littman (UIC) that started in October 2023. It is important to note the substantial impact of the devastating war in the Middle East, and its related reverberations related to BDS movement pressuring scholars to boycott Israeli institutions and funding agencies with regards to the BSF project. As part of Dr. Hameiri and his colleagues work on the first part of the project, as described in our proposal, they set out to conduct a global, multi-cultural study. In addition to the eight contexts that they detailed in their proposal, they sent out a call for proposals to solicit participation from as many scholars from as many countries around the world to establish an international collaboration; while, in parallel, they developed our survey materials that they use in all contexts. The call exceeded all expectations and solicited the participation of approximately 200 scholars from more than 50 countries worldwide. The research group met regularly for several months to go over the responses they got, and to plan a workshop in which they had planned to describe the research to all participating scholars and form a new global network of researchers interested in researching the drivers of political violence. However, due to BDS pressure, they unfortunately had to put the global study on hold. After some deliberation, they decided to run a slimmer version of our global study with nine countries. In addition to the studies in the U.S. and Israel, they secured the participation from colleagues and friends from Nigeria, Kenya, India, Hungary, South (Greek) and North (Turkish) Cyprus, and the U.K. They are currently running their first study in the U.S. with 300 Democrats and 300 Republican participants. Following the completion of this study, after assuring the reliability of our measures, they will start with the process of translating the materials to the different languages and then running the studies in all contexts in parallel.



Conflict Resolution

Noy Calif, BMI Fellow

Academic Advisor: Dr. Boaz Hameiri, School of Social and Policy Studies

Noy is working on using Network Analysis to reduce support for political violence among Jews and Arabs. In this exploratory study, she used network analysis as a bottom-up approach to identify key factors (e.g., attitudes and beliefs) for targeted interventions to reduce the support for political violence and examined if attitudes associated with it differ between Jews and Arabs. She used data collected during the summer of 2021, after the violent clashes between Jews and Arabs in Israel's mixed cities (Lavie et al., 2021; Karsh, 2021). It includes Jewish respondents from mixed cities (n = 756) and Arab respondents from Arabs cities (n = 339), covering over 30 factors related to intergroup relations and political violence. At the macro level, measures of the entire network structure and connectivity was examined using Q, ASPL and CC measures. She found that the CC of the Jewish network was larger than that of the Arabs network and the ASPL and Q was smaller than that of the Arabs network. Which means that the network of the Jewish sample had a higher connectivity overall. At the micro level she used Eigenvector and Hybrid centrality measures, the latter has been found to have a predictive component. The analysis identified several common core nodes for both networks, including anger, resentment, competitive victimhood, delegitimization, outgroup feelings, and various threat perceptions. However, some core nodes were group-specific. For Arabs, these included exclusive victimhood, collective angst, and identification with Israel, while for Jews, they encompassed hatred, outgroup dehumanization, and violence norms. While further analysis is needed to fully characterize both networks, these early findings underscore the distinct factors associated with political violence among Jews and Arabs in Israel and highlighting the need for more advanced and nuanced approaches when developing interventions. This research was awarded the Sergio Grywac prize for its contribution to Jewish-Arab relations research. Another project that Noy is working on is titled: Trait victimhood shapes people's willingness to help others as a function of victim signaling (or lack thereof). Prosocial behavior encompasses a broad range of actions intended to benefit other people other than oneself, such as helping, comforting, sharing, and cooperating (Batson & Powell, 2003). There are many forms and motives for providing help as well as numerous factors influencing the decision to help or not. In this research she aimed to explore the association between trait victimhood and perceptions of individuals signaling victimhood, and to asses trait victimhood's potential moderating effects on the willingness to help others. The results from four studies consistently demonstrate a correlation between trait victimhood and perceptions of others' victimhood. The results indicate that individuals with high trait victimhood scores are more likely to perceive a help-seeker as a victim, feel more positive towards them, and believe they deserve help, particularly when victim signals are clear. But, these effects are less pronounced when the help-seeker prioritize their own interest at the expense of those with high trait victimhood, especially in competitive contexts. In such situations, she observed reduced positive emotions and perceptions of deservingness for help, revealing a more competitive and vengeful aspect of trait victimhood. These findings underscore the complex role of trait victimhood in shaping responses to others in need. At the moment with the help of a BSF grant, Noy, together with Dr. Hameiri are investigating the predictors of political violence, with a focus on victimhood on interpersonal (trait victimhood) and intergroup levels (e.g., collective victimhood, competitive victimhood, inclusive and exclusive victim beliefs). In collaboration with Rebecca Littman from UIC, they've been working on the first part of the project in which they developed all the materials and will test the model in the US (among Democrats and Republicans) and later in another seven different contexts globally.



Conflict Resolution

Petr Pesov, BMI Fellow

Academic Advisors: Prof. James Wertsch, Anthropology, University of Washington, St. Louis & Prof. Udi Sommer, Department of Political Science, TAU

Research project: Conflicts as Processes: An Attempt at an Interdisciplinary Modern Conflict Typology: Conflict resolution is an interdisciplinary field that encompasses concepts and theories from various areas of knowledge. Scholars for a long time have tried to develop comprehensive models for conflict escalation, however they often end up being too narrow and fitted to cases or not specific enough in an attempt for a one-fits-all approach. This project tries to solve this problem by focusing on the evolution of the conflict, from its roots to eruption of violence through 5 factors: structural causes, social identity, narratives (which is hypothesized to be the most central element), elite-level decisions and mobilization towards violence. The goal of the new model is best defined by enabling scholars to create a new typology of conflicts based on their escalation process and energized by narratives. The typology is the second and most significant proposed contribution of the PhD dissertation, since it will allow researchers to look at the groups of conflicts and create better, commonly used conflict prevention, management, mitigation and resolution strategies. Furthermore, the preventive part is most significant, as judging by the model a specific element can be pinpointed for interventions. The project features two research questions that will be addressed in the dissertation:

- 1. To what extent are the elements of the model present in violent intergroup conflicts?
- 2. What is the variance between the different violent intergroup conflicts as it pertains to the model?

Both questions relate to two parts of the PhD work that will be completed, escalation model and the conflict typology. The methodology chosen for the former are elite and expert in-depth interviews and social media sentiment analysis to reconstruct a two level (political and social) narrative and then analyze the similarities and differences in cases between each other using comparative case studies. Three preliminary cases: Nagorno-Karabakh, Israeli-Palestinian and Russia-Ukraine Conflicts have been completed with previously gathered data, in order to illustrate models and show that the former two escalate in a similar pattern, while the latter differs significantly. The next steps of the work are refining methodology, gathering and analyzing data and outlining articles for publication. Petr presented his research in BMI's 9th Annual Research Conference and successfully defended his proposal.



Figure 1. Process model sample of a conflict



Lab Head:



Prof. Itai Sened, Dean, Faculty of Social Sciences & Head of BMI

We live in a rapidly changing world where trust in government is decreasing, resulting in the instability of institutions and presenting new and complex challenges for society. This field of research focuses on democratic, economic, and global institutions with a strategic perspective of fostering geopolitical collaborations essential for addressing prosperity on multiple levels.



Academic Advisors: Prof. Vered Blass, Department of Environmental Engineering

A 2023 report by the International Food Policy Research Institute (IFPRI) highlights that populations in unstable, conflict-ridden environments suffer more from shocks to food systems. The 2021 UN Food Systems Summit concluded that "most hungry people are in fragile and conflict-affected places... [where] it is especially difficult to transform food systems and to meet the needs of the most vulnerable and marginalized people" (IFPRI, 2023, p. 11). During the war, disruptions to Gaza's supply chains had catastrophic effects, worsening the humanitarian crisis and potentially strengthening terrorist organizations (IFPRI, 2023). Eden's revised thesis will concentrate on critical food supply chains, food security, and crisis responses in Israel. Israel lacks a strategic plan for food production under normal and emergency conditions. The National Emergency Management Authority (NEMA) handles emergency scenarios but is limited to short-term crises, not prolonged ones like a global food crisis. Most Israeli agriculture is unplanned, with products like fruits and vegetables dependent on farmers' market assessments. Only milk and egg production is planned, relying on imported feed. Consequently, planning for a long-term, self-sufficient food supply is challenging. Emergency food stockpiles, prepared for NEMA's scenarios, consist of imported dry food, insufficient for a prolonged crisis (Foreign Affairs and Defense Committee, 2021). The research comprises four phases: Identification of Critical Foods, Empirical Analysis, Food Security and National Security Nexus, Solutions and Policy Recommendations. In the initial phase of her research, Eden conducted a comprehensive literature review focusing on disruptions in supply chains. Eden reviewed a total of 85 articles, categorizing them into three main areas: 36 articles on general supply chain disruptions, 35 articles specifically addressing food supply chain disruptions, and 14 articles on disruptions in tag and grain supply chains. This extensive review provided a solid foundation and diverse perspectives on the various factors affecting supply chain stability. Following the literature review, she analyzed case studies of climatic disruptions in Russia and Vietnam and currently is analyzing another one on Ukraine. An important part of her research involves identifying security indicators to determine the minimum and maximum thresholds of risk to Israel's food security. For example, in the context of price increases, a minimum threshold might be a 10% rise, while a maximum threshold could be a 20% increase. These indicators will help in assessing the vulnerability and resilience of Israel's food supply chains under different scenarios. To conduct this research, Eden is utilizing a variety of sources, including reports from international organizations such as the International Food Policy Research Institute (IFPRI), the Food and Agriculture Organization (FAO), the Organization for Economic Co-operation and Development (OECD), the Intergovernmental Panel on Climate Change (IPCC), and the World Food Programme (WFP). Additionally, she is drawing on government data from ministries of health, agriculture, defense, and trade in Israel and other countries. Furthermore, she will analyze supply chain databases such as the World Integrated Trade Solution (WITS), Google's flood data, and data from the company Risk Thinking AI. The ongoing conflict underscores the

critical importance of robust and resilient supply chains for Israel's national security. The potential for severe shortages across sectors, exacerbated by disruptions, necessitates a strategic approach to securing critical resources. This research aims to enhance understanding of Israel's food security and supply chain vulnerability by analyzing potential climate-induced disruptions. Through a comprehensive assessment, this study will inform the development of policies and strategies to bolster the nation's preparedness and resilience in the face of future challenges.



Academic Advisors: Prof. Vered Blass, Department of Environmental Engineering

The past decade revealed the extent of social vulnerability to risks to global supply chains: from Covid-19's impact on global labor and material flows to the geopolitical effects of the war in Ukraine on food and energy accessibility, all the way to the current war in Gaza's disruption of global shipping routes. In addition, climate change is an ever-looming threat to global food supply, to essential trading routes such as the Panama Canal and European rivers, and to energy production capacity in key production sites such as China. In Israel, global risks are compounded by national security threats, which create obstacles to local production and supply chain operations at times of heightened security risks. While in peacetime supply chain vulnerability is not perceived as a threat to social wellbeing, as the security situation worsens, and global and local security risks converge – maintaining continued supply of goods immediately becomes crucial to societal resilience. Over the past year and a half a consortium of research institutes and think tanks in Israel have come together to form a better understanding of the risks to supply chains to Israel, so as to support science based decision making in this domain. After reviewing how different countries dealt with different challenges of material security, the project decided to focus on one particular sector of the economy to begin with – the food sector. It brought together experts on different parts of the supply chain and different types of risks, and initiated a pilot on two basic commodities – grains and fish. The project also formally joined the newly formed national committee for food security, where it is responsible for designing tools and creating insights that will steer the country's national food security strategy in its analysis of import. The following research questions are being addressed in the project:

- 1. How do different countries in the world manage risks to critical supply chains supplying raw materials to the national economy?
- 2. How do different countries in the world manage risks to imported food supply chains?
- 3. What risks has the academic literature on food supply chains focused on in the past two decades?
- 4. How does import dependence impact Israel's exposure to different risks to global food supply chains?
- 5. How can we use advanced modelling and automation tools to identify and monitor risks to national food supply chains?

The material security policy review has been presented at an INSS to a broad range of policy stakeholders from the government and industry in Israel, and published as a policy brief. An initial report of results from the policy and literature review on risks to food supplies has been presented to key stakeholders for comments and revisions. Dozens of meetings have been conducted with stakeholders related to Israel's food security policymaking, leading to potential collaborations and useful insights with the ministry of agriculture, the central bureau of statistics, the food industry representative

organization, the ministry of health, and others. As the war dramatically changed the map of risks to food supply chains in Israel, the project shifted some of its focus to mapping risks to internal supply chains in face of the different security threats and Israeli military mobilization. This research project has initiated high level emergency discussions with government officials and representatives of different links of the supply chain to map challenges for food production and delivery, and preparing for worst case scenarios. This had both policy implications and informed our research in terms of understanding how internal and external supply chain allow risk hedging, which nonetheless require complementary strategies and systems analysis (which is currently lacking).



We are happy and Proud to have supported the following fellows who have successfully moved to pursue their doctoral degrees:

>>> Suzan Kagan, Climate & Energy Lab

>>> Roni Erdan, Climate & Energy Lab



BMI'S 9TH ANNUAL CONFERENCE - REGIMES, HUMAN DEVELOPMENT AND SUSTAINABILITY

Tel-Aviv University May 29th-30th, 2024

The Boris Mints Institute (BMI) held its 9th Annual Conference on "Regimes, Human Development and Sustainability" at Tel-Aviv University on May 29th and 30th, 2024. The event brought together scholars and experts to discuss various topics related to political regimes, human development, and sustainability. The conference commenced with opening remarks from Dr. Boris Mints, the founder and president of BMI, and Prof. Itai Sened, Dean of the Gershon H. Gordon Faculty of Social Sciences and Head of BMI. The keynote address, titled "Civilizational Development: Foreseeing the Future through



the Past," was delivered by Mr. Mikheil Abramishvili, the Director of the Tbilisi Archaeological Museum at the Georgian National Museum. Abramishvili's address focused on how historical patterns of civilizational development can provide insights into future societal trends from the archeological perspective. A key panel discussion on the Return of the Authoritarianism explored the resurgence of authoritarian regimes globally and the implications for international relations and democracy. The second day of the conference began with the Human Development Lab Student Presentations, which highlighted cutting-edge research on human development issues, demonstrating the breadth and depth of student engagement in these critical areas. Another significant session was on "Welfare, Inequality, and Democracy, delving into the intersections between social welfare policies, economic inequality, and democratic governance, providing a nuanced analysis of contemporary challenges and potential solutions. The Energy & Climate Lab's presentations focused on innovative research addressing the pressing issues of energy sustainability and climate change. Overall, the 9th Annual Conference of BMI successfully fostered a rich exchange of ideas and highlighted significant research contributions from both established scholars and emerging researchers.

>>> OTHER BMI ACTIVITIES

BMI SUPPORTED THE "TZAHAI" INITIATIVE FOR EMPOWERING ETHIOPIAN WOMEN

Sep 5, 2023

During the coming year, BMI will support the "Tzahai" initiative, a program designed to empower Ethiopian women to participate in leadership roles in their communities, societies, and political institutions. Participants in the program will learn about topics such as the political game, power relations, resource distribution, and politics in Israel. Also, ethnicity, economic status, feminism, identity politics, and multiculturalism enable them to acquire critical skills and competencies for effective participation in public life. The institute will assign its researchers to provide training and assistance alongside the program's leaders.



The Israeli knowledge center for applied systems analysis

BMI ANNOUNCES A NEW PARTNERSHIP

Oct 1, 2023

BMI introduces a new collaboration with its sister-institute, Archimedes (https://www. archimedescenter.org/en). The aim of the Archimedes center is to build a community of researchers (academic and non-academic) that will work to adapt and develop models of

complex systems in the realm of sustainability that are suitable for the Israeli reality. The center offers research scholarships, building and expanding research groups, conferences and more to create group collaborations. The center's activities include the recruitment of extensive research grants, relevant in Europe and in International Institute for Applied Systems Analysis (IIASA) member countries. Together with Archimedes, several joint-support grants have been issued to PhD students that work in the field of sustainability and renewable energy. As a pioneer in the field in Israel, BMI is proud to hand off the majority of the work to Archimedes, together with its Climate & Energy lab, subsidizing the work of brilliant young scholars in their respective areas of research. Furthermore, the partnership with Archimedes presents BMI with a unique opportunity to connect with IIASA on various research projects and engage with a global community of renowned experts and scientists around the world to work on the sustainable development goals.



THE 13TH ARAVA SEMINAR ON RENEWABLE ENERGIES

Dec 21, 2023

As part of a collaboration with Afeka college and the Eilat-Eilot renewable energies organization, the institute is proud to lead the methodological development allowing Social Science students from TAU and future engineers from Afeka college to participate in a one-week intensive seminar devoted to developing interdisciplinary and robust solutions in fields of renewable energies. During the seminar, students are introduced to the diverse renewable energy eco-system in the Arava region and attend numerous lectures and workshops given by top-tier industry leaders and researchers to lay solid foundations for accurate and contemporary work by the students in the future.

CELEBRATING THE BMI – EILAT EILOT COLLABORATION

Feb 29, 2024

The Boris Mints Institute is proud to state that Prof. Sened, head of BMI and Dean of the Social Sciences Faculty has received a certificate of appreciation from the Eilat-Eilot Center for Renewable Energy for his input into the collaboration and long-standing support of the activities. The Institute has supported the Eilat-Eilot Center for the past 8 years and has seen incredible growth of the initiative. We appreciate our partnership with the Center and are proud to see achievements and development that were accomplished by both Eilat-Eilot and the collaboration with BMI.





THE 14TH ARAVA SEMINAR ON SUSTAINABLE DEVELOPMENT

April 30, 2024

Another cohort of students took part in an inter-disciplinary seminar at the Arava desert. The seminar addressed various issues of sustainable development, including on-hand experiences, lecture from experts and entrepreneurs and much more. The heterogenic group of students from various disciplines – Public Policy, Engineering, Conflict Resolution, Environment and Sustainable Development – worked together to create solution to real-life sustainable development challenges.

erc

BMI SENIOR FELLOW DR. ROE'E LEVY WON THE PRESTIGIOUS ERC GRANT

Sep 5, 2024

Dr. Levy is an economist who studies the impact of social media, news consumption, and political outcomes. In the research for which he received the grant, Levy studies the slant of news (its political leading). Previous studies have measured the slant of news outlets (for example, the New York Times site versus Fox News). However, today individuals no longer consume news

from one or two outlets but are exposed to many articles from various sources through social media. Levy and his research partners will fine-tune a large language model to estimate the slant of millions of articles and use this data to estimate the extent to which people are exposed to and consume like-minded news. The research will examine whether people reside in online echo chambers and also study what influences those echo chambers: the consumers' choice to avoid content they disagree with, social media algorithms, or the tendency of outlets to produce more biased content.

44 THE BORIS MINTS INSTITUTE FOR STRATEGIC POLICY SOLUTIONS TO GLOBAL CHALLENGES 9TH ANNUAL REPORT | 2024

