

# Frederick Paige, PhD

## Curriculum Vitae

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### Education

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**Doctor of Philosophy in Civil Engineering**, August 2016  
Clemson University, Clemson, South Carolina  
*Co-Advisors:* Dr. Leidy Klotz; Dr. Julie Martin

**Masters of Science in Civil Engineering**, December 2014  
Clemson University, Clemson, South Carolina

**Bachelors of Science in Civil Engineering**, Cum Laude May 2013  
Clemson University, Clemson, South Carolina

**11- Credit Teaching Certificate in Engineering Education**, December 2015  
Clemson University, South Carolina

### Experience

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**Assistant Professor**, Vecellio Construction Engineering and Management Program, The Charles E. Via, Jr. Department of Civil & Environmental Engineering. 2017- Present

- Investigation of questions related to sustainable construction processes and the empowerment of an infrastructure dependent society.
- Mentor scholars, teach practitioners, and serve the AEC fields.

**Assistant Director**, Virginia Center for Housing Research, The Charles E. Via, Jr. Department of Civil & Environmental Engineering. 2017- Present

- Facilitate collaborations internal and external to Virginia Tech in the field of housing sustainability.
- Provide research assistance to affordable housing stakeholders.

**Research Scientist**, Vecellio Construction Engineering and Management Program, The Charles E. Via, Jr. Department of Civil & Environmental Engineering. 2016-2017

- Investigation of questions related to sustainable construction processes and the empowerment of an infrastructure dependent society.
- Mentor scholars, teach practitioners, and serve the AEC fields.

**Dissertation research**, "Learning to and from Net Zero Energy Homes," 2013 – 2016

- Investigated the potential for people to become more energy literate by interacting with high efficiency homes and their inhabitants

**Course Developer and Research Assistant**, Clemson Online, 2013-2016

- Conducted interdisciplinary research on improving the opportunity for students to learn in the online environment
- Assisted with student perspective on teaching strategies, conducted action research as an instructor, and developed educational media and activities for students of all ages

**Graduate Assistant**, Sustainable Architecture Intensive Study, "Shutters, the human centered energy remote," Genoa, Italy, Summer 2014

- International independent study focused on sustainable architecture

- I investigated the connection between the use of operational shutters and the users understanding of energy

**Education Specialist**, Federal Alliance for Safe Homes (Flash) Resiliency Charrette, Orlando, Florida, January 2014

- Collaboration of engineers and architects in a design group to create a design guide for resilient home building to be used in industry
- My role included but was not limited to providing educational expertise, organizing and recording information at meetings, and reviewing drafts of the deliverable

**Undergraduate Research Assistant**, James Gibert, Modeling Piezoelectric energy harvester. Clemson, SC, Summer 2011

- Created Simulink models to compare numerical results to analytical analysis of the harvester
- Generated new ideas for uses for PZT energy harvesters

## Published Works

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### Journal Articles

Paige, F., Agee, P., Jazizadeh, F. “Data Descriptor: fEECe, an Energy Use and Occupant Behavior Dataset for Net Zero Energy Affordable Senior Residential Buildings” *Nature Scientific Data* (In-press)

Zhao, Dong, Andrew P. McCoy, Philip Agee, Yunjeong Mo, Georg Reichard, and **Freddy Paige**. “Time Effects of Green Buildings on Energy Use for Low-Income Households: A Longitudinal Study in the United States.” *Sustainable Cities and Society* 40 (July 1, 2018): 559–68.

### Refereed Conference Proceedings Papers Presented

Agee, P., McCoy, A., Kleiner, B., **Paige, F.**, (September 2018) “Macroergonomics: A Path to Understanding Net-Zero Energy Builder-Developers” Proceedings of the 5th European Conference on Behaviour Environment and Energy Efficiency 5-7 September, 2018.

Zhao, D., McCoy, A.P., Agee, P., Mo, Y., **Paige, F.** and Reichard, G. (2018) “Energy consumption, capital costs and paybacks of green buildings for low-income households in the United States: A longitudinal study.” 8th International Symposium on Energy; Aberdeen, Scotland, United Kingdom, August 6-9, 2018.

**Paige, F.**, Thirukkumaran, S. (April 2018). "Peggy's House: Making a Case for Social Sustainability" Proceedings of the Construction Research Congress: *Building Community Partnerships* (CRC 2018); New Orleans, LA, April 2 - 4, 2018.

**Paige, F.**, Agee, P., Zhao, D., McCoy, A.(February 2018). "The Longitudinal Impact of Energy Education on Affordable Energy Efficient Multifamily Housing Units" *Proceedings of the 4th Residential Building Design and Construction Conference (RBDCC 2018)*; Bethlehem, PA, February 28 - March 1, 2018.

Martin, C., McCoy, A., **Paige, F.** (February 2018). “Housing Technology and the Contemporary Policy Context in the U.S.” Proceedings of the 4th Residential Building Design and Construction Conference (RBDCC 2018); Bethlehem, PA, February 28 - March 1, 2018.

Martin, J. P., & Pfirman, A. L., & Anderson, R. K., & Stefl, S. K., & Paige, F., & Cain, L. W. (2015, June), A Series of Singular Testimonies: A New Way to Explore Unearned Advantages and Unearned Disadvantages Paper presented at 2015 ASEE Annual Conference and Exposition, Seattle, Washington. 10.18260/p.23449 Best Diversity Paper ERM Division

Gibert J. M., Alazemi S., **Paige F.**, Daqaq M. F., “New Insights in Piezoelectric Energy Harvesting Using a Dynamic Magnifier (Dual Mass System)”, *Proceedings of the ASME 2012 Conference on Smart Materials, Adaptive Structures and Intelligent Systems (19-21) Stone Mountain, GA* (September 19-21, 2012)

**Paige F. E.**, Ward C., “Examination of Renewable Energy and its Cost to Customers of Santee Cooper”, *Proceedings of the LS-AMP Conference University of South Carolina Columbia, SC (October 13th, 2012)*

*STEM DAY Geo-Caching Instructor*, April 2014- August 2013 PEER, Clemson, SC Introduced ~80 high school students to STEM concepts through a Geo-Caching activity which required them to work in teams and use problem solving skills to find treasure around the Clemson University Campus

PEER “What is RESEARCH” Speaker, April 2012, June 2013, Clemson, SC. Introduced and explained undergraduate and graduate research to more than 60 incoming women and minority STEM freshman in a summer math and prospective student outreach program

### **Invited talks**

McCoy, A., Zhao, D., Agee, P., Mo, L., **Paige, F.** and Reichard, G. (2017). “Toward the future of housing efficiency: leveraging technology, behavior, education and cost.” Keynote at INternational CongRess on Engineering and Sustainability in the XXI cEntury – INCREaSE 2017, Faro, Portugal, October 11-13, 2017.

### **White Papers**

**Paige, F.**, Agee, P., Zhao, D., Mo, Y., & McCoy, A. (2017). “Educating for Energy Efficiency: Exploring the Impacts in Virginia’s Affordable Housing Stock.” A Highlight Report by the Virginia Center for Housing Research (VCHR) at Virginia Tech for Housing Virginia. January 2019.

McCoy, A. Zhao, D., Agee, P., Mo, Y., & **Paige, F.** (2017). “Educating for Energy Efficiency: Longitudinal Evidence of Sustained Energy Savings in Virginia’s Affordable Housing.” A Report by the Virginia Center for Housing Research (VCHR) at Virginia Tech for Housing Virginia. October 6, 2017.

## **Instruction and Course Development**

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*Instructor of Record, CEE 5984, Policy Making for Infrastructure, F 2018, Sp 2020*

- Course Description: In this class, we will discuss current policy topics drawn from recent national, state and/or institutional policies (and as relevant, historical topics) that are relevant to civil infrastructure development and maintenance. Students write two policy briefs and

complete a policy analysis project, lead and participate in discussions, as well as provide constructive critique for your classmates' work. For the project students investigate a policy topic of their choice by performing an in-depth analysis, synthesizing your findings, and critiquing the current state of your policy topic in both written and presentation formats.

- This course was a new development at Virginia Tech and was introduced as a special topics course. In Fall 2018 the course was broadcast as a CGEP course with one distance student joining in from Northern Virginia .

***Instructor of Record***, CEE 5074, Global Virtual Design & Construction, Virginia Tech, Sp 2018, Sp 2019

- Course Description: This course is designed to acquaint students with issues relating to working on globally distributed projects in the increasingly global design and construction industry. Even solely domestically operating design and construction firms are facing global issues as increasing competition is bringing global competitors into domestic markets. Design and construction projects are dynamic and uncertain, requiring considerable coordination and communication to execute. Yet, coordination and communication become increasingly difficult in a global virtual project environment. In this course we will examine the theory and practice of working in globally distributed teams to understand and address the challenges of coordination and communication.
- In the Spring of 2019 the course was taught solely at Virginia Tech and the project site was moved from Atlanta, GA to the Caribbean island St. Lucia where the students designed a sustainable resort. The students work was reviewed by a private investor in St. Lucia provided the site details of one of their properties and their expertise.

***Instructor of Record***, CEE 3014, Construction Management, Virginia Tech, Sp 2018, Sp 2019

- Course description: This junior level is intended to introduce students to the fundamental elements involved in managing construction projects. 1) Management structure, 2) construction contracts, 3) Equipment and labor productivity, 4) Schedule, quality, and cost control.
- In the spring of 2018 I shifted the contemporary topics project to be done using digital posters which were peer reviewed. In the Spring of 2019 I shifted the contemporary topics project to be done as a Google “sites” which also included a Google “forms” peer review.

***Program Developer and Instructor***, PEER Foundations In Research Experience (FIRE), July 2015 – Present

- Course description: This course is intended to: 1) provide a hands-on foundation for understanding how and why research is conducted in the science, technology, engineering, and math fields and 2) provide practice in the skills necessary for research success.
- Developed the second edition of the program, incorporating more math and problem solving activities, which helped us win a **\$40,000** grant from DUKE Energy to extend the program and provide more resources to students.
- In the inaugural offering of the course, I played a heavy role in course development, implementation, and assessment.
- I collaborated with the in-person instructor Julia Brumaghim and our research instructors, a two week bridge program for 24 incoming Black and Latino freshmen students to learn about research in a hybrid course.

***Primary Instructor***, Sustainability Leadership, Spring 2013

- Course description: Participants, representing Clemson's diverse student body, will learn and apply critical thinking skills to understand economic, social, and environmental sustainability in such contexts as personal lifestyle choices, the structure of the built environment, and the operation of public and private institutions. Participants will also develop and practice skills to act as agents of change in the University and the broader community.
- In this inaugural offering of the course, I played a heavy role in the courses development, implementation, and assessment. I was provided an open template of a syllabus and given free reign to create lesson plans to meet course objectives. I was also in charge of recruiting and coordinating the multiple guest speakers the course featured.
- The course followed the flipped classroom format and is the beginnings of a completely online course where modules are being adjusted for the exclusively online environment.

***Course development***, Sustainable Energy Innovations (online edition), Fall 2012

- Helped critique and improve course content and website (<https://canvas.instructure.com/courses/593350>) for launching as a Massive Open Online Course (MOOC). We used Canvas Network, an online education software that offers free courses to students. We require students to use both Canvas as well as other forms of communication technology including Twitter, blog posts, and YouTube videos related to course material.
- I created instructor and student videos that allowed students to put a familiar face to their instructor, which from research has been show to be very beneficial to students taking online courses.
- Course modules include topics such as: biomimicry, systems thinking, charrettes, renewable energy sources, green washing, and specific sustainability strategies for creating an energy innovation (product, service, business).

***Undergraduate Teaching Assistant***, Engineering Problem Solving, Spring 2011

- Appointed by the College of Engineering and Science to assist the professor with the daily needs of a first year problem solving course using Microsoft Excel.
- My tasks job requirements included but were not limited to, inputting grades, answering questions in class, and holding tutoring hours after class for a ~ 60 student class.

***Undergraduate Teaching Assistant***, Engineering Graphics, Fall 2010

- Appointed by the College of Engineering and Science to assist the professor with the daily needs of a freshman AutoCad course.
- My tasks job requirements included but were not limited to, inputting grades, answering questions in class, and holding tutoring hours after class for a ~ 60 student class.

## **Professional Experience**

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*Department of Energy Solar Decathlon Fall 2013, Summer 2014, Fall 2015*

- Worked directly with industry partners to raise funds and receive necessary donations for the project.
- Assessed homes for their potential to educate in the summer of 2013 for my dissertation study, and also investigated ideas for Clemson's potential 2015 competition team.
- Scouted the European Solar Decathlon in the summer of 2014 while studying

- abroad in Italy with Clemson's Co-PI for their 2015 Solar Decathlon team.
- Consulted in the fall of 2015 to help Clemson's Indigo Pine team win second place in the communications competition by sharing my research with the students giving the tours. Indigo Pine exemplified a variety of lessons on energy and showcased very do-able and understandable actions people can implement to live more sustainably.

*Environmental Intern*, May 2012 - August 2013 Santee Cooper, Moncks Corner, SC

- Selected by South Carolina senators as one of eleven environmental interns and representatives to learn about the environmental systems of the state's largest energy utility.
- Worked with professionals in the company's renewable energy, analytical and biological sciences, vector management, and right of way management divisions.
- Created a plan for the utility to invest in new educational programs to increase the energy awareness of their customers.

*ESSo Researcher*, May 2013 - Present Clemson University, Clemson, SC

- Member of a team of sustainable infrastructure researchers led by Dr. Leidy Klotz.
- My team responsibilities include but are not limited to educational outreach for K-12 and undergraduates, promoting online presence, and creation of educational media for online courses.

*SoCap Researcher*, May 2013 - Present Clemson University, Clemson, SC

- Member of a team of engineering and science education researchers led by Dr. Julie Martin
- My team responsibilities include but are not limited to educational outreach for K-12 and undergraduates, promoting online presence, and organizing research group activities.

*PEER Graduate Assistant*, May 2013 - Present Clemson University, Clemson, SC

- Assistant to the Director of PEER Serita Acker
- Evaluate programs and create partnerships internally at Clemson and externally
- Act on the director's behalf when necessary, organize events, assist in conflict resolution, participate on hiring committees, provide mentorship to mentors and tutors, and represent the student population when making organizational decisions.

## Awards

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*VT Engage Faculty Fellow*, August 2019- August 2020

- Fellowship for community engagement and international service learning.

*GAANN Research Fellowship*, August 2013- August 2018

- Fellowship from the Department of Education to conduct research in an area of need.
- Awarded \$189,910 to advance the knowledge of sustainable infrastructure.

*DuBois Pinnacle Award*, May 2016

- Award from the Clemson Chapter of the W.E.B. Du Bois Honors Society.
- Demonstrated service to the student body, university, and community with an emphasis on support to the diverse student populations.
- Exemplified model citizenship, outstanding student leadership and high academic

achievement.

*Best Diversity Paper ASEE National Conference ERM Division, June 2015*

- Competitive award for diversity papers in the ERM division of ASEE.
- Contributed to study participant recruitment, research method development, data analysis, paper section writing, editing of the final paper, and the creation of the conference presentation.

*Glenn Global Leadership Award Summer, 2013*

- Competitive award to sponsor international experiences in the Glenn Department of Civil Engineering.
- Awarded \$5,000 to study sustainable architecture at the Charles E. Daniel Center for Building Research and Urban Studies in Genova, Italy.

*Hearst Scholarship, 2011*

- \$5,000 Scholarship to conduct summer undergraduate research at a department of my choice
- Gibert J. M., Alazemi S., **Paige F.**, Daqaq M. F., “New Insights in Piezoelectric Energy Harvesting Using a Dynamic Magnifier (Dual Mass System)”, *Proceedings of the ASME 2012 Conference on Smart Materials, Adaptive Structures and Intelligent Systems (19-21) Stone Mountain, GA* (September 19-21, 2012).

*Second Place in Division- LS-AMP Conference University of South Carolina, October 2012*

- Placed second in division of poster presentations.
- **Paige F. E.**, Ward C., “Examination of Renewable Energy and its Cost to Customers of Santee Cooper”, *Proceedings of the LS-AMP Conference University of South Carolina Columbia, SC.*

*Award of Distinction, Communicator Awards, Spring 2014*

- The 2014 Communicator Award of Excellence for a rap video promoting water conservation.
- I provided lyrics, vocal delivery and concepts for the video shoot.

*Award of Excellence, Videographer Award, Fall 2013*

- The 2013 Videographer Award of Excellence in the Video for the Web/Environmental Issue category.
- I provided lyrics, vocal delivery and concepts for the video shoot.

## **Service and Leadership**

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### **Charles E. Via Jr. Department of Civil Engineering**

**Faculty Advisor**, Construction Management Association of America, 2019 – Present

- Advise student chapter of a national professional organization which encourages students to grow as construction professionals.
- Host guest speakers, CMIT examination, and social events for graduate and undergraduate students.

**Committee Member**, Instruction Equipment Enhancement Committee, 2019- Present

- Evaluated equipment purchase requests for the department
- Developed equipment purchase requests for the construction management program area

### **Glenn Department of Civil Engineering**

**President**, Chi Epsilon Civil Engineering Honors Society, 2013 – 2014 (Secretary, 2012-2013)

- Directed executive meetings, student meetings, programs, and current student and alumni involvement. Reported directly to faculty advisor and national board.
- Communicated with committee chairs and advisors to facilitate the development of student programs and events including the search for our department chair.

*Student Ambassador 2012 – Present*

- Serve on faculty search panels.
- Conduct tours of the department to prospective graduate students, undergraduate students, donors, and alumni.
- Represent the student body at departmental meetings that require student input.

### **Programs for Educational Enrichment and Retention (PEER)**

*Mentor, 2011- Present*

- Counsel minority freshmen engineering majors in their transition from high school to college.
- Focus on study tips, time management, networking, professional etiquette, and goal planning.

*Tutor, 2010- Present*

- Assist in students understanding of graphical design, mathematics, freshman level engineering courses, and civil engineering courses.
- Recruit new tutors, train tutors and greeters, and assist in the purchasing of resources for the program (teaching supplies, name tags, card readers, etc)

### **Clemson Black Graduate Student Association (BGSA)**

*Community Service Volunteer, 2013- Present*

- Team lead for the annual CU Future Scholars program, I led a team of high school students on an interactive tour of our college of engineering and science.
- Coordinate fundraising activities.

### **Wilson Calvary Baptist Church**

*Community Service Volunteer, 2015- Present*

- Organized a youth leadership experience for young black males in the Anderson community.
- Recruited fellow minority engineers undergraduate, graduate, and professional engineers to speak to the youth about there academic opportunities.

### **STILE Research Group**

*Research Advisor/Mentor, 2013- Present*

- Mentor students interested in research.
- Undergraduate students:
  - Jhordan Jenkins, B.S. Electrical Engineering, expected December 2019, Clemson University
  - Mark Allen, B.S. Mechanical Engineering, May 2017, Clemson University
  - Joseph James, B.S. Mechanical Engineering, May 2017, Clemson University
  - Shannon Snelgrove, B.A. Anthropology, May 2017, Clemson University
  - Emma Coleman, B.S. Ecological Engineering, May 2017, Clemson University
  - Jeannie Ossorio – B.S. Ecological Engineering at Virginia Tech expected 2021



- Graduate Students Mentored
  - Joseph James, Ph.D. Civil Engineering, expected 2023, Virginia Tech
  - Zach Boykin, Ph.D. Civil Engineering, expected 2023, Virginia Tech
  - Emma Coleman, Ph.D. Civil Engineering, expected 2021, Virginia Tech
  - Wendell Grinton, M.S. Civil Engineering, Expected 2020, Virginia Tech
  - Dwayne Jefferson, M.S. Civil Engineering, Expected 2020, Virginia Tech
  - Daniel Keku, M.S. Civil Engineering, Expected 2020, Virginia Tech
  - Jerome Williams – M.F.A. Film & TV Production Student at University of Southern California May 2018

### **Professional Affiliations/Memberships**

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- American Society of Civil Engineers, 2010 – present
- American Society for Engineering Education 2013 - present
- National Society of Black Engineers, 2010 – present
- American Society of Mechanical Engineers, 2013 – present
- Chi Epsilon Civil Engineering Honors Society, 2012 – present