BIOENGINEERING, BIOMEDICAL AND MATERIALS FRONTIERS

Sheereen Majd

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Publications

1. Kang Y-J, Wostein H. S., and Majd S., "A Simple and Versatile Method for the Formation of Arrays of Giant Vesicles with Controlled Size and Composition", Advanced Materials, 2013, 25, 6834-6838. (cover article)*

2. Mirab F., Wang Y., Farhadi H., and Majd S., "Preparation of Gel-Liposome Nanoparticles for Drug Delivery Applications", Engineering in Medicine and Biology Society (EMBC), 2019 41st Annual International Conference of the IEEE, 3935-3938.*

3. Yushutin V., Quaini A., Majd S., Olshanskii M., "A Computational Study of Lateral Phase Separation in Biological Membranes", International Journal for Numerical Methods in Biomedical Engineering, 2019, 35(3): e3181.

4. Park S., Yang G., Maduri N., Abidian M.R., and Majd S.,"Hydrogel-Mediated Direct Patterning of Conducting Polymer Films with Multiple Surface Chemistries", Advanced Materials, 2014, 26, 2782–2787. (cover article).*

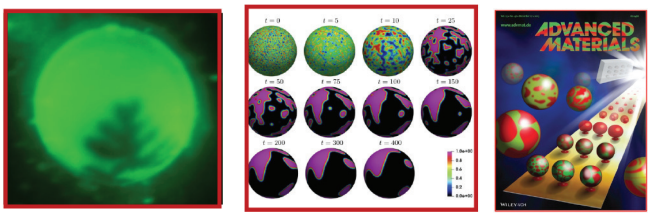
5. Park S., Abidian M.R., and Majd S., "Micro-Patterned Films of Bio-functionalized Conducting Polymers for Cellular Engineering", Engineering in Medicine and Biology Society (EMBC), 2017 39th Annual International Conference of the IEEE, 1595-1598.*

6. US Patent No. 1017995; "Hydrogel-Mediated Electrodeposition of Conducting Polymers"

Dr. Majd's research expertise is in the areas of membrane biophysics, biomaterials, and micro/nano-technology for biosensing, drug delivery, and tissue engineering. She is the recipient of the Charles Kaufman Foundation Young Investigator Grant and National Science Foundation CAREER Award. The two particularly exciting areas of research in Dr. Majd's lab are: 1) combining the advances in materials science and membrane biophysics to create smart and robust liposomal delivery vehicles, and 2) selective printing of conducting polymers for applications in sensing and tissue engineering.

MEMBRANE-MIMICKING BIONANOMATERIALS

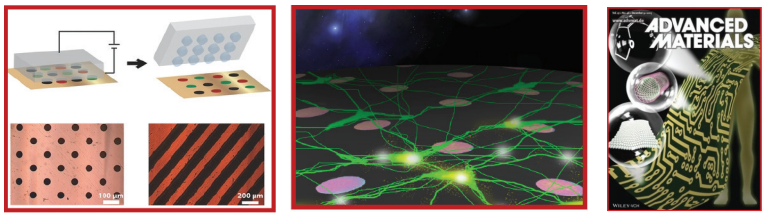
Liposomes are one of the most promising delivery platforms developed to date. However, these nanomaterials have limited clinical success due to their lack of stability. Dr. Majd has used versatile and tunable polymeric materials to make stable liposomal vehicles. Additionally, her group has applied biophysical principles used by biological membranes to develop smart membrane-mimicking nanomaterials for efficient and selective delivery. Currently, Dr. Majd and her collaborators from the University of Houston are developing liposomal vehicles for intracellular delivery of macromolecules.



Membrane mimicking biomaterials: *Studying liposomal membranes and their biophysical properties (e.g. phase separation) through experimentation and modeling towards development of new drug delivery carriers*

SELECTIVE PRINTING OF CONDUCTING POLYMERS

Conducting polymers (CP) offer tunable chemical and physical properties (e.g. volume, color) and thus, have applications in a number of fields ranging from bioelectronics and robotics to neural interfaces and drug delivery. Dr. Majd and her group have developed a simple, novel, and versatile technique for selective electropolymerization of CP films with multiple surface chemistries and incorporated biomolecules. Currently, Dr. Majd and her collaborators from the Cullen College of Engineering are applying this technique to create platforms that promote cellular regrowth.



Gel-mediated electrodeposition: *Creating patterned films of conducting polymers for cell and tissue engineering*

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