



Wolfson Department of Chemical Engineering Seminar
Wolfson Department of Chemical Engineering,
Wednesday, June 17st, 2020 at 13:30

Eli Rubin Memorial Lecture

Online seminar via Zoom

<https://technion.zoom.us/j/92569978744>

**Formation-structure-performance of polymeric membranes:
Modeling and direct observation using microfluidic platforms**

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Membrane functionality – selectivity and permeability – is intimately linked with the structure and morphology of the membrane material(s), spanning truly molecular scales through the nano-scale and up to features the size of many microns. These structures are, in turn, a direct outcome of the processes employed for the fabrication of the membrane; notable examples are phase separation and interfacial polymerization (IP).

Recent modeling efforts have been made at linking composite membrane structure, particularly the porous morphology of the thin-film and underlying support, to membrane performance, using simplified models that attempt to capture the essential features of the problem. Efforts have also been extended to understanding the mechanisms underlying the formation of the thin film, for which we employ microfluidic platforms and in-situ microscopic imaging. In particular, we have recently measured the temperature generated in the vicinity of the reaction zone during IP.

These efforts are part of a more holistic vision that aims at providing design guidelines in an attempt to reduce the parameter space that must then be tested empirically during actual membrane fabrication. Furthermore, experimental setups, based on microfluidic platforms, are being developed as a complimentary path, whose aim is two-fold: (a) provide a means for direct and rapid observation of membrane structures and a rapid-prototyping environment, and (b) allow in-situ measurements and characterization of membrane properties.