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REPORT

2016

STUDENT CHAPTER OF SOCIETY FOR BIOMATERIALS

From student chapter

Welcome to the 1st student-generated report of the Biomaterials Day 2016 organized by student chapter of Society For Biomaterials at North Carolina A&T State University (NCAT).

The student chapter of North Carolina A&T State University's [Society For Biomaterials](#) hosted Biomaterials Day 2016 as the Chapter's inaugural event on May 5th, from 8:30 am to 4 pm in Fort-IRC 410. Biomaterials Day at NCAT was a one-day symposium consisting of chapter inaugural ceremony, plenary address, keynote speeches and research poster presentation. Provost, Dr. Joe Whitehead from NCAT; Dean, College of Engineering, Dr. Robin Coger; Director of NSF-ERC-RMB and Distinguished University Professor, Dr. Jagannathan Sankar and Department Chair of Chemical, Biological, and Bioengineering, Dr. Stephen Knisley gave chapter inaugural-welcome remarks. Dr. William Wagner, Professor of Surgery, Bioengineering and Chemical Engineering at the University of Pittsburgh gave plenary speech. Our Keynote speakers were from UNC Chapel Hill - Dr. Jeffrey Macdonald and UNC Charlotte - Dr. Ahmed El-Ghannam. Associate Professor of Chemical, Biological, and Bioengineering, Dr. Narayan Bhattarai played a pivotal role in successfully organizing this one day symposium. Graduate and Undergraduate students from interdisciplinary majors presented their research in oral-poster format. *The objectives* of this SFB chapter is to enhance student interest in biomaterials and related disciplines, to promote advancement of biomaterials research and education and its related aspects, and to further the aims and objectives of the SFB as they relate to student research and education.



Biomaterials Day Organizing Committee Members with Keynote Speaker

Our theme for this year was:

"Innovative Processing of Biomaterials from Lab Bench to Industry and Entrepreneurship".

Sincerely,
Student Chapter Committee

Nava P Rijal (Founding President)
nprijal@aggies.ncat.edu

Dr. Narayan Bhattarai (Chapter Advisor)
nbhattar@ncat.edu

Chapter Officers:

Nava P Rijal (President)

Erika Johnson (Secretary/Treasurer)

Paul McGhee (By-Law Chair)

Volunteers:

Paulette Foster
Ashley Jackson
Dinesh Gannerlla

Udhab Adhikari (Vice-president)

Liu Lumei (Secretary/Treasurer-Elect)

Shalil Khanal (Outreach Coordinator)



Welcome Address



Dr. Joseph B. Whitehead, NCAT Provost, gave an inaugural-welcome address. His major highlights were the importance of student participation and leadership skills. He emphasized on how bioengineering program at NCAT (1st HBCU in the nation) as part of the ERC more than seven years ago was playing a pivotal role in creating a great hub such as this SFB chapter on campus for student knowledge in the biomedical field, a specialized forum which can assist members in their professional development and a global path to network with academic and industrial experts.



Dr. Robin Coger, Dean, College of Engineering, gave a welcome address. Her excited remarks were for role of young engineering students in organizing this Biomaterials Day 2016.

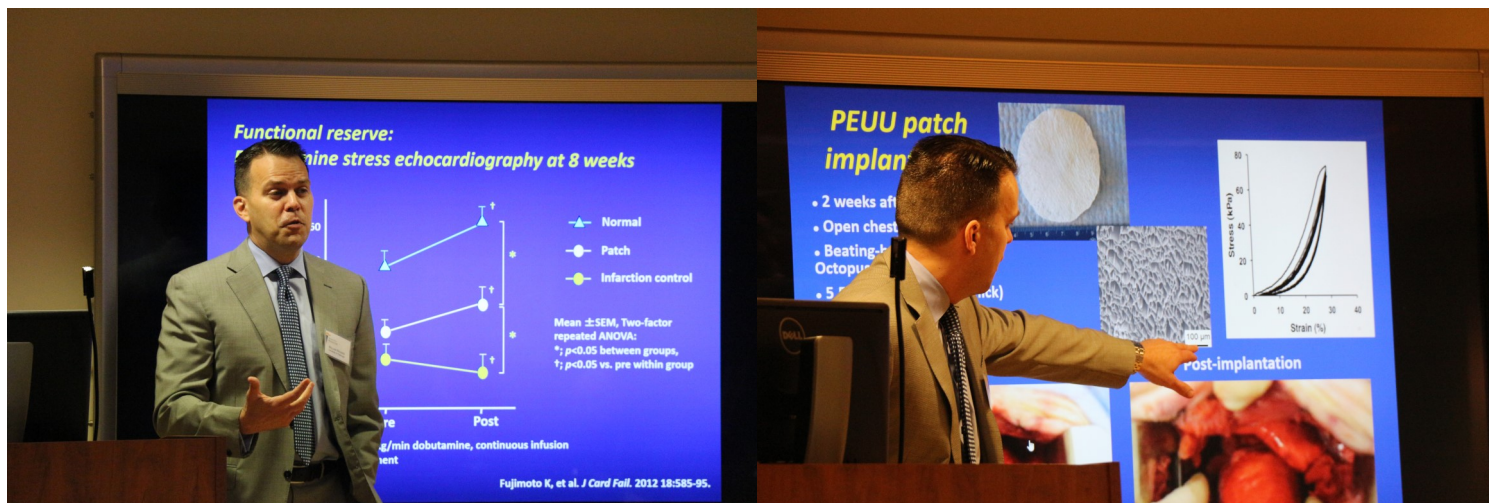


Dr. Stephen Knisley, Department Chair of Chemical, Biological, and Bioengineering gave a welcome address. He emphasized the importance of student chapter and leadership in minority school, and why we are always first in the nation.



Dr. Jagannathan Sankar, Director of NSF-ERC-RMB and Distinguished University Professor, gave a welcome address. He emphasized the importance of student chapter, leadership, and student participation to establish materials hub at NCAT. He also pointed out the great team work of student organization as well as ERC-RMB participants.

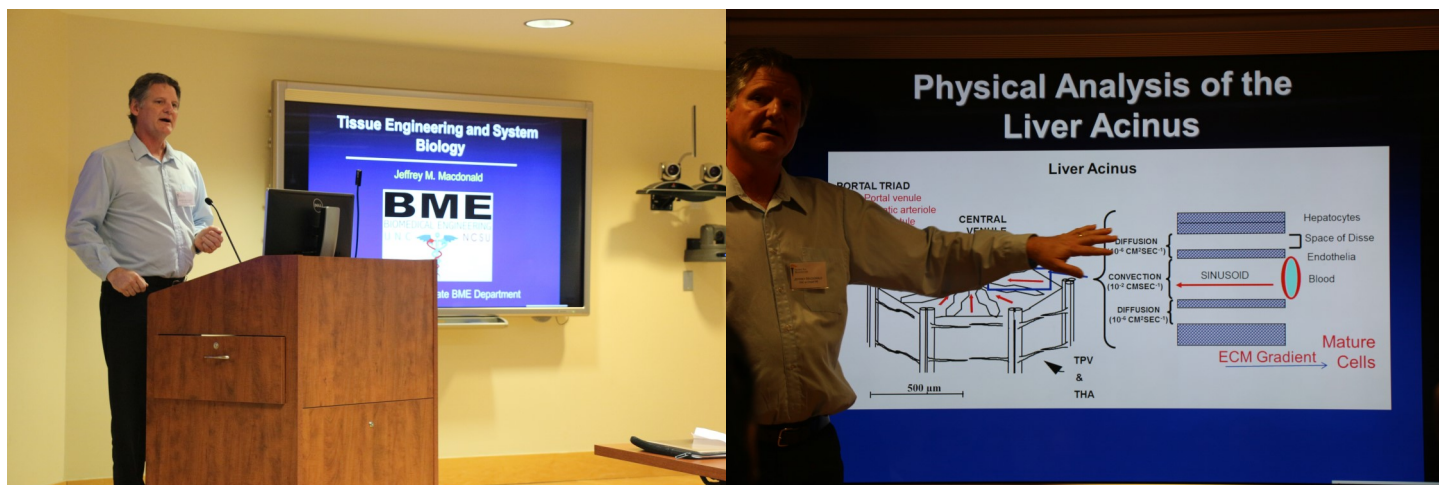
Plenary Address by Dr. William Wagner, University of Pittsburgh



Dr. William R. Wagner, the Director of the McGowan Institute for Regenerative Medicine as well as a Professor of Surgery, Bioengineering and Chemical Engineering at the University of Pittsburgh gave the plenary address on, "Biomaterials Design for Devices Addressing Cardiovascular Disease". He talked on how temporarily altering mechanical environment of cardiovascular tissue alters regeneration and remodeling. He also highlighted the effect of increased wall stress on ventricular wall thinning in his plenary speech.

He emphasized the importance of biodegradable material design with tunable properties to meet the desired needs for soft tissue protection and tissue engineering. For the material design, he mentioned the use of different natural and synthetic polymers in designing the tissue patches to maintain stress in cardiovascular wall.

Keynote Address by Dr. Jeffrey Macdonald, UNC-Chapel Hill



Dr. Jeffrey Macdonald, founder and scientific director of the UNC Metabolomic and Flux Analysis facility and Co-scientific director of the NCSU marine MRI & Spectroscopy facility, Morehead City, NC gave keynote address was on, "Tissue Engineering and System Biology". Dr. Macdonald's research goal is to combine metabolomics and tissue engineering and apply these tools to quantitative biosystem analysis. He talked basic principles of tissue engineering and provided example on how scaffolds are used in the formation of new viable tissue for medical purposes. He emphasized how system biology is interconnected with different size scales of molecules, cells, organism and whole species. He also talked about the genomics, proteomic, metabolomics, and fluxomics in connection with liver tissue engineering.

He also highlighted the advantages of using fluxomics to characterize normal differentiated functions in tissue construct. Flux is the culmination of genomics and proteomics. He mentioned that shifts in flux are normal in daily life during fasted and fed states and should be reflected in liver tissue cultures. He reflected on various parameters required in mimicking liver such as nutrients flow, ECM Cell types, autocrine, paracrine and endocrine signals and transport of oxygen.

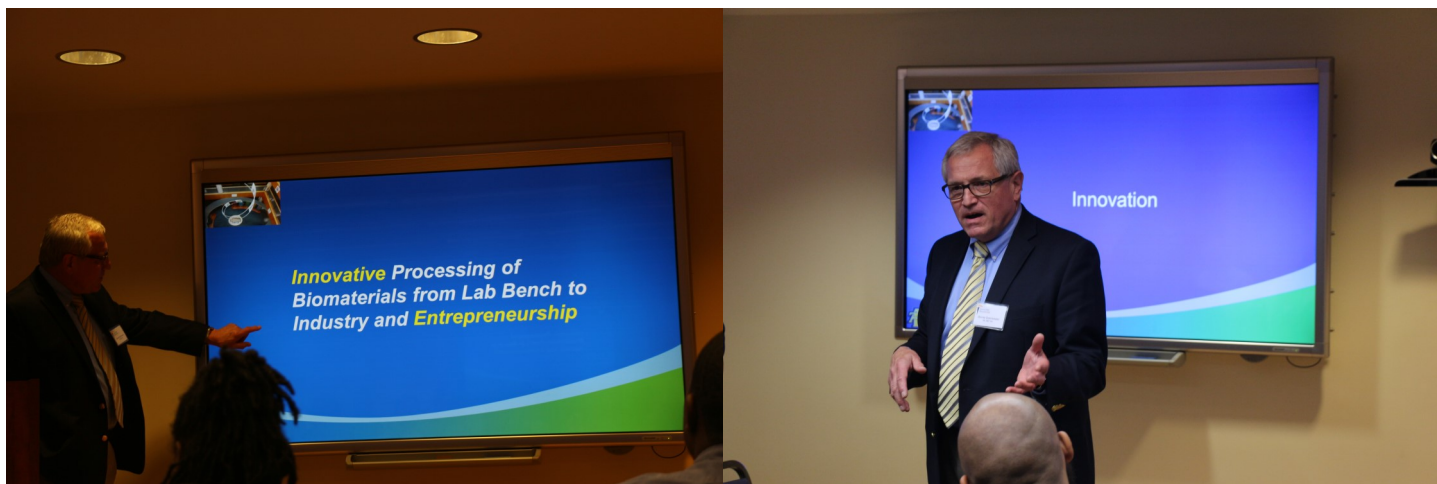
Keynote Address by Dr. Ahmed El-Ghannam , UNC-Charlotte



Dr. Ahmed El-Ghannam, President of the International Society for Ceramics in Medicine and Director of orthopedic tissue engineering and biomaterials lab at UNC Charlotte, NC gave keynote address on, "Bioceramic Drug Delivery Systems for Cancer Treatment and Regenerative Medicine". His research interests include coating of metallic implants with bioactive ceramic, development of bioactive fixation devices and preservation of stem cells in resorbable bioactive scaffolds.

He talked on the design and fabrication of bioactive scaffolds which included a family of silica-calcium phosphates composites (SCPC). He also discussed the importance of crystalline structure and lattice parameters in overall design of scaffold material. SCPC provides a successful drug delivery system for various drugs. Drug release can be programmed by engineering the phase composition and porosity of the material. The high porosity and surface area of silicon based material facilitated binding of high amount of drug per unit ceramic mass and contributed to a high rate of drug release kinetics. The interactions between the release drug and the dissolution products of the ceramic didn't affect the bioactivity of the drugs.

Keynote Address by Mr. Wayne Szafranski , NCAT

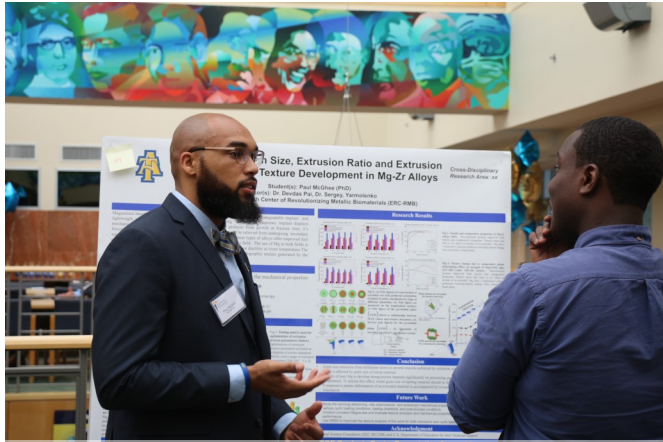


Mr. Wayne Szafranski, Assistant Vice Chancellor for Outreach and Economic Development at NCAT gave keynote address on, "Intellectual Property & Technology Transfer". Mr. Szafranski talked on innovation and entrepreneurship and they relate to biomaterials world. is responsible for N.C. A&T's intellectual property portfolio and technology transfer operations. He demonstrated how innovation may occur in everyday life and encourage everyone to think outside of the box. Innovation cannot be achieved if we limit the horizon of our thinking and vision. He also provided real example on how to solve the problem and be innovative. At NCAT, Mr. Szafranski is responsible for negotiating research relationships and contracts with commercial and federal agency partners. He represents the university in local, regional and state-wide economic development activities and on the boards of economic development or-

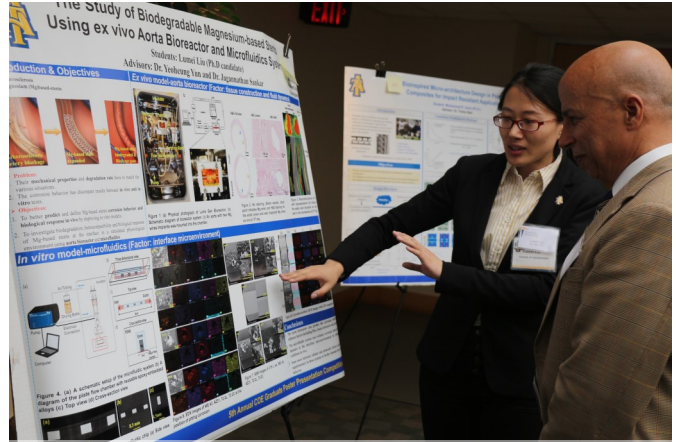


Biomaterials Day 2016 NC A&T State University

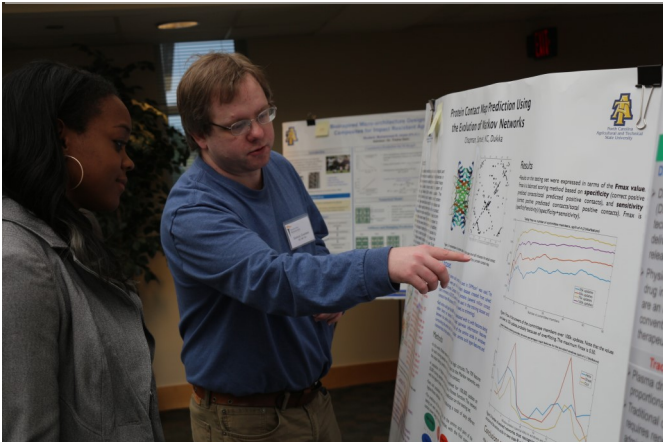
POSTER SESSION



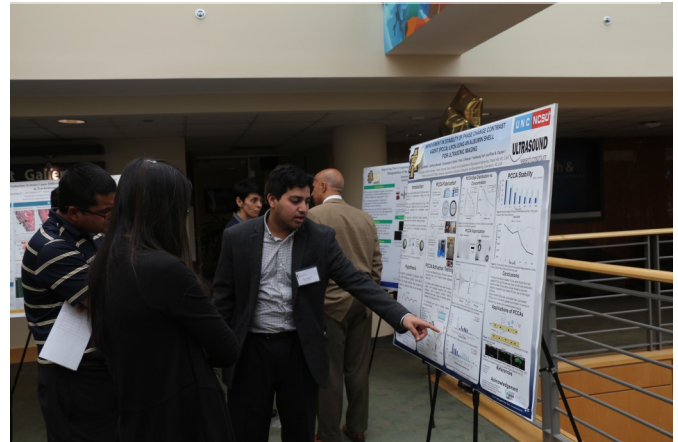
Mr. Paul McGhee, PhD student from Mechanical Engineering presenting his research work titled, "The Effect of Grain Size, Extrusion Ratio and Extrusion Temperature on Texture Development in Mg-Zr Alloys".



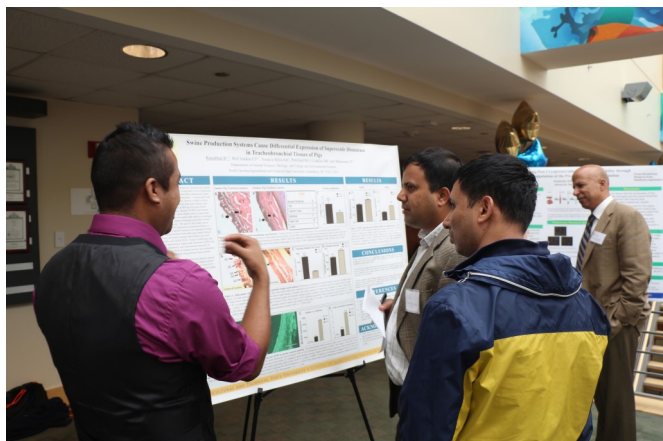
Lumei Liu, PhD student from Mechanical Engineering presenting her research work titled, "The Study of Biodegradable Magnesium-Based Stents Using *ex vivo* Aorta Bioreactor and Microfluidics Systems".



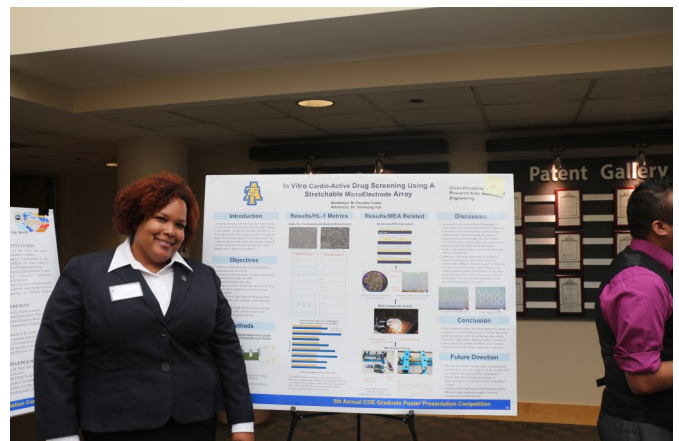
Samuel Chapman, PhD student from Computational Science and Engineering presenting his research work titled, "Protein Contact Map Prediction Using the Evolution of Markov Networks".



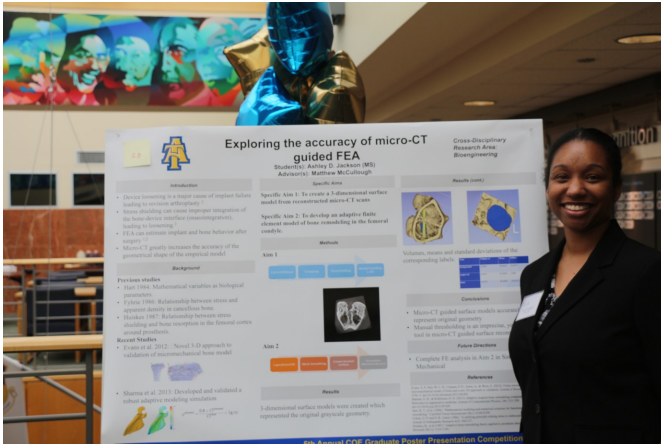
Zain Bhatti, MS student of Bioengineering presenting his research work titled, "Improvement in Stability of Phase Change Contrast Agent (PCC) Upon Using an Albumin Shell For Ultrasonic Imaging".



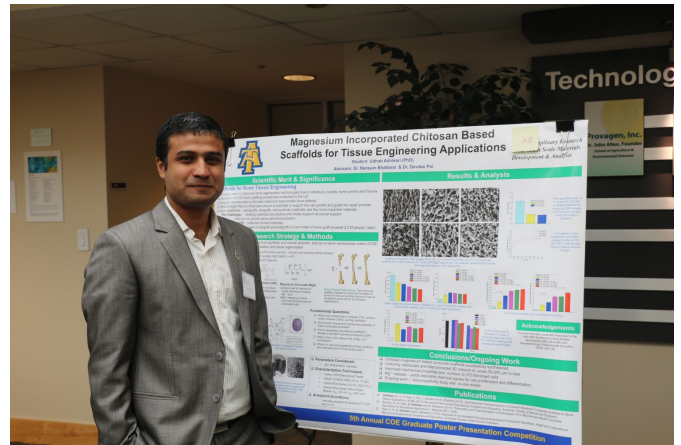
Rohit Ranabhat, PhD student from Animal Science presenting his research work titled, "Swine Production Systems Cause Differential Expression of Superoxide Dismutase in Tracheobronchial Tissues of Pigs".



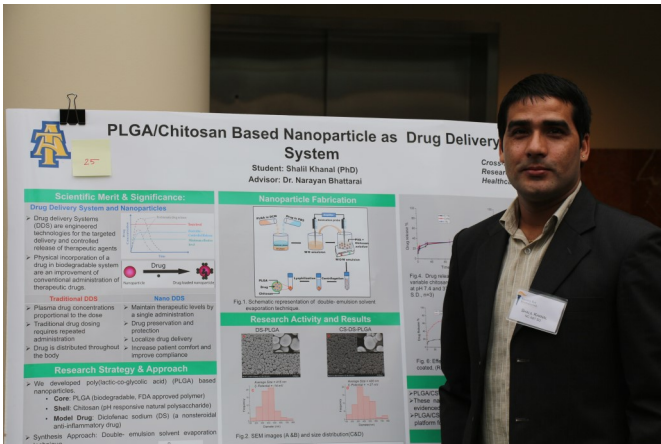
M. Paulette Foster, MS student of Bioengineering presenting her research work titled, "In Vitro Cardio-Active Drug Screening Using a Stretchable Microelectrode Array".



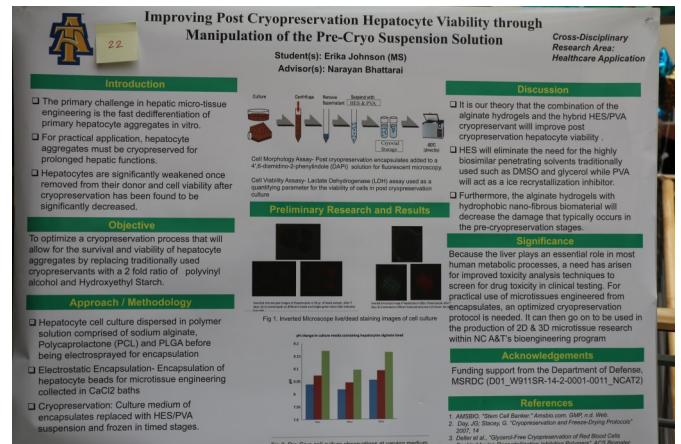
Ashley Jackson, MS student of Bioengineering presenting her research work entitled, "Exploring the Accuracy of micro-CT Guided FEA".



Udhab Adhikari, PhD candidate from Mechanical Engineering presenting his research work entitled, "Magnesium Incorporated Chitosan Based Scaffolds for Tissue Engineering Applications".



Shalil Khanal, PhD candidate from Energy and Environmental System presenting his research work titled, "PLGA/Chitosan Based Nanoparticles as Drug Delivery System".



Erika Johnson, MS student of Bioengineering presenting her research work titled, "Improving Post Cryopreservation Hepatocyte Viability through Manipulation of the Pre-Cryo Suspension Solution".



Speakers and presenter interacting during Poster Session

AWARDS & RECOGNITION



We would like to extend our sincere thanks to our judges for poster session. Our panel of judges comprised of various scientists and researchers with backgrounds in interdisciplinary fields.

Dr. Narayan Bhattarai
Associate Professor
Department of Chemical, Biological and Bioengineering
North Carolina A&T State University

Dr. Dukka KC
Graduate Coordinator
Department of Computational Science and Engineering
North Carolina A&T State University

Dr. Svitlana Fialkova
Post-Doctoral Associate
Department of Mechanical Engineering
North Carolina A&T State University

Dr. Youngmi Koo
Post-Doctoral Associate
Center for Advanced Materials and Smart Structures
North Carolina A&T State University

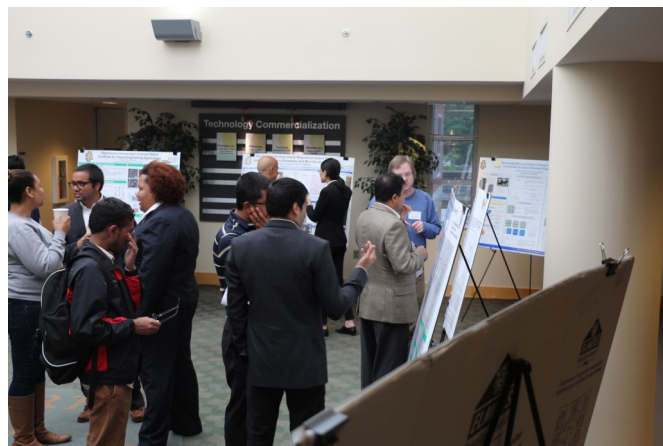
Following were the judging criteria for the poster session:

- ♦ Overall scientific/technical merit (technical quality of the work).
- ♦ Significance of the work (does the work address a problem important to its technical field and/or society; and is this persuasively communicated by the poster?).
- ♦ Quality of the research strategy (the strength of the experimental and/or theoretical design).
- ♦ Clarity of poster to a non-experts (is the poster easy to read, easy to follow, and does it effectively highlight the research?).
- ♦ Presentation of poster (wow well did the student verbally explain the work?).

It is now our pleasure to congratulate the following winners of the poster session.

M. Paulette Foster, 1st place for her outstanding presentation titled, "In Vitro Cardio-Active Drug Screening Using a Stretchable MicroElectrode Array".

Rohit Ranabhat and Lumei Liu, 2nd place for their excellent research work and presentation titled, "Swine Production Systems Cause Differential Expression of Superoxide Dismutase in Tracheobronchial Tissues of Pigs" and "The Study of Biodegradable Magnesium-Based Stents Using *ex vivo* Aorta Bioreactor and Microfluidics Systems", respectively.



Speakers and presenter interacting during Poster Session

Chapter Members and Volunteers

The Student Chapter would like to acknowledge our members, advisors and volunteers . It is through their leadership, encouragement, and guidance that we as a student body are able to always perform to our greatest potential.

Mr. Nava P Rijal



President and Committee Chair/
Organizer

Mr. Udhab Adhikari



Vice-President

Mr. Paul McGhee



By-Law Chair

M. Paulette



Committee Member and Volunteer

Lumei Liu



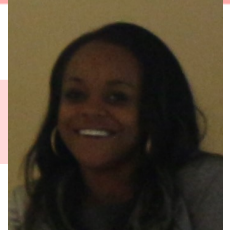
Secretary-Treasurer Elect

Mr. Shalil Khanal



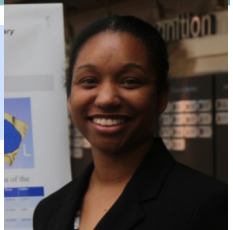
Outreach Coordinator

Erika Johnson



Volunteer

Ashley Jackson



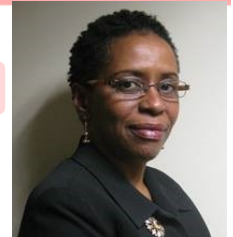
Volunteer

Dr. Narayan Bhattarai



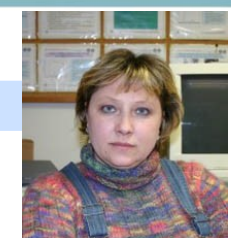
Chapter Advisor

Ms. Lois Dalton Deve



Volunteer

Victoriya Yefimova



Volunteer



Biomaterials Day 2016 NC A&T State University

Closing Statement and Success Story

The 1st Biomaterials Day 2016 hosted by the North Carolina A&T State University was a very successful event that brought together interested students and faculty from around the region and leading biomedical researchers. The biggest highlight of our event was having Dr. William R. Wagner, the Director of the McGowan Institute for Regenerative Medicine as well as a Professor of Surgery, Bioengineering and Chemical Engineering at the University of Pittsburgh for giving the plenary address.

This Biomaterials Day helped us to promote and explore innovative research being done in area of translational biomaterials especially in degradable metallic implants. The 2016 Biomaterials Day was a perfect opportunity to foster collaborations, networks and relationships to transfer knowledge from academia to industry. Members from different region gave and shared knowledge about biomaterials and biomedical engineering area. During the course of the day there was technical talks from leaders in the biomaterials field, entrepreneurship, process of commercializing products, and the day ended with success stories.

Graduate and undergraduate students representing from minority serving institute were essential part of this program. Participants also got an opportunity to know about cutting edge research being done at NCAT especially in the Department of Chemical, Biological and Bioengineering, and Engineering Research Center for Revolutionizing Metallic Biomaterials. This Biomaterials Day program served as a perfect platform to bring scientist and students working on new materials development, materials processing/characterization and modeling, and biocompatibility testing together. This opportunity allowed us to explore the possibility of developing engineered systems approaches to the development of revolutionary metallic biomaterials-based devices and applications. Furthermore, this program provided tremendous opportunities to minority students including females at NCAT.