

# Janice L. (Cunningham) Hall

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## EDUCATION

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### Doctor of Philosophy | Engineering Education

May 2021

Virginia Tech | Blacksburg, VA

Dissertation | *A Case study on Varied Engineering Career Orientations and Strategies of Black Women in Tech*

### Master of Science | Biomedical Engineering

August 2015

Mississippi State University | Starkville, MS

Thesis | *Protein Therapy for the Treatment of Vascular Calcification in Patients with End-Stage Renal Disease*

### Bachelor of Science | Biomedical Engineering | Magna Cum Laude

May 2013

Mississippi State University | Starkville, MS

## ENGINEERING EDUCATION RESEARCH

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Department of Engineering Education | Virginia Tech

### Postdoctoral Researcher | Mentor

05/2021 – present

Supervisors: Dr.'s Walter C. Lee & David Knight

- Lead researcher, responsible for managing both qualitative and quantitative data collection and analysis for 2 Diversity, Equity, and Inclusion (DEI) projects focused on undergraduate engineering students
  - NSF Award No. 1644138 | The Virginia Tech Network for Engineering Transfer Students (VT-NETS)
  - NSF-CAREER Award No. 1943811 | Responsive Support Structures for Marginalized Students: A Critical Interrogation of Navigational Strategies
- Assigns and evaluates work of graduate research assistants based on project needs, and individual capability
- Develop conceptual models using multiple theoretical frameworks to map out phenomenon of interest for future study and theory building
- Organize and maintain project documents and records to ensure compliance with university IRB standards
- Lead writing efforts for project dissemination and reporting to government funding agencies
- Facilitate bi-monthly meetings and discussions on research topics, debate issues in collegial manner
- Synthesize and implement feedback from diverse stakeholders, convey complex information to non-experts
- Recruit and interview participants, 35-60% success rate, keen ability to observe, and attention to detail
- Mentor 4 graduate students in progression through academic milestones, scoping research designs, and recommends professional development and training opportunities

### National Science Foundation (NSF) Graduate Research Fellow

08/2015 – 05/2021

Advisor: Dr. Walter C. Lee

**DISSERTATION PROJECT:** *The purpose of this study was to examine how the varied career orientations of Black women working as engineers in tech influence their career mobility. To achieve this objective, I used a qualitative multiple case study design to assess the work-related attitudes of 10 Black women engineers who work in the tech industry and the impact of their attitudes on career decision-making. Career mobility was assessed in terms of direction, duration and frequency of career moves across each participants working history.*

- Conducted an independent project, designed research study to explore phenomena; manage project from beginning to end
- Recruited participants at 35% success rate, collected and analyzed qualitative data
- Utilized culturally responsive methodology and interdisciplinary theories to understand subjective experiences
- Organized and presented ideas effectively to small or large groups resulting in 2 invited talks (i.e., virtual)
- Developed organizing principles (i.e. theory or models) to effectively sort and evaluate data
- Formed and defended independent conclusions, link ideas; connect seemingly unrelated phenomena

- Worked effectively with limited supervision or under pressure

### **Graduate Research Assistant| Mentor**

**08/2018- 08/2020**

Supervisor: Dr. Walter C. Lee

- Managed 2 research projects meeting deadlines and coordinating communications across a maximum of 9 institutions concurrently
  - NSF-EAGER: Supporting Students in STEM
  - NSF-CAREER Award No. 1943811 | Responsive Support Structures for Marginalized Students: A Critical Interrogation of Navigational Strategies
- Designed web-based surveys for pilot testing during instrument development using Qualtrics software
- Imported and cleaned data for statistical analysis in R during pilot testing for instrument development
- Identified and operationalize theoretical constructs to measure student support
- Constructed survey questions using both ordered scales and open-ended items
- Collected data using focus groups or individual interviews with users piloting survey instrument
- Synthesized user feedback to improve survey clarity and quality
- Coordinated and conduct update meetings with project advisory board and institutional partners,
- Prepared concise and logically written materials at all levels – brief abstract to journal manuscript (e.g., 6 conference papers, 2 journal manuscripts, and 4 annual reports)

### **Graduate Member**

**08/2017- 05/2021**

#### **GUIDE Research Group**

Advisor: Dr. Walter C. Lee

- Reviewed materials (e.g. abstracts, manuscripts, and presentations) for peers relating to marginalized and underrepresented minorities in science, technology, engineering, and math (STEM)
- Engaged in round-table discussions to critically examine challenges facing engineering education and the profession
- Mentored peers through departmental program milestones (e.g. qualifying, and preliminary exams) by providing accountability for tasks and goals as well as provide suggestions on study guides, materials, and planning.
- Assisted colleagues in defining problems, brainstorming and ideation for grant projects and proposals

### **Graduate Member**

**01/2016 – 05/2017**

#### **RILEE Research Group,**

Advisor: Dr. Donna M. Riley

- Reviewed abstracts, manuscripts, and presentations for research group members on topics in ethics, policy and underrepresented minorities in science, technology, engineering and math
- Assisted colleagues in data collection on veterans in engineering panel at annual ASEE conference
- Prepared literature reviews for publications (topics: charter schools, educational policy reform,
- Presented and discussed research group member projects
- Assembled historical data and discussed action plan for Departmental Project “Telling Our Stories”

## **INSTRUCTIONAL EXPERIENCE**

*Center for the Enhancement of Engineering Diversity |Virginia Tech*

### **Instructor of Record| ENGR 1034 - First Year Hypatia Seminar**

**08/2016 – 05/2017**

- Taught a 2-credit course for first-year women in engineering with a focus on professional skills (e.g., networking etiquette, elevator pitches, email drafting, resumes, and time management etc.)
- Supervised student engagement and completion of community service learning projects
- Provided professional networking opportunities with engineering faculty and industry professionals
- Co-developed curriculum for cross-cultural communications workshop for over 400 first-year engineering students, and facilitated professional development training by establishing metrics for evaluation
- Reviewed students’ four year academic plans and chart coursework

*Ag. & Bio. Engineering Department | Mississippi State University*

### **Teaching Assistant| Biomaterials**

**01/2014 – 05/2015**

- Taught junior engineers' structure-property relationships of natural composites, ceramics and polymeric materials using Problem Based Learning pedagogy (e.g. Biophysical Property of Materials course)
- Developed project based learning modules for senior engineers to enhance students' understanding of biomedical material interactions within biological systems (e.g. Biomedical Materials course)
- Demonstrated techniques for testing physical vs. mechanical properties of biomaterials
- Trained students to conduct impact testing of polymers and composites
- Assisted in the formulation of course syllabus, scoring rubrics and problem statements
- Facilitated guided inquiry to promote self-directed learning of project teams
- Reviewed and evaluate student(s) technical reports and oral presentations based on rubric

## BIO-ENGINEERING RESEARCH

*Agricultural & Biological Engineering Department | Mississippi State University*

### Graduate Research Assistant

**08/2013 – 08/2015**

Advisor: Dr. C.LaShan Simpson

- Investigated and reported results of experiments on the binding mechanisms of nanosized-minerals and native proteins
- Inspected materials using advanced techniques for microstructural, surface science, and chemical characterization
- Adapted testing procedures and specimen preparation of unique materials to suit different characterization techniques
- Coordinated activities with professors and undergraduate researchers for inter-disciplinary research projects.
- Established procedures and instruction manuals for mechanical testing equipment
- Managed and developed project objectives and experimental designs of undergraduates
- Mentored undergraduate researchers and developed their skills in data acquisition, analysis and result interpretation from different materials characterization techniques

*Chemical Engineering Department | Mississippi State University*

### Undergraduate Research Assistant

**10/2011- 03/2013**

Supervisor: Dr. Rafael Hernandez/ Dr. Adebola Oyedeji

- Assisted in the optimization process of biodiesel yield from microbial media using a supercritical methanol process
- Responsible for the extraction of gravimetric product yields of biodiesel using Bligh-Dyer extraction technique
- Independently assembled batch reactors from Swagelok fittings and stainless steel rods
- Prepared samples for gas chromatography for quantification of biodiesel yield

*Agricultural & Biological Engineering Department | Mississippi State University*

### Undergraduate Research Assistant

**06/2011-06/2012**

Supervisor: Dr. James N. Warnock

- Developed an *in-vitro* cell culture model of a blood vessel for the study of tumor angiogenesis
- Isolated cells, collagen, and various other biological samples using standard tissue culture methods
- Prepared procedures for seeding cells onto collagen construct for development of 3-D cell culture models

## SERVICE

### Peer-Reviewer | Collaborative Network for Engineering Computing and Diversity (CoNECD) **2021**

- Peer-Reviewed abstract submissions for 2022 annual CoNECD conference
- Provided constructive feedback on written submissions and made determinations for acceptance or rejection based on established criteria

### Council Member | Graduate School Honor Council | Virginia Tech **2017- 2021**

- Reviewed alleged cases of academic misconduct based on course syllabus, and university policy
- Chair honor council hearings and recommend sanctions, educational interventions, and corrective actions

### Workshop Participant | Who's Not at the Table |Clemson University **2016**

- Developed a national agenda for inclusion and engagement of historically underrepresented groups in engineering including student veterans, LGBTQ+, ethnic/racial minorities, and those with disabilities

- Provided constructive feedback on workshop proposals, made determination for acceptance, revision, or rejection of suggested policies and programs to enhance support of underrepresented students
- Search Committee Member | Bagley College of Engineering | Mississippi State University 2015**
- Evaluated 50+ nominees for research awards at the levels of undergraduate, graduate, and early faculty based on merit and intellectual contribution
  - Recommended nominees for selection and developed merit-based metrics for future award cycles
- Tillman Military Scholar | G.V. Sonny Montgomery Center for America's Veteran 2010- 2013**
- Completed a minimum of 20 hours of community service each academic year
  - Advocated for the needs of student veterans within the state of Mississippi at an annual leadership summit to Washington D.C. to meet and discuss support opportunities with State Senator (Roger Wicker)
- Speaker | Graduate Women in Science and Engineering| East Mississippi Community College 2014**
- Introduced over 400 prospective female college students from rural counties to biomedical engineering
  - Addressed engineering education preparation for high school and discussed how community college could be a pathway to a four-year engineering degree
- Council Member | Student Honor Code Council| Mississippi State University 2013- 2015**
- Reviewed alleged cases of academic misconduct for university wide cases (e.g. undergraduate, graduate school as well as college of veterinary medicine)
  - Debate policy implementation and interpretation in a collegial manner with other students and faculty
  - Determined appropriate sanctions and corrective actions based on course syllabus, and university policy
- Mentor | Freshman Mentoring Program| Mississippi State University 2013- 2015**
- Mentored first-generation students majoring in biomedical engineering, discussed time management, study skills and provided tutoring for academic work
  - Charted course work, discussed selection of disciplinary concentrations and provided resources for co-curricular engagement
- Maroon Volunteer | Mississippi State University 2010- 2015**
- Completed community service to support local programs including Bridges over Poverty an adult literacy program, where I provided free childcare while adults worked with one-on-one tutors to improve their reading comprehension
  - Participated in annual Sweet-Potato Drop, to collect, sort and organize unsellable produce from local farmers for redistribution to food pantries and homeless shelters in the community
  - Judge K-12 science fair projects and best robotics competitions for local schools

## JOURNAL PUBLICATIONS

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1. Vasquez, E. S., **Cunningham, J. L.**, McMahan, J. B., Simpson, C. L., & Walters, K. B. (2015). Fetuin-A adsorption and stabilization of calcium carbonate nanoparticles in a simulated body fluid. *Journal of Materials Chemistry B*, 3(31), 6411-6419. <https://doi.org/10.1039/C5TB00565E> [4.726 / 10] This article is part of a themed collection, 2015 Journal of Materials Chemistry B Hot Papers.
2. Vasquez, E.S.; **Cunningham, J.L.**; McMahan, J.B.; Simpson, C.L. and Walters, K.B. (2015).\* "Front Cover" *Journal of Materials Chemistry B*, 3, 6393-6394. <https://doi.org/10.1039/C5TB90112J> [4.726 / NA]
3. **Cunningham, J.**, Simpson, C. L., Vasquez, E. S., & Walters, K. B. (2014). Targeted therapy to treat cardiovascular calcification in ESRD patients. *Journal of the Mississippi Academy of Sciences*, 59, 335-339.

## PEER REVIEWED CONFERENCE PAPERS & PROCEEDINGS

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1. Pee, C., Hall, J., Johnson, T., Lee, W.C., (2022). *Marginalization in Engineering: Establishing a Theoretical and Methodological Foundation*. In Collaborative Network for Engineering and Computing Diversity (CoNECD) Conference, New Orleans, LA. [abstract accepted]

2. **Hall, J. L.**, Verdín, D., Lee, W. C., Godwin, A., & Knight, D. (2019, October). *Differences Between Science and Engineering Undergraduate Students' Perceived Support: Exploring the Potential of College Profiles*. In 2019 IEEE Frontiers in Education Conference (FIE) (pp. 1-5). IEEE. Cincinnati, OH.
3. Lee, W. C., Knight, D. B., Godwin, A., **Hall, J. L.**, & Verdín, D. (2019, June). *Eager: Measuring student support in STEM: Insights from year two*. In ASEE Annual Conference and Exposition, Conference Proceedings. Tampa FL.
4. **Hall, J. L.**, Verdín, D., Lee, W. C., Knight, D. B., & Godwin, A. F. (2019, April). *Toward a Measurement of Co-Curricular Support: Insights from an Exploratory Factor Analysis*. In Collaborative Network for Engineering and Computing Diversity (CoNECD) Conference. Crystal City, VA.
5. Novaselich, B. & **Hall, J.** (2017). *Supporting Veteran Students Along Engineering Pathways: Faculty, Student, and Researcher Perspectives*. In ASEE Annual Conference and Exposition, Conference Proceedings, Columbus, OH.
6. **Hall, J.** & Riley, D. (2016). Privatization of Public Education: Lessons from New Orleans for Engineering Education in K-12 and Beyond. In ASEE Annual Conference and Exposition, Conference Proceedings, New Orleans, LA.
7. **Cunningham, J.L.**, Vasquez, E. S., Walters, K.B., Simpson, C.L., (2015, April). *Human Fetuin-A Treatment for Demineralization of Arteriosclerosis*. In Society for Biomaterials (SFB) Annual Meeting and Exposition, Charlotte, NC. Paper ID: 117.
8. Vasquez, E. S., **Cunningham, J. L.**, McMahan, J., Simpson, C. L., & Walters, K. B., (2015, April). *Fetuin-A Therapy: A New Approach for the Treatment of Vascular Calcification in Chronic Kidney Disease Patients*. In Society for Biomaterials (SFB) Annual Meeting and Exposition, Charlotte, NC. Paper ID: 34.

POSTER SESSIONS AND PRESENTATIONS \*INDICATES PRIMARY PRESENTER OTHER THAN MYSELF

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1. **Hall, J.** (2021). *Career Orientations and Career Mobility of Black Women Working in the Tech Industry, Insights for Career Management*. 2021 STEM Noire Inaugural Research and Holistic Wellness Conference. Virtual Conference.
2. **Hall, J.** (2021, February). Disaggregating the Monolith: A case study of varied engineering and computing career orientations of Black women in Tech. Talk - The OSU EED Seminar, The Ohio State University.
3. Lee, W.C., Boyd-Sinkler, K., **Hall, J.**, Lightner, T., Pee, C., Holloman, T., (2021, February). Reimagining Engineering Through the Eyes of Black Women Educators: A Conversation with Walter Lee. Lecture/Panel - Hennebach Program in the Humanities, Colorado School of Mines.
4. Vasquez, E. S., **Cunningham, J. L.**, McMahan, J.\*, Simpson, C. S., Walters, K. B., (April, 2015). Fetuin-A Therapy: A New Approach for the Treatment of Vascular Calcification in Chronic Kidney Disease Patients. Society for Biomaterials (SFB) Annual Meeting and Exposition, Charlotte, NC.
5. **Cunningham, J. L.**, Vasquez, E. S., Walters, K. B. & Simpson, C. S., (April 2015). *Human Fetuin-A Treatment for Demineralization of Arteriosclerosis*. Society for Biomaterials (SFB) Annual Meeting and Exposition, Charlotte, NC.

6. **Cunningham, J.**, Simpson, C. L., Vasquez, E.S.\*, & Walters, K.B. (October, 2014). *Nano-sized Polymersomes for Fetuin-A Delivery to Reverse Cardiovascular Calcification*. 2014 Biomedical Engineering Society (BMES) Annual Meeting, San Antonio, TX.
7. \*McMahan, J.; **Cunningham, J. L.**; Vasquez, E.S.; Walters, K.B.; Simpson, C.L. (2014, July). Characterization of the Fetuin- Calcium Binding Interaction. Presentation- Shackouls Honor College Summer Undergraduate Research Symposium, Mississippi State, MS. [*Outstanding Research Award 3rd place in Biological Sciences and Engineering*]
8. **Cunningham, J.L.**, Simpson, C.L., (2014, February). What is Bioengineering? Seminar at Women in Science and Technology Conference Biomedical and Healthcare Session. Presentation- East Mississippi Community College.
9. **Cunningham, J.L.**; Vasquez, E. S.; Walters, K.B.; Simpson, C.L. (2014, March). Targeted Therapy to Treat Cardiovascular Calcification in ESRD Patients. Poster Session - 12th Annual Graduate Student Research Symposium; Mississippi State, MS.
10. **Cunningham, J.L.**; Vasquez, E. S.; Walters, K.B.; Simpson, C.L. (2014, March). Targeted Therapy to Treat Cardiovascular Calcification in ESRD Patients. Poster Session - Bagley College of Engineering Graduate Research Poster Competition Mississippi State, MS. [*Outstanding Research Award 1st Place in Life and Biomedical Sciences and Engineering*]
11. **Cunningham J.L.**, Coker A. (2012, July). Optimization of Biodiesel Yield and the Effect of Water on Esterification of Palmitic Acid Using Zeolite Catalyst. Poster session -Shackouls Honor College Summer Undergraduate Research Symposium, Mississippi State, MS. [*Outstanding Research Award for 1st Place in Physical Science and Engineering*]
12. **Cunningham J.L.**, Spates T. (2012). Development of an in vitro model of tumor angiogenesis. Poster session - Institute of Biological Engineering Annual Conference, Indianapolis, IN.

## RESEARCH SKILLS & CERTIFICATIONS

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### Quantitative

- Biomedical/Molecular Biology Research and Analysis Techniques Advanced
  - Mammalian cell culture and sterile technique
  - RT-qPCR, ELISA assay Western Blot, SDS-PAGE Gel Electrophoresis,
  - Nanoparticle characterization using DLS/Zeta Potential, Immunofluorescence Microscopy, UV/Vis Spectroscopy
- Design, program, deploy and analyze online quantitative surveys (Qualtrics and Survey Monkey) Advanced
- Software Packages – analysis using statistical software packages – SPSS; SAS: R Advanced
- Programming languages – C++; MATLAB; LABVIEW Proficient

### Qualitative

- Design, conduct, and analyze user research
- Analytic Software Packages– Dedoose, NVivo, and Microsoft OneNote Advanced
- Conduct in-depth interviews (IDIs), focus groups, case studies Advanced
- Thematic analysis, conceptual modeling Advanced
- Lean Six Sigma (greenbelt) Certification

## PROFESSIONAL DEVELOPMENT WORKSHOPS & SEMINARS

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Cambridge Mobile Telematics Women in Leadership Webinar: Assembling Your Recruiting Toolkit	2021
Florida Alliance for Graduate Education and the Professoriate (FL-AGEP) Research Bootcamp	2021
Graduate Teaching Assistant Workshop, Virginia Tech	2016
NSF Seminar "Understanding Student Resistance" – Maura Borrego	2015
NSF Career Development Workshop, MSU Bost Conference Center	2015
NSF Seminar "Take a Walk on the Policy Side" - Alan Cheville – Attendee	2014
Bagley Graduate Student – Workshop Series Participant	2014
Grant Writing II: The practicum – Workshop Participant	2014
Exploring Pathways to the PhD – Reflections from WOC – Workshop Participant	2013
Poster Session Research: Training Workshop – Workshop Participant	2013

#### PROFESSIONAL MEMBERSHIPS

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National Center for Faculty Diversity and Development – Member	2021- present
American Society of Engineering Education (ASEE) – Member	2016- present
Order of the Engineer (Link-126)	2015- 2021
Society of Women Engineers (SWE) – Member	2013- 2016
National Society of Black Engineers (NSBE) – Member	2013- 2015
Institute of Biological Engineering (IBE) – Member	2010- 2015

#### ACADEMIC HONORS & AWARDS

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Engineering Fellowship Awardee (eFellows)   American Society of Engineering Education	2021
Graduate Research Fellowship Recipient   National Science Foundation	2015
Outstanding Research Award 3rd place in Biological Sciences and Engineering	2014
Outstanding Research Award 1st Place in Life and Biomedical Sciences and Engineering	2014
Outstanding Research Award for 1 <sup>st</sup> Place in Physical Science and Engineering	2012
KiOR Renewable Energy Research Scholarship Recipient	2012
NSF Women in STEM Scholarship Recipient	2011
Pat Tillman Military Scholarship Recipient	2010
MSU Academic Merit Scholarship	2010
MSU Valedictorian Scholarship Recipient	2010