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ELECTRICAL & COMPUTER ENGINEERING
TEXAS A&M UNIVERSITY

S E M I N A R

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Engineering the ABIO-BIO Interface for Bioelectronics and Bionics

by

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Abstract: The interface formed between solid stare electronic devices and biological tissues must be judiciously engineered to support what is destined to be a new era in implantable devices. Soft and flexible electronics based on biopolymers and synthetic–hybrid biopolymers containing one-dimensional organic semiconductors such as polythiophene, polyaniline and polypyrrole are being developed to enable low impedance, biocompatible interfaces between solid-state devices such as biosensors and biological cells, tissues and organs. This presentation will highlight recent and ongoing work in three areas: 1) the development of microfabricated, minimally invasive, intramuscular implants to monitor key biomarkers associated with whole body hemorrhage and to guide resuscitation in the ER and ICU. 2) the 3D microfabrication and 3D printing of neuroprostheses to guide axonal regeneration over long distances, and 3) the electro-stimulation to guide innervation as well as stem-cell neuro-differentiation.

Dr. Anthony Guiseppi-Elie is a professor in the Department of Biomedical Engineering and TEES Research Professor at Texas A&M University. A former department head of biomedical engineering at TAMU and member of the EnMed Working Group, his primary research interests are in engineered bioanalytical microsystems in the service of human health and medicine and includes; bioelectronics and organic electronics, biochips and biofuel cells, nano- and micro-fabrication and bio-MEMS, and the intersection of science, technology, innovation & public policy. Tony is a Fellow of IEEE, of the Royal Society of Chemistry and of the American Institute of Medical and Biological Engineering. He holds Visiting Distinguished Professorships at Wrocław University of Science and Technology, Poland; L'Ecole des Mines d'Alès, France, and the University of Tucumán, Argentina. He is a Fulbright Specialist (2014 - 2019) and has been the Kenneth E. Avis Distinguished Visiting Professor of Pharmaceutics at the University of Tennessee Health Sciences Center, distinguished lecturer in biomedical engineering at Purdue University, and a visiting lecturer in MIT's Program in Polymers and Soft Matter (PPSM). Prof. Guiseppi holds the Sc.D. in Materials Science and Engineering from MIT, the M.Sc. in Chemical Engineering from UMIST, and the B.Sc. (First Class Honors) from the University of the West Indies. He completed his Postdoctoral Fellowship at MIT. He has published ~150 papers (5600 citations, h-index = 40) and hold 9-patents.