Jessica Mae Gayle

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EDUCATION

Rice University, Houston TX Graduates: May 2023
PhD Material Science and Nano Engineering **GPA: 3.40**

Wichita State University, Wichita KS **Magna Cum Laude**
Major: Biomedical Engineering **Minor:** Chemistry Graduated: May 2018
Track: Emory Lindquist Honors Scholar **GPA: 3.906**

Rose Hill High School, Rose Hill KS Graduated: May 2014
General Studies **GPA: 3.95**

WORK/RESEARCH EXPERIENCE

POLYMERIC NANOMATERIALS August 2018- Present
Rice University and Baylor College of Medicine (coadvised)
PI: Dr. Pulickel Ajayan and Dr. Ghanashyam Acharya

1st Year: Exploring the synthesis, material processing, and characterization of novel two-dimensional covalent organic framework (COFS) materials. Processing of freestanding COF films for highly sensitive colorimetric detection of corrosive gases.
2nd - 3rd Year: Exploring novel 2D microporous materials for controlled drug delivery. Processing these materials into wound healing bandages using novel electrospinning and 3D printing techniques.

JOHNS HOPKINS INSTITUTE FOR NANOBIOTECHNOLOGY May 2017- August 2017
Johns Hopkins University
PI: Dr. Sean Sun

Summer 2017: My research integrated a wide range of disciplines through use of material design, biology, and mathematics. My project studied fibrosarcoma cells (HT1080) with a fluorescent nuclear label (H2B) to study both cell and nuclear volume changes. Changes in cell and nuclear volume could have a possible role in gene transcription and overall mechanical properties of a cell. Therefore cell and nuclear volume were observed consecutively during cell adhesion and detachment processes to provide better clarity on how these cancer cell properties may change during adhesion and detachment in vivo. This could provide better possible insight on cancer cells and whether these processes are more cell controlled or related to other outside mechanisms.

BIOMATERIALS LAB May 2015 – May 2018
Wichita State University
PI: Dr. Anil Mahapatro

Fall 2016 - Fall 2018: Biocompatibility of laser modified surfaces of Tantalum. The evaluation of how increased surface area of laser modified Tantalum can affect osteoblast growth.
Summer 2016**:** Optimization of Fluorescence dye and quantification of Alizarin red dye. Also assisted graduate student for the biocompatibility testing of the NASA sensor.
Summer 2015: Optimization and evaluation of a dynamic electrochemical corrosion testing apparatus**.** Simulating an in vitro environment that incorporated shear stresses and physiological factors while performing electrochemical corrosion testing for potential magnesium stent materials.

NATIONAL INSTITUTE OF AVIATION RESEARCH (NIAR) December 2014- May 2015
Wichita State University

Worked as a lab assistant in the composite lab. Performed acid digestion on composites to help formulate void space on composite samples. Also gained experience with working hands on for ITAR projects. Fully trained to work with dangerous high powered tools and highly corrosive acids.

SKILLS

Bio Related Experience:
Excellent aseptic techniques, experienced with cell culture techniques, biocompatibility testing, microfluidics, microfabrication, gel electrophoresis, photolithography, epifluorescence microscopy, confocal microscopy, and light microscopy.

Material Related Experience:
FTIR, NMR, XRD, TEM, BET, AFM, XPS, HPLC, NO analzyer, Raman spectroscopy, XPS, nanoindention, tensile testing, Thermal TGA-MS, critical point dryer, ellipsometer, polarizing optical microscope, plasma etching, polymer synthesis techniques, FDM 3D modeling and printing, electrochemical corrosion test methods, clean room, electroplating, and electrospinning.

Computational Modeling Experience:
Proficient in SolidWorks, COMSOL, MADYMO, ADAMS, and CATIA --completed CATIA V5 training at the National Institute of Aviation Research, MATLAB, LabView, and Arduino software.

PUBLICATIONS

1. **Jessica Gayle** and Anil Mahapatro, "Magnesium Based Biodegradable Metallic Implant Materials: Corrosion Control and Evaluation of Surface Coatings", *Innovations in Corrosion and Material Science*. **DOI** : 10.2174/2352094909666190228113315 (**Accepted 21 Feb 2019).**

2. **Jessica Gayle**, Anil Mahapatro, and Hailey Lundin "Preliminary Validation of a Dynamic Electrochemical Biodegradation Test Bench in Pseudo-Physiological Conditions", *Materials Technology*, 33:2, 135-144, DOI: 10.1080/10667857.2017.1416972 **(Published - 21 Dec 2017).**

RESEARCH PRESENTATIONS

1. "Device for Actively Monitoring the Integrity of Intrathecal Catheter Systems", Jessica Gayle, Jessica Aldrich, and Nicole Ramirez, *2018 KUSM-W Annual Research Forum*, Wichita KS, April 2018.
2. "Development of ConnectXP Catheter Connector Device", Jessica Gayle, Jessica Aldrich, Nicole Ramirez, *The Shocker New Venture Competition*, Wichita KS, April 2018.
3. "Cell and Nuclear Volume during Adhesion and Detachment", Jessica Gayle and Sean Sun, *2017 Hopkins C.A.R.E.S. Summer Symposium*, Baltimore, MD, July 2017.
4. "Dynamic Electrochemical Corrosion Evaluation of 316L Stainless Steel in Simulated Body Fluid Conditions", Jessica Gayle and Anil Mahapatro, *Midwest Biomedical Engineering Regional Conference*, Akron, OH, November 2015.
5. "Validation of a Dynamic Electrochemical Corrosion Test Bench in Hanks Solution", Jessica Gayle and Anil Mahapatro, *Research Day at the Capital*, Topeka, KS, February 2016.
6. "Validation of A Dynamic Electrochemical Apparatus within In-vitro Conditions", Jessica Gayle and Anil Mahapatro, *URCAF*, Wichita, KS, April 2016.

LEADERSHIP POSITIONS

Curriculum Committee Chair 2018-2021
National Research Traineeship Bioelectronics

Engineering Ambassador 2017
Wichita State University

OTHER WORK EXPERIENCE

TEACHER ASSISTANT - BIOMATERIALS August 2017-May 2018
Wichita State University

CATIA TUTOR January 2015-May 2015
Wichita State University

ACADEMIC HONORS

- Dean's Honor Roll (2014-Present)
- Honors College Merit Scholar (2014-Present)
- United State Achievement Academy
- Board of Regents Scholar
- Kansas Honor Scholar

AWARDS AND ACCOMPLISHMENTS

- National Science Foundation National Research Traineeship Bioelectronics Fellow (2019-2021)
- National Science Foundation Graduate Research Fellowship Honorable Mention (2018)
- Shocker New Ventures Competition Finalist (2018)
- Bruce & Connie Peterman Eng. Scholarship (2017)
- WE16 National Conference Scholarship (2016)
- Wichita Manufacturer's Association Scholarship (2017)
- Wichita Manufacter's Association Scholarship (2016)
- Meritrust Scholarship (2016)
- John G. Ellis Scholarship (2017)
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- John G. Ellis Scholarship (2014)
- Honors College Scholarship (2014-2018)
- McCormick Lewis Scholarship (2017)
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- McCormick Lewis Scholarship (2015)
- Boeing Scholarship (2014)
- Morris Merit Scholarship (2013-2018)
- BEETS Research Grant (2015)
- Dr. Glenn R. Crocker Memorial Scholarship (2014)
- DEB Employee of the Month (2014)

RELATED CLASS PROJECTS (CLASS SIMULATONS)

- Explored a way to advance the size and technological function of a traditional intrathecal pain pump that allows for less tissue displacement in the body for individuals who manage chronic pain (Fall 2017, Capstone Project)

- Developing and modeling an eye drop assistive device that meets the needs of functionally and visually impaired individuals (Fall 2017)

- Detection of heart rate variability between both males and females during multitasking through use of pulse sensor detection and Arduino software for analysis (Spring 2017).

- Development of a pedometer for step detection through measurement of impedance and using Arduino software for analysis (Spring 2017).

- 3-D modeling and meiser force analysis of an innovative armbrace through SolidWorks modeling (Fall 2016).

- Developing a MATLAB code to detect desired target codon within a DNA sequence (Fall 2016).

- Filtering EMG and force data to minimize noise variances using LabView (Fall 2016)

- Development and proposed business model for a two part orthopedic device modeled through SolidWorks that could increase the longevity of traditional total knee replacement devices (Spring 2016).

- The development of an innovative longboard break through CATIA modeling (Fall 2015).

ORGANIZATIONS AND ACTIVITIES

NRT Bioelectronics Curriculum Committee (2018-2021)

NRT Bioelectronics Outreach/Community Engagement Committee (2018-2019)

Summer Leadership Institute (Summer 2017)
Attended a camp that strengthened leadership skills such as communication, listening, and perspectives. This camp took place over a week in which we learned more about our leadership styles and how to be successful when working with different types of leaders.

Engineering Ambassador (August 2016 - May 2018)
As an ambassador, attention is geared towards recruiting new prospective students. Often this involved offering personal advice and sharing related experiences to give students a deeper connection and understanding of engineering.

Society of Woman Engineers (August 2014 - May 2018)
Active member that participated in many outreach programs and volunteering events. Received a scholarship to attend the national conference for the society of woman engineers through this society.

Biomedical Engineering Society (August 2015- May 2018)

National Society of Leadership and Success (August 2016 - May 2018)

Bridge to Engineering and Engineering Technology Program (Summer 2014)
Summer program that I attended where a gained valuable leadership skills and was awarded a research grant to begin research as a freshmen.

Nerd Union (August 2014- May 2015)
Social organization

Rocket Club (2014)
Built a personal rocket within a group and lead the structure's team in the design and development of the club's rocket.

VOLUNTEERING AND OUTREACH

Society of Woman Engineers:

Lords Dinner: Volunteering to feed the less fortunate

Expand your Horizons: An event that helps spread awareness of STEM careers for young girls

Engineering Ambassadors:

Help give tours to new prospective students and assist students in the transition into the engineering department.