האקדמיה הלאומית הישראלית למדעים
المجمع الوطني الإسرائيلي للعلوم والآداب
THE ISRAEL ACADEMY OF SCIENCES AND HUMANITIES

RuthArnon

Fellowships

מלגות רות ארנון תש"ף | 2020

Introductory remarks

Professor Nili Cohen

President, Israel Academy of Sciences and Humanities

Throughout her illustrious scientific career, Professor Arnon has addressed the many concerns of researchers at the Weizmann Institute in particular and in Israel in general, by serving in many influential positions, as Dean of Biology, and Vice President for Research at the Institute and more recently as President of the Israel Academy of Sciences and Humanities. In all these positions she paved the way for women as scientists and as academic leaders.

The issues facing women scientists throughout their careers are of particular concern to Professor Arnon, and so she agreed to chair the Council for Higher Education's Committee to Further Women in Israel's Institutions of Higher Education. The committee found that the major obstacle to the advancement of women's careers was the necessity to travel abroad for postdoctoral training. Without this experience on their curriculum vitae, they found themselves at a significant disadvantage as opposed to their male counterparts. Often they were hindered from traveling because their spouses couldn't take the required time off from their careers, or couldn't find employment abroad to provide the necessary supplement for their young families' needs. Some of the women researchers are single mothers. Funding daycare for young children abroad is another expense not covered by the various postdoctoral fellowships. The Arnon Committee made several recommendations, one of which was to seek additional financial assistance for women's postdoctoral training abroad.

In 2016, setting an example to her cohorts and the system, Professor Arnon donated out of her own pocket to establish a fellowship fund under the auspices of the Israel Academy for alumnae of the Academy's Adams Fellowships Program. She suggested that the same academic committee that approves Adams Fellowship candidates review the applications of candidates from among the Adams alumnae to select an annual awardee for a $20,000 fellowship to supplement the traditional postdoctoral fellowship funding. This year, Professor Arnon donated an extra $40,000 to provide two additional fellowships.

Professor Arnon is a champion of women researchers in Israel and abroad. We applaud her bravery and leadership!

Professor Moshe Oren

Chair, Adams Fellowships Committee

Dear recipients of the Ruth Arnon Postdoctoral Fellowships,

Gender inequality in academic leadership remains a major problem in Israel, as it is throughout the world. As a researcher in the life sciences, I am repeatedly saddened to see that the majority of graduate students in our field are women, but when it comes to professors and research group leaders, the balance gets heavily tilted towards men. There is no objective reason why this must be so: as graduate students, women are at least as outstanding as their male peers. Everybody talks about this imbalance and the need to rectify it, but not many actually take action to ensure a more balanced representation of female researchers in the top ranks. That is exactly what Ruth Arnon had in mind when she generously established this special fellowship program. And you are exactly the type of young researchers she had in mind.

Being selected as an Adams fellow is already a recognition of your unique excellence. Receipt of the Ruth Arnon Postdoctoral Fellowship puts a final stamp of success on the hard work of your doctoral studies: you promised, and you richly delivered!

As you move on to the next step in your careers, on your way to becoming independent researchers and mentoring the next generation of students, don't forget that your Adams mission is not yet over. You should now serve as role models to your young female students, showing them that they must believe in themselves and aspire to fulfil their dreams, just as you did. That is what Ruth Arnon expects you to do, and that is what all the members of the Adams Committee expect you to do. And I very much hope that this will happen right here, in Israel!

On behalf of the Adams Fellowships Committee, I wish you continued success in your post-doctoral research. We will be looking forward to seeing you back in Israel as exemplary scientists and leaders of our research community.

Professor Ruth Arnon

Academy Member and Israel Prize Laureate in Medicine
The Weizmann Institute of Science

Professor Ruth Arnon earned both her MSc (1955) and her PhD at the Hebrew University of Jerusalem (1960) prior to joining the Weizmann Institute in 1960. She is the incumbent of the Paul Ehrlich Chair in Immunochemistry and has held a number of senior posts at the Institute, including Head of the Department of Chemical Immunology (1973–74 and 1975–78), Dean of Biology (1985–88), and Vice President (1988–97). From 1985 to 1994 she was the Director of the Institute's MacArthur Center for Molecular Biology of Tropical Diseases.

Professor Arnon has made significant contributions to the fields of vaccine development and cancer research, and to the study of parasitic diseases. She co-developed Copaxone®, a multiple sclerosis (MS) drug currently marketed worldwide. She continues to focus on understanding the mechanism by which Copaxone exerts its beneficial effect. She is also developing a synthetic vaccine to provide broad–range immunity against infection with influenza viruses.

Between 2010–2015, Professor Arnon served as President of The Israel Academy of Sciences and Humanities. She is an elected member of the European Molecular Biology Organization (EMBO) and of the American Philosophical Society. She has also served as President of the European Federation of Immunological Societies (EFIS), Secretary-General of the International Union of Immunological Societies (IUIS) and President of the Association of Academies of Sciences in Asia (AASA), and she was a member of the European Union Research Advisory Board (EURAB).

Professor Arnon's awards and honors include the Robert Koch Prize in Medical Sciences (1979, Germany), the Jimenez Diaz Memorial Award (1986, Spain), the Legion of Honor (1994, France), the Hadassah World Organization's Women of Distinction Award (1997), the Wolf Prize (1998), the Rothschild Prize (1998), the Israel Prize (2001), the Aesku Prize for Life Contribution to Autoimmunity (2008), the "Yakir Tel-Hai" award of Tel-Hai Academic College (2008), and the Dr. Tovi Comet-Walerstein C.A.I.R Institute Science Award of Bar-Ilan University (2015). She holds honorary doctorates from several universities in Israel and Europe, including Ben-Gurion University of the Negev (2007), Tel Aviv University (2011), the Open University of Israel (2014), and Leuphana University in Germany (2014).

Over the years, Professor Arnon has been active nationally and internationally in efforts to advance women scientists, by participating in conferences, such as the Fulbright Foundation conference on *Women in Science*: *The Challenge of Progress in Academia* at the Open University of Israel in December 2012, and the *Women and the World Conference on Women in Science* in Tokyo in 2015, and by sitting on committees, and she chaired the Arnon Committee to Further Women in Israel's Institutions of Higher Education for the Council for Higher Education and its Planning and Budgeting Committee. One of her committee's recommendations was to seek additional funding to assist women in traveling abroad for postdoctoral training – an essential stage in advancing their scientific careers.

Addressing this issue, Professor Arnon most generously presented the Academy with a personal gift to establish a fund to encourage alumnae of the Adams Fellowships Program to travel abroad for postdoctoral training upon completion of their doctorates. Each year, one Adams alumna is awarded a fellowship in the amount of $20,000, to supplement her postdoctoral fellowship. The recipient is selected by the Adams Fellowships Committee solely on the basis of excellence in research. Upon the inauguration of her fellowship, she decided to provide a second fellowship for that year to enable one alumna from a previous year to benefit.

Professor Arnon and her husband, Uriel, have two children and six grandchildren.

Photographs of Prof. Arnon courtesy of the Weizmann Institute of Science

Avia Raviv Moshe

Avia Raviv-Moshe was born in Lod and moved at a young age to Rosh Ha'ayin. Drawn to physics as a child, she attended the Aleh High School of Exact Sciences in Lod, concentrating in physics, chemistry and math. After a voluntary stint in the civil service, tutoring at-risk children from dysfunctional families, she began studying physics at Tel Aviv University.

Upon finishing her BSc in physics, *magna cum laude*, Avia went on to earn an MSc, *summa cum laude*, in theoretical high-energy particle physics. Her thesis, under the supervision of Prof. Yaron Oz, focused on non-relativistic, supersymmetric models.

Avia is currently a PhD student at Tel Aviv University in the field of theoretical high-energy particle physics. Her PhD dissertation, *Aspects of Scaling in Supersymmetric Quantum Field Theories*, under the supervision of Prof. Yaron Oz, focuses on non-relativistic quantum field theories and the applications of Lifshitz scaling symmetry to quantum field theory, to the study of quantum anomalies and to supersymmetry. The topics of her work range from abstract gravitational concepts through analytic calculations in gravity and quantum field theory. During her PhD studies, Avia was awarded the Judah Eisenberg Award for outstanding academic achievements and the prestigious Adams Fellowship of the Israel Academy of Sciences and Humanities. She has published several papers and presented her research at a number of national and international scientific conferences and workshops.

Since she began her studies at Tel Aviv University, Avia has been involved in a variety of teaching activities. As an undergraduate, she taught mathematics at her local junior high school in Rosh-Ha'ayin and as a teaching assistant at Tel Aviv University. Alongside her PhD studies, Avia served as head instructor of the laboratory course in physics at Tel Aviv University, managing a course for hundreds of first-year BA students in physics, chemistry and engineering, with a team of dozens of instructors. In this role, Avia initiated new programs, such as the Advanced Lab excellence program in experimental physics for students in their second semester of physics studies. She received a Certificate of Honor from the school of physics in Tel Aviv University in recognition of her contribution to the course. Avia's involvement in promoting women's participation in STEM activities and programs for science-oriented youth from Israel's periphery has included lectures and workshops for high-school students, arranged by the Dov Lautman unit for science-oriented youth and Tel Aviv University – activities she hopes to continue in the future.

In Fall 2020, Avia plans to join the Simons Center for Geometry and Physics (SCGP) at Stony Brook University, New York, as a postdoctoral researcher. Avia is married and the mother of a 4-year-old daughter, Danielle.

Bracha Laufer-Goldshtein

Bracha Laufer-Goldshtein's longstanding fascination with science, technology, mathematics and physics drew her to the multidisciplinary field of electrical engineering. She won the Rector's and Dean's prizes for outstanding undergraduate students at Bar-Ilan University for every year of her BSc studies, graduating *summa cum laude* and first in her class.

Bracha continued her studies in the combined MSc-PhD track at Bar-Ilan University. Under the joint supervision of Prof. Sharon Gannot of Bar-Ilan University and Prof. Ronen Talmon of the Technion – Israel Institute of Technology, she is investigating novel approaches to acoustic signal analysis and processing using geometric learning. In particular, she is developing methods for source separation and localization based on multiple microphone recordings, in adverse challenging noise and reverberation conditions. The methods are based on geometric learning over manifolds and simplexes, which extract low-dimensional mappings of complex acoustic responses, leading to compact and simplified representations. Bracha has received several prizes and awards for her research achievements, including the Adams Fellowship of the Israel Academy of Sciences and Humanities, the Wolf Foundation prize, the Israel Ministry of Science and Technology award for women in science and the Bar-Ilan Rector's prize.

Bracha's work emphasizes both theoretical depth and practical relevance, envisioning applications in human–automobile communication, hearing aids, and smart homes for the elderly. The results of her research have been published in six papers in leading journals in signal processing and in ten international conference papers, based on her conference talks. Her work was chosen for presentation in a three-hour tutorial talk at the European Signal Processing Conference 2019, and the same findings will soon appear in a survey monograph in *Foundations and Trends in Signal Processing*.

Alongside her research work, Bracha has served as a teaching assistant in several undergraduate courses and as the lecturer in one of the core courses for second-year undergraduate students at Bar-Ilan. She enjoys teaching and has received high scores in teaching assessment surveys.

Upon the completion of her PhD, Bracha looks forward to starting her postdoctoral training, in which she intends to address challenging new problems in complex high-dimensional data analysis by combining novel geometrical and statistical models. The methods developed thereby will be leveraged in various applications, such as medical diagnosis, disaster prediction and control, and autonomous systems.

Ayelet Arazi

Ayelet was born and raised in Ma'alot, a small town in northern Israel. She studied at the Tefen Democratic School, where she concentrated on mathematics, biology and psychology. During her high school years, Ayelet volunteered in Magen David Adom and at a center caring for individuals with special needs. After graduating high school, she volunteered for a year in Safed, working with youths from a low socio-economic background. She served in the army for two and a half years in the Air Force Traffic Control Unit.

In 2009, Ayelet began her BSc in Biomedical Engineering at Ben-Gurion University of the Negev. In her final year, Ayelet began working as a research assistant in the laboratory of Prof. Ilan Dinstein, in the Psychology Department. During that year, Ayelet developed advanced algorithms for analyzing EEG activity recorded from individuals with autism, in an attempt to uncover the unique sensory processing that characterizes such individuals. Working in a research lab specializing in neuroimaging and computational neuroscience motivated Ayelet to pursue graduate studies in the Department of Brain & Cognitive Sciences at Ben-Gurion University. She completed her master's degree *summa cum laude* and continued to a PhD in the same department, all under Prof. Dinstein's supervision.

Ayelet's research focuses on the reliability of neural responses. Using neuroimaging techniques such as EEG and fMRI, Ayelet has shown that the neural activity of the human brain varies dramatically across trials and over time, even when the same sensory stimuli are presented repeatedly. This brain variability is tightly related to cognitive function and behavior and is found to be greater in humans with neurodevelopmental disorders such as ADHD and autism. Ayelet found that neural variability is a stable human trait that constrains individual perceptual abilities and cognitive performances, though it can be slightly altered by means of flexible cognitive mechanisms such as allocating attention.

Alongside her principal research, Ayelet has conducted two projects at the National Center for Autism Research at Ben-Gurion University. In the first, she examined sleep disturbances in children with autism and uncovered an impaired sleep mechanism that may underlie the high prevalence of sleep disorders in this population. In the second, she is analyzing brain MRI scans of toddlers with autism in an effort to identify early brain abnormalities.

In the fall of 2020, Ayelet will begin her postdoctoral training in the laboratory of Prof. Tobias Donner at the University Medical Center Hamburg-Eppendorf in Hamburg, Germany.

Dr. Sharon Fleischer

Nowadays, the only cure for patients who survive end-stage heart failure is a heart transplant. As cardiac donors are scarce, there is an urgent need to develop new strategies to repair the diseased heart. One of the most promising is cardiac tissue engineering, in which cells are seeded within biomaterials to promote the assembly of functional cardiac patches. A critical challenge to developing such tissues for clinical use is that the biomaterials widely used today do not recapitulate the cardiac microenvironment. *In-vivo*, cells reside within a complex microenvironment that provides them with cues to guide their organization into functional tissues.

In her PhD, one of Sharon's aims was to recapitulate this process *in-vitro*. She developed novel biomaterials and fabrication techniques to synthetically mimic different aspects of the cardiac microenvironment, demonstrating these materials' ability to promote the assembly of individual cardiac cells into functional heart tissues, able spontaneously to generate pump function. Furthermore, she developed an entirely new platform for the assembly of 3D cardiac tissues, enabling the generation of mm-thick cardiac tissues that could be used for transplantation in humans. These were incorporated with a rationally designed built-in vascular network and a controlled-release system of drugs to improve their integration into the heart muscle after transplantation. Sharon's findings helped advance the field of cardiac tissue engineering toward clinical translation, and they could also be utilized to advance other engineered tissues, such as liver, lung, and spinal cord tissues.

Sharon is doing her postdoctoral research at Columbia University in the lab of Prof. Gordana Vunjak-Novakovic. The financial support provided by the Ruth Arnon Fellowship will help her pursue her dream of becoming an independent researcher and returning in a few years to one of the leading institutes in Israel.

Dr. Sophia Buhbut-Sinai

Sophia completed her PhD in Chemistry at the end of 2014 under the guidance Prof. Arie Zaban at Bar-Ilan University. The first part of her doctoral research was to build a new design of DSSC, which combines the benefits of QDs, in terms of their broad absorption spectrum, with the evolved charge transfer mechanism of DSSC. In this design, QDs serve as "antennas," funneling absorbed energy to nearby dye molecules via Förster resonance energy transfer (FRET). The use of this novel design enabled her to overcome the low light absorption of the dye monolayer in DSSCs and opened new opportunities for the expansion of the spectral window in QDSSCs.

The second part was to increase the efficiency of QDSSCs. She proposed a unique strategy for smart photon management which opened a new path for the fabrication of highly efficient QDSSCs. Sophia demonstrated that by using the PID concept it is possible to increase the open circuit voltage of a solar cell by more than 100mV.

Following post-doctoral research in organic chemistry at the Weizmann Institute, Sophia, with the assistance of her Ruth Arnon Fellowship, joined the Orenstein Lab of the Debye Institute for Nanomaterials Science at the University of Utrecht, The Netherlands.

Dr. Rivka Bekenstein

In 2016, Rivka Bekenstein completed her PhD in Physics under the guidance of Prof. Mordechai Segev at the Technion. Although Rivka's dissertation is in fundamental physics, applicative ideas arose as the research advanced, suggesting that the tools and techniques of creating curved space for light can contribute to novel nanophotonic applications.

Rivka presented a new class of nanophotonic structures with intricate design in three dimensions, enabling control over light dynamics, through the curvature of the medium in which the light is propagating, based on General Relativity (GR) principles. Moreover, she presented wavefront shaping by a miniature dielectric slab sample with predesigned refractive index that varies according to the curvature of space. She used this technique to construct non-diffracting beams, suggesting that GR can inspire any wavefront shaping in highly tight waveguide settings. Finally, using the same miniature device, the phenomenon of Einstein Rings, dating back to 1936, was emulated.

With her Ruth Arnon Fellowship, Rivka moved with her husband and two daughters to the US, where she joined Prof. Mikhail Lukin's lab at Harvard University. The fellowship has enabled her to conduct her research at Harvard while her daughters attend private Jewish childcares and schools.

Studio Schneider

www.academy.ac.il