

"Qwaterly" drop: In this, the 3rd issue of "Qwaterly", we summarize the collaborations that have developed and the events that have occurred since our last communication. We provide some insight into the worldwide problem of microplastics, and we meet a scholar from the Moshe Mirilashvili Institute. In addition, Prof. Hadas Mamane summarizes her 6-month sabbatical in India, where she studied the acute water-contamination problems in that country, and promoted academic collaborations. ENJOY!

Sincerely, Qwaterly

Sabbatical at the Indian Institute of Technology (IIT) Madras (May–Nov 2018)
Prof. Hadas Mamane

My sabbatical at IIT Madras, in Chennai, was a magnificent experience. I traveled to India not only for the science but also because of a deep spiritual connection to Bharat. During my sabbatical, I developed a great fondness for the south Indian culture, the warmth of its people, its language and traditions, and the deep respect for nature that lies at this culture's core. However, contradictory and intricate feelings were also ignited, including deep distress, pain, frustration and anger, by the massive environmental damage and degradation of nature—which ultimately degrades the soul, with massive industrial and population growth inciting further damage. In many places in India, nature is in its truest and most beautiful form, but in others, it is abused. The raised contrasting feelings resulted in many emotional ups and downs, thrills and disappointments. During my time in India, I learned to reconnect to my spiritual self and I found ways to combine science and emotions. I met scientists such as myself, from the exact sciences and engineering, who were also involved in ancient languages and spirituality, and I was finally free to express myself without fear of being judged, especially for my intuitive scientific ideas; this was revealing, releasing and transforming. I realized during my time in India that I want to contribute more to society through my knowledge and expertise. I saw areas where wastewater was being dumped untreated, where wastewater was not being reused, where solid waste was being dumped onto bare soil, which soaked up the toxic compounds that then infiltrated into the groundwater; I witnessed overuse of resources and increases in water salinity. I wanted to see the source of the environmental damage—touch, smell and feel the contamination.

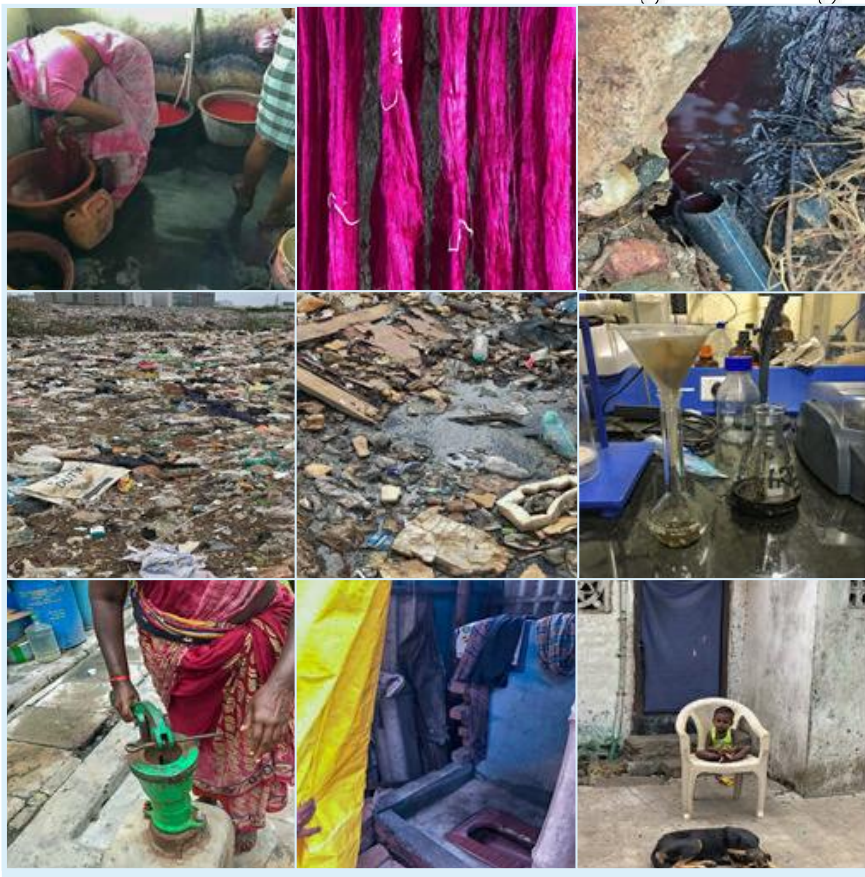


Figure 1. A project in India on the treatment of textile effluent from a silk saree dyeing and weaving unit from which wastewater is directly discharged to the environment as is, and requires a collection and treatment system. The used dye solution flows into the drainage effluent and ultimately into the river or soil (top images). Another collaborative project in India on treating open dump leachate (solid waste accumulated in liquids) for the identification of hidden plastics and treatment in the laboratory (middle images). Water systems from tankers and groundwater pumps, and the sanitary system in the slums of Chennai (bottom images)

I listened to others' ideas and beliefs to understand why this environmental damage is being imposed on magical India, which had once been in complete harmony with nature, and now felt disconnected. My visit to India further clarified my understanding of the moral, spiritual and physical connections that we, as humans, must have with nature. Nature has a limited capacity for absorption and therefore, degradation of the environment will result in

catastrophe if left untreated; we may still be able to do something, we may not yet be at the tipping point. I am very afraid of the consequences of doing nothing, a fear that has penetrated my soul in the face of reality.

There is no doubt in my mind that my time in India has changed me forever and that I will go back, as my connection to that country has deepened but is still largely unexplored.

At IIT Madras, I was warmly hosted by Prof. Mohan, who invested time and effort in making me feel at home. I was exposed to numerous local practices and visited hazardous waste-disposal sites, open dumps, ponds, wetlands, slums and others. I was involved in projects related to the treatment of dissolved plastics in leachate using advanced oxidation and biochar, the treatment of silk saree-

Figure 2. From top left clockwise: Prof. Govindaradjane; Prof. MS Swaminathan; myself on a wedding celebration; with Prof. Avisar and Prof. Mohan on a "teacher day".

production wastewater that is discharged to the soil and the river, the development of unique multifunctional materials for the environment, including reactor design and interactions with the industry. I participated in numerous workshops and lectures. I met inspiring people, such as Prof. M.S. Swaminathan, the architect of India's green revolution. My dream is to find a way to continue this relationship and implement research outcomes from pilot studies on cottage industries as well as from large projects, such as cleaning the Ganga, and disseminating practices related to industrial and domestic wastewater reuse, renewable energy and water disinfection to combat global challenges. I believe change can happen if we stop being apathetic.



Workshop:

September 2018 – One-day seminar on the topic of “Advanced Industrial Wastewater Treatment” at IIT Madras, India. As part of the Water Research Center's cooperation with Prof. Mohan from IIT Madras, Prof. Avisar received an invitation to give a keynote lecture.

Projects and collaborations:

Collaboration with India – A memorandum of understanding on scientific cooperation between Punjab Agricultural University and Tel Aviv University was signed at the Embassy of India in honor of a visit from the Chief Minister of Punjab, Capt. Amarinder Singh, to Israel.

Stockholm Junior Water Prize in Israel (SIWI Israel) – As part of the Water Research Center at Tel Aviv University (WRC-TAU) mission to create a knowledge center for various water issues, we are collaborating with SIWI Israel. Under this collaboration, we are teaching excellent and curious young students who are willing to deeply study a topic in water and wastewater contamination and treatment for semifinalist projects. Also, starting this year (2019), the WRC-TAU will award a special prize for the best full-scale project on water and wastewater treatment.

Focus on microplastics in drinking water:

A new long-term project for the Hydrochemistry group involves estimating the amount of microplastic particles (~30–1000 μm) in water, and their effect on bacteria and toxic metal accumulation. The first stage of the study will focus on the detection and quantification of microplastic particles using several techniques, for example dyeing the hydrophobic plastic particles in the water and analyzing them by fluorescence microscopy.

Conferences:

November 2018 – The first international conference on Innovations in Conflict Resolution and Mediation (ICRM). The conference includes two sessions on Water Management and Transboundary Cooperation in Conflict Settings, organized by WRC-TAU.

Coming events:

January 2019 – Isranalytica 2019 international conference – The 22nd Annual Meeting of the Israel Analytical Chemistry Society
January 2019 – WRC-TAU annual group meeting

The Moshe Mirilashvili Institute:

The institute supports international collaborations and outstanding scientists:

Offir Inbar is a M.Sc. student in the department of Geophysics under the guidance of Prof. Avisar. His research focuses on the implications of air pollution on the chemical and biological qualities of drinking water produced from air moisture.

