# William Robert Locke, E.I.T. (Ph.D. Student)

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## Research Focus

My research focuses on improving civil infrastructure resiliency through the development of a civilian based health monitoring system and a new model calibration strategy.

## Education

**Clemson University,** Clemson, SC — August 2016 - Present
*Ph.D. Student in Civil Engineering, concentration in Structural Engineering* — 3.83 GPA overall

**Clemson University,** Clemson, SC — May 2017
*M.S. in Civil Engineering, concentration in Structural Engineering* — 3.9 GPA overall

**Clemson University,** Clemson, SC — May 2015
*B.S. in Civil Engineering, concentration in Structural Engineering* — 3.98 GPA in major, 3.82 GPA overall

## Research Experience

**Clemson University** — Clemson, SC
*NRT and GAANN Fellow* — August 2016-Present

- Developing finite element models of coupled vehicle-bridge systems that integrate real world environmental and operational variabilities. The models consider effects such as, temperature, wind, surface roughness, vehicle speed, vehicle dynamic properties, and linear damage.
- Working with a partner in computer science to apply pattern recognition and machine learning algorithms to dynamic outputs in order to filter unwanted noise.
- Currently performing modal analysis on filtered signals to detect changes caused by damage.
- Working on an interdisciplinary research project that unites civil engineering and statics to develop a generally applicable approach for quantifying flexibility of a model calibration campaign.

**Los Alamos National Labs – Dynamic Summer School** — Los Alamos, NM
*Dynamic Summer School Intern* — June 2017-August 2017

- Applied information theory to measure increases in structural complexity caused by corrosion in aluminum plates and non-linear cracking in a frame structure.
- Developed finite element numerical models of a scaled four story frame structure, and performed time series analyses to measure dynamic changes when non-linear cracking was introduced.
- Used data acquisition and signal processing for physical frame to validate numerical results.
- Calculated changes in gradient sums across images of corrosion to measure changes in geometric complexity.
- Collaborated with colleagues to complete project goals before end of nine-week fellowship program.
- Presenting findings at 2018 IMAC Conference.
- Attended weekly tutorials discussing tools used when working with dynamic systems, such as data acquisition, signal processing, embedded systems, and verification and validation.

## Conference/ Journal Papers (in preparation)

West, B.M., Locke, W.R., Andrews, T.C., Scheinker, A., and Farrar, C.R. "Applying Concepts of Complexity to Structural Health Monitoring."

Locke, W.R., Sybrandt, J., Safro, I., and Atamturktur, S. "Using Drive-By Health Monitoring to Detect Damage Considering Environmental and Operation Effects."

Locke, W.R., Brown, A., and Atamturktur, S. "Data-Aware Calibration of Physics-Based Computer Models of Engineering System: Quantifying Flexibility of Calibration Campaign"

## Professional Experience

**Clemson University** — Clemson, SC
*FIRST Program Graduate Assistant* — August 2015-August 2016

- Acted as advisor for the FIRST social organization; was in charge of training officers, leading weekly meetings, coordinating events, and ensuring the overall success of the organization.
- Charged with creating agendas and leading weekly mentor meetings.
- Scheduled and conducted interviews to hire mentors and summer counselors.
- Managed office workers by helping with: training, assigning projects, and monitoring work.
- Lead retreats by helping teach team building, leadership and communication skills.
- Served as an instructor for the mentor training class.
- Prepared summer programs by managing applications, calculating the budget, and scheduling events.

- Met with the Under Secretary of Education, Ted Mitchell, to raise awareness about FIRST generation students in post-secondary institutions.

**Infrastructure Engineering** Greer, SC
*Co-op Student* August 2014-December2015

- Aided in visual forensic investigations of bridge structures to identify defects and mark their locations.
- Helped write findings reports for clients. Was in charge of summarizing defects found and helping indicate if overall condition of structure was critical or not.
- Was in charge of editing and creating Auto-CAD drawings to show damage and suggest repairs.
- Acted as lead co-op during second and third rotations. Helped with training new interns and acted as leader on preparing pre inspection documents, findings reports, and drawings.
- Minimally performed structural calculations for damaged members to determine load bearing capacity.

**Clemson University** Clemson, SC
*FIRST Program UPIC Intern/ Mentor* July 2012-August 2015

- Responsible for mentoring and tutoring first-generation engineering students.
- Charged with planning and executing study sessions.
- Required to organize social group activities to keep students involved in campus life.
- Performed presentations in front of university officials to receive financial support for the program.
- Acted as fundraising chairman; raised approximately $2500 in funds for the student organization.
- Featured in an article and video about FIRST generation success and the problems students face. http://newsstand.clemson.edu/facing-the-challenges-of-being-a-first-generation-college-student/

**NCDOT** Shelby, NC
*Summer Intern* May 2014 – August 2014

- Helped oversee crews during the construction of two overpass bridges for the US-74 Shelby Bypass.
- Performed soil density tests using a Nuclear Density Gauge.
- Aided in ASTM standard testing during concrete deck pours.
- Charged with managing trucks entering the job site and their dump locations.
- Used GPS/ GNSS tools to perform elevation measurements for grades and subgrades.

**Construction Science and Engineering, Inc.** Westminster, SC
*Co-op Student* Spring 2013 and Fall 2013

- Participated with and performed forensic investigations for various types of structures.
- Wrote letters and reports for clients discussing problems and repairs for subject properties.
- Created Auto-CAD and Google Sketchup drawings for suggested repairs.
- Performed structural, hydrological, and geotechnical analyses on a regular basis.

**Vector Marketing** Charlotte, NC
*Field Sales Leader - $33,000 Career sales* May 2011- August 2012

- Attended professional business conferences to enhance teamwork and leadership abilities.
- Executed over 1,000 presentations to improve speech and public speaking abilities.

## Awards, Honors, and Achievements

- NRT Fellowship, Fall 2017
- Los Alamos Dynamic Summer School Fellowship, Summer 2017
- DAISE GAANN Fellowship, Fall 2016
- Graduated Cum Laude, Clemson University, May 2015
- President's Honor List, Clemson University, Spring 2014
- Dean's Honor List, Clemson University, Fall 2011, Fall 2012, and Spring 2012
- RCI Student Scholar and Scholarship Recipient, Spring 2013

## Memberships

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| ASCE | ACI | Tau Beta Pi | Chi-Epsilon | FIRST |

## Computer/ Engineering Skills

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| AutoCAD | Ansys | SAP2000 | MathCAD | Matlab |
| RStudio | Google Sketchup | Microsoft Office | OSHA Certified | Confined Spaced Certified |