

Rebekah D. Burke, PhD, PE (VA), LEED AP BD+C

Office Phone: 843.953.1391 | RBurke2@citadel.edu | 171 Moultrie Street | Charleston, SC 29464

EDUCATION

Ph.D., Civil, Environmental, and Sustainable Engineering May 2018

School of Sustainable Engineering and the Built Environment, Ira. A Fulton Schools of Engineering, Arizona State University, Tempe

Early Design Decisions in Material Selection for Higher Performing Buildings

Committee: Kristen Parrish (Chair), G. Edward Gibson, Braden Allenby

M.S., Civil, Environmental, and Sustainable Engineering December 2016

School of Sustainable Engineering and the Built Environment, Ira A. Fulton Schools of Engineering, Arizona State University, Tempe

B.S., Architectural Engineering with a Structural Emphasis May 2001

Civil and Architectural Engineering, University of Wyoming, Laramie

ACADEMIC APPOINTMENTS

Assistant Professor August 2018-Current

Construction Engineering, Department of Civil and Environmental Engineering, The Citadel, The Military College of South Carolina, Charleston

PROFESSIONAL LICENSURE

Registered Professional Engineer, Virginia No. 0402 040677 December 2005-Current

LEED Accredited Professional December 2004-Current

LEED Accredited Professional with Buildings Design and Construction Specialty (LEED AP BD+C) November 2009-Current

ACADEMIC EXPERIENCE

National Science Foundation Graduate Research Fellowship Program Fellow June 2015-May 2018

- Early Design Decisions in Material Selection for Higher Performing Buildings
 - Designed, facilitated, and analyzed industry specific focus groups to inform an intervention in the early design process for building material selection
 - Utilizing Message Sequence Charts, a systems engineering tool, architecture and engineering professionals documented the design process

- Utilized NVivo for qualitative data analysis
- Designed, administered, and analyzed online survey data to triangulate focus group results
 - Survey administered to architecture and engineering professionals through my professional network and an international industry conference
 - Utilized Qualtrics for data collection, and SPSS for statistical analysis
- Collaborated with industry partner to administer an early design process intervention, designed to test findings from the focus groups and survey
- Construction Industry Institute's (CII) Project Definition Rating Index (PRDI) – Small Infrastructure Projects Research Project
 - Developed CII's highly anticipated PDRI – Small Infrastructure Projects; including a research report, research summary, implementation resource, and excel tool
 - Highly collaborative industry research project
 - Designed, administered, and analyzed online survey data
 - Conducted industry workshops

Graduate Research Associate

January 2015-May 2015

School of Sustainable Engineering in the Built Environment, Arizona State University, Tempe

- National Science Foundation (NSF) Transforming Undergraduate Education in Science, Technology, Engineering and Mathematics (TUES2) Research Project
 - Utilized surveys to elucidate faculty perceptions regarding the incorporation of sustainability topics into engineering education curriculum
 - Explored the learning outcomes for sustainable topics when incorporated into a project-based course
 - Examine the cognitive achievements in senior design courses where sustainable topics had been part of the students' curriculum
- Wrote NSF Engineering and Systems Design proposal with Co-Principal Investigators, Drs. Amy E. Landis and Kristen Parrish

Undergraduate Research Assistant

January 1999-August 2000

Structural Engineering Research Laboratory, University of Wyoming, Laramie

- Conducted punching shear tests on half-scale concrete bridge decks reinforced with steel, Carbon Fiber Reinforced Polymers (CFRP), or post-tensioned CFRP
- Performed research determining the friction loss of CFRP post-tensioned tendons along non-metallic ducts

Peer Assistant

Fall 2000

Engineering College, University of Wyoming, Laramie

- Introduction to Engineering Study (ES1000), mentor and teaching assistant for first year experience

PUBLICATIONS

Journals

Refereed (Published or Accepted)

1. **Rebekah D. Burke**, Claire L. Antaya Dancz, Kevin J. Ketchman, Melissa M. Bilec, Treavor H. Boyer, Cliff Davidson, Amy E. Landis, and Kristen Parrish. (2018) "Engineering Faculty Perspectives to Inform Sustainability Integration in Engineering Curriculum." *Journal of Professional Issues in Engineering Education and Practice*, 144 (3), 04018004. doi:10.1061/(ASCE)EI.1943-5541.0000373
2. Mohamed El Zomor, **Rebekah Burke**, Kristen Parrish, G. Edward Gibson. "Project Definition Rating Index (PDRI) Tools: Supporting Risk Assessment and Planning for Large and Small Infrastructure Projects." *Journal of Management in Engineering*. (Accepted 1 December 2017)
3. **Rebekah Burke**, Kristen Parrish, Mounir El Asmar. "Environmental Product Declarations: Use in the Architectural and Engineering Design Process to Support Sustainable Construction." *Journal of Construction Engineering Management*, 144(5), 04018026. doi:10.1061/(ASCE)CO.1943-7862.0001481
4. Kevin Ketchman, Claire L. A. Dancz, **Rebekah D. Burke**, Kristen Parrish, Amy E. Landis, and Melissa M. Bilec (2017). "Sustainable Engineering Cognitive Outcomes: Examining Different Approaches for Curriculum Integration." *Journal of Professional Issues in Engineering Education and Practice*, 143 (3) (2017).
5. Claire L. Dancz, Kevin J. Ketchman, **Rebekah D. Burke**, Troy A. Hottle, Kristen Parrish, Melissa M. Bilec, and Amy E. Landis (2017). "Utilizing Civil Engineering Senior Design Capstone Projects to Evaluate Students' Sustainability Education Across Engineering Curriculum." *Advances in Engineering Education*, 6 (2) (2017).

Submitted

1. **Rebekah Burke**, Kristen Parrish. "Modelling the Conceptual Design Decision Process with a System Engineering Method"
2. **Rebekah Burke**, Kristen Parrish. "Toward Dispelling Sustainable Construction Myths: A Case Study Approach."

Conferences

Refereed Publications

1. **Rebekah Burke**, Kristen Parrish (2018). "System Engineering Analysis Approach to Building Material Selection for Sustainable Buildings." Construction Research Congress, New Orleans, LA, April 2-4, 2018.
2. **Rebekah Burke**, Kristen Parrish, and G. Edward Gibson, Jr. (2016). "Defining Small Projects in Developing the PDRI for Small Infrastructure Projects." Construction Research Congress, San Juan, Puerto Rico, May 31-June 2, 2016.

- Claire L. Antaya Dancz, Kevin J. Ketchman, **Rebekah Burke**, Melissa M. Bilec, Elizabeth A. Adams, Braden Allenby, Mikhail Chester, Vikas Khanna, Kristen Parrish, Thomas P. Seager, and Amy E. Landis. (2015). "Integrating Sustainability Grand Challenges and Experiential Learning into Engineering Curricula: Years 1 and 2." American Society for Engineering Education, June 14-17, 2015 Seattle, WA.

Proceedings and Presentations

- Rebekah Burke** (2018). "For Maximum Impact: Introduction of Environmental Information about Building Materials in the Design Process." 54th Associated Schools of Construction Annual International Conference, April 19-20, 2018, Minneapolis, MN.
- Rebekah Burke**, Kristen Parrish (2017). "A Clearer Vision: Illuminating the Material Selection Process for High Performance Buildings." 53rd Associated Schools of Construction Annual International Conference, April 5-7, 2017, Seattle, WA.
- Rebekah Burke**, Kristen Parrish (2017). "I Can See Clearly Now: Illuminating the Material Selection Process for High Performing Buildings." Engineering Sustainability 2017, April 9-11, 2017, Pittsburgh, PA.
- Rebekah Burke**, Kristen Parrish (2016). "And They All Fall Down: The Domino Effect in Building Material Selection." American Council for an Energy-Efficient Economy Summer Study on Energy Efficiency in Buildings, August 21-26, 2016, Pacific Grove, CA.

Refereed Reports and Technical Manuals

- Construction Industry Institute (2016). *Implementation Resource 314a-2: Project Definition Rating Index - Small Infrastructure Projects*. Construction Industry Institute.
- Construction Industry Institute (2016). *Research Report 314a-11: Development of Project Definition Rating Index for Small Infrastructure Project*. Construction Industry Institute.

SPONSORED RESEARCH AWARDS

Sponsor	Title	Role	Performance Period	Total	Awarded
NSF	National Science Foundation Graduate Research Fellowship	Research Fellow	Summer 2015 – Spring 2018	3-year fellowship	\$200,000 (approx.)
NSF ESD	MAHP (Material Analytical Hierarchy Process): Turning building industry rules of thumb into data-driven selection of sustainable materials	Graduate Research Assistant	Submitted February 2015	\$375,362	Not awarded

AIA	Virginia Beach-Sustainability Design Assessment Team (SDAT)	Proposal Participant, Community Leader	Awarded 2009, Implemented June 2010	Non-monetary	Awarded
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ADDITIONAL FUNDING AWARDS

National Science Foundation, University of Pittsburgh Travel Grant, Engineering Sustainability, Pittsburgh	Awarded \$500 April 2017
Graduate and Professional Student Association Travel Grant, Construction Research Congress, Puerto Rico	Awarded \$950 April 2016

HONORS and AWARDS

- **National Science Foundation Graduate Research Fellowship Program** Summer 2015-Spring 2018
- **Preparing Future Faculty Program** Fall 2016-Spring 2017
- **Young Engineer of the Year, Virginia Society of Professional Engineering** 2008
- **J. W. Van Dyke Scholarship, Harold and Bonnie Jane Kester Scholarship, and Namtvedt Memorial Milo C. Scholarship** Fall 2000-Spring 2001
- **Howard J. Leik Memorial Scholarship** Fall 1999-Spring 2000
- **Engineering College Scholarship** Fall 1998-Spring 1999
- **Powder River Basin Section Society of Mining Scholarship** Fall 1997-Spring 1998

TEACHING EXPERIENCE

Construction Engineering, Department of Civil and Environmental Engineering, The Citadel, The Military College of South Carolina, Charleston

Fall 2018

- CONE302-Engineering Law, Ethics, Safety, and Contracts
- CONE320-Construction Materials and Methods
- CIVL314-Engineering Economy

Professional Development

Two Way Formative Feedback for Multiple Disciplinary (JTfD) Program Fall 2017-Spring 2018

- Participant in NSF-funded Improving Undergraduate STEM Education (IUSE) project for faculty development in active learning strategies for the classroom and course development
- Topics: Active Learning, Bloom's Taxonomy, Effective Learning Objectives, Interactive Classrooms, Cooperative Learning, Student Motivation, Positive Learning Environments

Preparing Future Faculty Fall 2016-Spring 2017

- Competitive program dedicated to the realities of research, teaching, and service in higher education

- Fall semester focused on the contextual and interdisciplinary knowledge of the professoriate through presentations, CV development and institution exploration exercises
- Spring semester applied the knowledge of the previous semester through further development of our CV and a group project to explore the future of the academic institution

Invited Lectures

1. “Construction Safety in Structural Steel Erection” CON271 – Construction Safety, Arizona State University, 30 October 2017.
2. “Construction Safety in Concrete and Masonry Construction” CON271 – Construction Safety, Arizona State University, 23 October 2017.
3. “Structural Steel Framing” (2 sections) CON244 – Working Drawing Analysis, Arizona State University, 26 September 2017.
4. “Retrofits: A Structural Engineering Perspective” CON 598 – Retrofit Construction, Arizona State University, 13 September 2017.
5. “A Case Study: Historic Sustainable Design Retrofit project at Walter Reed Hospital” CON 598 – Retrofit Construction, Arizona State University, 11 September 2017.
6. “An AE Perspective on LCA and CSR”. CEE/CNE 400 – Earth Systems Engineering Management, Arizona State University, 26 July 2017.
7. “A Case Study: Historic Sustainable Design Retrofit project at Walter Reed Hospital” CON 598 – Retrofit Construction, Arizona State University, 19 September 2016.
8. “A Case Study: Historic, Sustainable Design Retrofit at Walter Reed Hospital” CON 598 - Retrofit Construction, Arizona State University, 26 October 2015.

INDUSTRY EXPERIENCE

Corporate Director of Sustainable Design, Associate

November 2009-December 2014

Clark Nexsen, Architecture & Engineering, Virginia Beach, Virginia

- Directed Clark Nexsen’s Sustainable Design Advocates to lead the integrative sustainable design process for 60 LEED registered project seeking certification (as of 12/2015); included 5 LEED Platinum Certified and 12 LEED Gold Certified projects
- Sustainable design representative on numerous successful request for proposal (RFP) teams and interview teams, prepared RFP documents (i.e., staffing, budgets, design schedules)
- Coordinated with the firm’s full service A/E disciplines, including Architects, Interior Designer and Civil, Electrical, Mechanical, Plumbing and Structural Engineers
- Organized sustainable design and LEED continuing education for Clark Nexsen’s 170 LEED APs and 500 staff members in 10 offices in the Mid-Atlantic
- Stayed fully abreast of the most recent innovations and federal, state, local policies and incentives in high performing buildings and sustainable design

- Developed and implemented Quality Control procedures for all LEED projects undergoing certification, from the charette through the final LEED construction submittal and certification
- Instructed contractors on the LEED construction process, submittals and requirements
- Implemented ENERGY STAR Partner, and Designed to ENERGY STAR program
- Community Sustainability Planning, including the adoption by the city council of the City of Virginia Beach Sustainability Plan and development of Culpeper County's Green Building Model Program
- Directed efforts toward Clark Nexsen's commitment to the 2030 Challenge

Lead Structural Engineer

March 2007-November 2009

Clark Nexsen, Architecture & Engineering, Norfolk, Virginia

- Lead Structural Engineer: performed the framing, detailing, structural analysis, cross-discipline coordination, Engineer-In-Training management and mentoring, specifications and cost estimation as a member of fast-paced Design Build Teams to prepare Construction Documents
- Performed quality control verification of pre-final construction documents and structural calculations
- Project design experience includes, but is not limited to:
 - Progressive Collapse Analysis for Anti-Terrorism Force Protection of 3 story structural steel moment framed hospital building
 - (3) 4-story, 80,000 - 120,000 SF residence halls of precast plank and cold formed metal steel gravity system with structural steel and cold-formed metal steel lateral system
 - 18-story cast-in-place concrete tower, performed special inspections for pile cap foundations and reinforcing steel
 - Numerous Pre-Engineered Metal Building foundation and mezzanine design and coordination and 2-story office and administration buildings and additions, of load bearing CMU, structural steel, precast concrete

Professional Structural Engineer & Lead LEED Accredited Professional

March 2005-March 2007

Hayes, Seay, Mattern & Mattern, Architects Engineers Planners, Virginia Beach, Virginia

- Lead structural engineer: performed the framing, detailing, structural analysis, cross-discipline coordination, specifications and cost estimation as a member of fast-paced Design Build Teams to prepare Construction Documents
- Responded to contractor requests for information and facilitated communication for construction administration
- Performed quality control verification of pre-final construction documents and structural calculations
- LEED® AP Facilitator for dynamic design charettes, responsible for coordinating with all disciplines to determine initial LEED certification goals, tracking the progression and documenting the necessary information for certification with USGBC

- Implemented the “Green Team” in the local office
- Responsible for opening the lines of communication between all departments on sustainable design; facilitated by bi-monthly learning sessions, study courses, local calendar of events and central location of articles, websites and resources of interest for sustainable design

Structural Engineer, Engineer in Training

July 2001-March 2005

Clark Nexsen, Architecture & Engineering, Norfolk, Virginia

- Framing, detailing and structural analysis of multi-story buildings and waterfront structures utilizing several computer modeling techniques
- Design experience includes cast-in-place and pre-cast concrete, masonry, steel, wood, and cold-formed steel structures; lateral systems of cast-in-place concrete, braced bays and steel moment frames
- Performed inspections of bridges as part of federal and state contracts, and special inspections during the construction of buildings

SERVICE to PROFESSION

Market Leadership Advisory Board Member, USGBC Arizona

January 2016-January 2018

- Strategically advised committees in achievement of the chapter’s mission
 - Heavy Medals-Celebrated local LEED project successes at the chapter’s signature annual event
 - Sponsorship-partnered with local companies to bring programming, education, and event to the state

Presentation Proposal Reviewer, USGBC’s Greenbuild International Conference January 2014

- Reviewed submitted presentation proposals for innovative and relevant topics, panels of diverse industry and academic representation

Task Force, USGBC LEED v4 Regional Priority Credit Task Force

June 2011 – January 2012

- Hampton Roads Green Building Council representative for Geographical Information Systems overlay, selection of LEED credits to receive ‘bonus’ credit for regional importance

Phase I Peer Reviewer, EPA 2011 Small Business Innovation Research Grant

January 2011

- Topic: Green Buildings, Area: Materials and Indoor Air Quality

Task Force Chair, USGBC’s LEED 2009 Regional Priority Credit Task Force

2008

- Determined of zone delineation, and regionally appropriate LEED points to be given prioritization for local environmental issues

First Chair Elect, Hampton Roads Green Building Council (HRGBC)

January 2008-December 2011

- Created the vision, mission and goals for our successful chapter, annually updated chapter goals and objectives
 - Created successful monthly Learning Series event series
 - Facilitated the development of the council's signature bi-annual event Green in the Military, growing from an initial 300-attendee event to a 500-attendee event
 - Set, achieved and refocused ongoing goals of active committees: advocacy (state, schools and homes), communication/media, special events and sponsorship
- *USGBC's Chapter Leaders Retreat* (2009-West Virginia, 2011-Utah, and 2012-San Antonio)

Advocacy Committee Chair, HRGBC

January 2007-January 2013

- State level Advocacy
 - Advocated for the "High Performance Public Buildings Act" signed by Governor Bob McDonnell in June 2012
 - Collaborated with the other 3 Virginia Chapters of USGBC to educate and communicate with state legislatures the importance of High Performance Buildings
- Home Owner and Builder Advocacy
 - Organized annual 2-day Solar Homes Tour in Hampton Roads (2008-2013)
 - Featured over 20 sustainably orientated homes and home solutions with over 500 registered attendees yearly
- Schools, Students and Teachers Advocacy
 - Organized HRGBC's 2012 participation in the "Green Apple Day of Service"
 - Partnered professionals, schools, gardeners, teachers and parents in a day of service to spread the word "We learn here, and where we learn matters"
 - Created lessons about healthy, efficient classrooms and schools to the students, parents, teachers, and building operators
 - Chapter Coordinator for 3 community wide projects, including an art project at The Hampton Roads Sustainable Living Expo, a rain garden, and solar PV array installation and green roof on educational shed at Kemps Landing Magnet School

Board of Directors, James River Green Building Council

November 2006-January 2008

- Facilitated the organization of HRGBC while under the umbrella of James River Green Building Council

Founding Board Member, HRGBC

March 2005-December 2011

The Council's objectives include:

- educating the community about LEED and sustainable construction practices
- bringing together Hampton Roads Architecture and Engineering community to promote and make decisions related to policy and the built environment to protect our natural environment and to create an atmosphere for information sharing among members

PRESENTATIONS in SERVICE to PROFESSION

1. "LEED v4 Material Credits." Hampton Roads Green Building Council's Monthly Learning Series, May 2014, Newport News, VA.
2. "An Introduction to Sustainable Design-Materials." Interior Design, INT 258 Interior Materials, October 2013, April 2014, The Art Institute of Virginia Beach.
3. "Sustainability in Architecture Today." Panelist, Architecture, ARC 417-418 Professional and Community Design Practice, April 2014, Hampton University, Hampton, VA
4. "LEED v4 Material Credits." Hampton Roads Green Building Council's Monthly Learning Series, September 2013, Norfolk, VA.
5. "Regional Green Building & Sustainability Highlights." Panelist representing Virginia Beach, Virginia Sustainable Building Network's Annual Meeting, June 2013, Richmond, VA.
6. "Reaching 30% Energy Reduction, Approaches to Reaching New Levels of Energy Performance." Emerging Trends for Sustainability in the Next Decade, 8th Annual Sustainable Energy Conference, April 2011, Raleigh, NC.
7. "LEEDing Into the Future: IgCC, ASHRAE 189 and The Living Building Challenge." Virginia Engineer's Conference, September 2010, Williamsburg, VA.