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NEWS AND VIEWS

Awards and Recognitions

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Professor Nicholas A. Peppas, Sc.D. (The University of Texas at Austin), has been elected to the American Academy of Arts and Sciences. Since 1780, the American Academy of Arts and Sciences has been serving as one of the country's oldest learned societies to address to the challenges in the nation and the world.

Professor Antonios Mikos, Ph.D. (Rice University), was selected as the recipient of the 2017 James E. Bailey Award in Biological Engineering from the American Institute of Chemical Engineers (AlChE). This award honors "an individual who embodies the spirit of James Bailey, one that is a pioneer, a mentor, an innovator, and integrator of biology and engineering, a teacher, and whose achievements have provided a major impact of the field of biological engineering." Prof. Mikos has made significant contributions in the fields of biomaterials, tissue engineering, gene therapy, and drug delivery for tissue regeneration. Prof. Mikos will receive this award and present the James E. Bailey Award Lecture at the annual meeting of the AlChE in October, in Minneapolis.

Professor Ali Khademhosseini, Ph.D. (Harvard Medical School), has been honored with the 2017 IEEE EMBS AWARD in the field of biomedical technology. Since 1960, the William J. Morlock Award was established by the family of William J. Morlock to give recognition to a qualified person that contributed in an important application of electronics techniques culminating in the solution of biomedical problems. Professor Khademhosseini has focused on developing micro- and nanoscale biomaterials to regulate cellular behavior for tissue engineering. He has also contributed in the development of organ-on-a-chip systems that mimic human responses to new drugs and therapeutic materials in vitro.

The National Academy of Sciences (NAS) elected 84 new members with US citizenship and 21 foreign associates to recognize their achievements in original research. NAS is a non-profit society providing independent advice related to science and technology to the nation. The list includes Professor Sangeeta N. Bhatia of the Massachusetts Institute of Technology.

The Association of Women in Science (AWIS) declared Susan Windham-Bannister as President-Elect and four new councilors. AWIS is a global leading organization that supports on behalf of women in the fields of Science, Technology, Engineering, and Mathematics (STEM) and has helped biotech, pharmaceutical, and many other organizations to make decisions with equity and parity and achieve gender diversity. Susan Windham-Bannister is currently serving as the president of Biomedical Growth Strategies, LLC. She was previously selected as one of the "10 Most Influential Women in Biotech" in 2013 by The Boston Globe. The four new councilors are Professor Sangeeta N. Bhatia, M.D., Ph.D. (Howard Hughes Medical Institute Investigator and the John J. and Dorothy Wilson Professor at MIT's Institute for Medical Engineering and Science); Professor Jennifer Elisseeff, Ph.D. (Morton Goldberg Professor and Director of the Translational Tissue Engineering Center at Johns Hopkins); Sara Kenkare-Mitra, Ph.D. (senior vice president of Developmental Sciences at Genetech); and Wendy Mayer, M.B.A. (vice president Strategy, Pfizer Innovative Health). The new members will concentrate on establishing a positive system to accelerate innovation and entrepreneurship for women who work in STEM.

Recent Advances in the Field

The US Food and Drug Administration (FDA) has started evaluating livers-on-a-chip for modeling human reactions to dietary supplements and food-borne illnesses. Organs-on-a-chip are made of 3D microfluidic devices with multi-channels lined with human cells to simulate the natural microstructure of living organs. These microchips can provide similar data with human metabolism by mimicking the structure and function of human organs and thus are expected to replace animal tests for safety and efficacy. Livers-on-a-chip are made by a biotechnology company Emulate in Boston, MA, which was founded by researchers at the Wyss Institute for Biologically Inspired Engineering at Harvard University.

A team of researchers from the Harvard John A. Paulson School of Engineering and Applied Sciences (SEAS) and the Wyss Institute for Biologically Inspired Engineering has developed a "tough adhesive" that can strongly bind to wet and dynamic surfaces of tissues. This adhesive consists of two layers, an adhesive surface and a stress dissipative matrix, inducing higher adhesion energies in a synergistic manner. The adhesive surface can attach to the substrate by covalent bones, electrostatic interactions, and physical interpenetration. The matrix can dissipate energy through hysteresis. These biocompatible and super-strong adhesives are expected to be useful for wound dressing and tissue repair. This research was published in *Science*.

A team of engineers from the University of Toronto has developed an injectable "shape memory" bandage that could fix a damaged heart in a minimally invasive manner. This bandage-shaped elastic scaffold is made of a biocompatible and biodegradable polymer (poly(octamethylene maleate (anhydride) citrate)), which can be injected through a small needle and then unfold itself once inside a patient without affecting viability and function of cardiomyocytes. This shape memory function is due to the microfabricated lattice design. Over time, this patch degrades and leaves the regenerated tissue behind. During in vivo test, the post-heart damaged rats could pump more blood when this patch was applied. The team is expecting to apply this flexible shape memory scaffold for organ repair by injection. This research was published in *Nature Materials*.

Government and Public Policy

In the full 2018 budget request of President Trump, the National Institutes of Health's (NIH's) budget would be decreased to $26.9 billion, which is 22% less than NIH's budget in 2017. A White House budget document said that 30% of NIH's total grant funding is assigned to indirect research costs which are paid to universities. These so-called variable indirect costs would be replaced with 10% of total research costs.

The International Space Station (ISS) started a project on defining the effect of spaceflight on stem cell biology, proliferation, and maintenance to get new insights into cardiac tissue function and repair compared to ground control groups. The results of the study would help to determine the effect of microgravity on cardiac stem cell function which may lead to developing novel stem cell therapies for heart diseases.