Tania Betancourt, Ph.D.

Associate Professor

Department of Chemistry and Biochemistry

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EDUCATIONAL BACKGROUND AND TRAINING:

Postdoctoral Fellow, Department of Chemical Engineering, The University of Texas at Austin (2008)
Ph.D. Biomedical Engineering, The University of Texas at Austin (2007)
M.S. Biomedical Engineering, The University of Texas at Austin (2005)
B.S. Chemical Engineering, Texas A&M University (2002)

BIOSKETCH:

Dr. Betancourt is an Associate Professor in the Department of Chemistry and Biochemistry and a faculty member of the Materials Science, Engineering, and Commercialization Program at Texas State University-San Marcos. Dr. Betancourt leads the research of the Biomaterials and Nanomedicine laboratory, which focuses on the development of functional polymeric nanostructures for the detection, monitoring, and treatment of cancer and other diseases.

Prior to joining Texas State University in 2011, Dr. Betancourt worked at InnoSense LLC, a technology company serving the aerospace, energy, defense, and health care market. During her three-year tenure at InnoSense, Dr. Betancourt held the positions of Research Scientist, Team Leader, and Deputy Director-R&D. At InnoSense, Dr. Betancourt was responsible for developing novel technologies in the areas of biosensors, biomaterials, therapeutics, theranostics, contrast agent, drug delivery, and specialty materials. She secured funding for support of R&D of biomedical and specialty material technologies as a Principal Investigator through small business innovation research (SBIR) grants from federal agencies, including two Phase I SBIRs from the National Institutes of Health totaling $384k, and two Phase I and one Phase II SBIR grants from NASA totaling $800k.

Dr. Betancourt has been a recipient of a grant by the Research Corporation for the Advancement of Science and co-PI in a NSF PREM grant (2012). In addition, she has been principal investigator of two Small Business Technology Transfer (STTR) grants from the NIH in partnership with CHEMTOR, LLC. Additional awards include the David and Mary Miller Fellowship (2006-2007), NSF IGERT Graduate Research Fellowship (2004-2006), Thrust 2000 Fellowship (2003-2007), Lindsay Scholarship (2001-2002), and the American Chemical Society Scholars Program scholarship (1999-2002). During her graduate studies, Dr. Betancourt was recipient of the Schlumberger Grand Award for best paper and presentation and Schlumberger Centaur Award in Nano/Microelectronics and MEMS in the Graduate and Industry Networking Conference (2006), and the Best Paper award in the Nano-Night 2005 Scientific Forum in Nanotechnology (2005). Dr. Betancourt graduated Magna Cum Laude with her B.S. in Chemical Engineering. She also participated in Omega Chi Epsilon Chemical Engineering Honor Society, Tau Beta Pi Engineering Honor Society, and Phi Theta Kappa International Honor Society.

Dr. Betancourt's work has been documented in 17 peer-reviewed publications, two review articles, two book chapters, and multiple professional presentations.

Integration of Synthetic Polymers and Biomolecules for the Development of User- or Disease-Controlled Nanomedicines

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Research in the Betancourt laboratory focuses on the development of novel polymeric biomaterials that can enable future diagnostic, imaging, and therapeutic strategies. Current projects involve the development of polymeric nanoparticles that provide a mechanism of user- or disease-controlled activation that is intended to increase selectivity for the targeted diseased tissue. In the area of nanomedicine, our group has been working on the development of conductive polymer nanoparticles that absorb light in the near infrared range and which have capabilities for photothermal conversion. These particles are being investigated as agents for localized, laser-induced photothermal ablation of cancer cells as well as for combined phototherapy and chemotherapy. Similarly, we have been working on the development of enzyme activatable near infrared fluorescent polymeric nanoparticles as highly specific contrast agents for optical imaging of cancer. These particles provide an off-to-on fluorescence switch that is triggered by the cleavage of polypeptides that are anchored on the surface of the nanoparticles by proteolytic enzymes that are overexpressed in tumor tissue. This seminar will describe the synthesis, characterization, and *in vitro* evaluation of the systems that we have developed, and provide a glance into the enormous potential of responsive polymeric biomaterials in biomedicine. In addition, case scenarios based on Dr. Betancourt's projects at InnoSense, LLC, will also be discussed to show the process of biomedical product development at a small technology company.