Elizabeth Spingola

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Education

Virginia Polytechnic Institute and State University (August 2014 – present)
Masters Student in Data Analytics and Applied Statistics (**May 2018**)
PhD Student in Engineering Education, School of Engineering (**2019**)
Concentration on Human Computer Interaction, Computer Science, and Accessibility

Ohio Northern University, Ada, Ohio (August 2010 – May 2014)
Bachelor of Science in Engineering, Major in Engineering Education
Minor in Mathematics, Concentration in Computer Science
Certification to teach AYA mathematics
Successful completion PRAXIS I & PRAXIS II, AYA Mathematics
Successful completion of PRAXIS PLT (Practices of Learning and Teaching), Grades 7-12
The first student in the nation to graduate with this undergraduate degree

Engineering Courses

- Programming 1, 2 & 3
- Statics
- Dynamics
- Electric Circuits
- Differential Equations
- Calculus 1, 2, 3 & 4
- Computer Applications
- Robotics
- Engineering Material Science
- Net-Centric Computing
- Modeling Curiosity: The Mars Rover (EPICS)
- Abstract Algebra

Engineering Education Senior Design

- 3-D Modeling and Design
- Engineering Education 1 &2

Education and Theoretical Mathematics Courses

- Culture and Schooling
- Curriculum and Assessment
- Communication in the Classroom
- Foundations of Mathematics
- Foundations of Geometry
- Integrated Mathematics Methods
- Exceptional Learners
- Development Across the Lifespan
- Literacy Across the Content Areas
- Educational Psychology
- International Lesson Planning (EPICS)
- Field Experiences 1,2,3,4,5,6
- Student Teaching
- Statistics for Engineers & Scientists

Graduate Level Courses

- Foundations of Engineering Education
- Assessment
- Statistics in Research Methods
- Theoretical Statistics
- Quantitative Research Methods
- Qualitative Research Methods
- Research Methods in Engineering Education
- Technology and Disability
- Digital Identity
- Usability Engineering
- Transformation and Application of Emerging Technology
- STEM Education Pedagogy
- Practicum in Engineering Classrooms
- GTA Training Workshop
- Human Factors System Design
- Design to Change Power and Authority
- Advanced Statistics
- Regression Methods
- Communicating in Statistical Collaboration
- Experimental Design

Related Knowledge

- AutoCad
- SolidWorks
- Inventor
- Java
- C++
- Html
- PHP
- Python
- CSS
- MatLab
- Qualitative Analysis
- R for Quantitative Analysis
- Computer interface design
- Curriculum design
- Digital game design
- Digital accessibility
- Accessible and inclusive design
- Assessment mapping
- ABET mapping
- Data mining
- Data cleaning
- Data analytics
- Algorithm building
- Machine learning
- Survey Building
- Research Interview Guides
- Lesson planning
- Curriculum design
- Teaching
- Canvas curriculum development
- Blended classroom lesson design
- Online classroom lesson design
- Physical classroom lesson design
- Project Management
- Gnatt Charts
- Research
- Website Design and Creation

Achievements & Awards

Achievements:

- Invited panelist for Advancing the Human Condition, October 2017
- Invited speaker for Stronger than Stigma, March 2017
- Licensed Educator in Ohio in 7-12 AYA Mathematics
- Passed the Engineering Education Qualifying Exams for the PhD program
- Passed the Engineering Education Preliminary Exams for the PhD program
- Project Manager for Engineering Projects in Community Service (EPICS) which designed and produced a functional Mars Rover model currently on display at the Neil Armstrong Air and Space Museum.
- Undergraduate Research Assistant designed an educational website for secondary teachers emphasizing knowledge updates for STEM curriculum (lead) and developed a classification scheme for Introduction to Engineering courses at the university level (team member).
- Classroom field experience teaching at the 7-12 grade levels, in the STEM areas, at five different schools.
- Co-developed and co-presented a series of Engineering Teacher Workshops for K-12 teachers in the Dominican Republic, to facilitate the introduction of STEM curriculum in the local classrooms, May 2012.
- Third Degree Black Belt, Certified Trainer and Instructor, Taekwondo
- Accomplished musician, playing piano, flute, piccolo and saxophone

Awards:

- 2014 Catherine Freed Leadership Award at Ohio Northern University, May, 2014. The award named for former University First Lady Catherine Freed, recognizes the outstanding female leader on campus.
- First person in the nation to graduate with a B.S. in Engineering Education. 2014.
- Admitted into the Graduate Teaching Academy of Excellence. 2016
- Honorable Mention for the National Science Foundation Graduate Student Fellowship Program for the proposal “Creating, Validating and Accessing Online Educational Environments to Target the Cognitive and Learning (Dis)abled.”, 2016
- AHEAD in Virginia Disabled Graduate Scholarship, 2018

Organizations

- American Society of Engineering Educators, Student Chapter-Officer
- Joint Engineering Council – Officer

- Disability Alliance – **President**
- Disability Caucus – **Co-chair**
- Commission for Equal Opportunity and Diversity- **Representative**
- Special Representative for the Disability Alliance and Caucus Representative for the Graduate Student Association
- Committee for Equal Opportunity and Diversity – Chair Representative
- Phi Sigma Rho (Women's Engineering Sorority) - Officer
- Relay for Life/College Against Cancer – Officer
- Northern Engineers Without Borders- Travel to Dominican Republic to implement engineering design strategy for teachers & on site engineering projects in the local community
- Habitat for Humanity-On site residential builds, impoverished Florida community and locally in Ohio
- Student Senate
- Kappa Phi, Women's Service Sorority
- Frontiers In Education
- National Council of Teachers of Mathematics
- Society of Women Engineers
- Human Computer Interaction International
- Accessing Engineering

Research &Publications

Research

- Co-author on the following conference papers:
    - The New Engineering Education Degree at Ohio Northern University, poster presented for the National Council for Accreditation of Teacher Education Review Board, at Ohio Northern University, 2012.
    - Bachelor of Science in Engineering Education: Differentiating from Traditional Education and Engineering Disciplines, presented at *American Society for Engineering Education Annual Conference*, Atlanta, June 2013.
    - Development of a First-Year Course Classification Scheme, presented at *American Society for Engineering Education Annual Conference*, Atlanta, June 2013.
    - Introducing Engineering into the Dominican Republic Classroom: Teacher Workshops, presented at *American Society for Engineering Education Annual Conference*, Atlanta, June 2013.
    - Why Did Students Select a New Engineering Education Degree Program? Presented at *American Society for Engineering Education North Central Conference,* Ohio Northern University, March 2012 and *American Society for Engineering Education North Central Conference*, Ohio State, Columbus, OH, April 2013.
    - Assessing the Introduction to Engineering into the K-12 classroom: The Use of Online Modules in a Teacher Workshop, presented at *American Society for Engineering Education North Central Conference*, Ohio State, Columbus, OH, April 2013.
    - Self-Efficacy in First-Year Engineering Design Courses: Satisfaction, Sense of Belonging, Team Roles and Gender*, Olin College, Research Experiences For Undergraduates*, *REU Summer Internship 2013*, in process of completion.
    - The Need for Engineering Education*, Ohio Northern University*, in process of completion.
    - Polar Launch, American Society for Engineering Education North Central Conference, *Oakland University, Rochester, MI, April 2014*.
    - Self-Efficacy in First-Year Design Courses, American Society for Engineering Education North Central Conference, *Oakland University, Rochester, MI, April 2014*.
    - Development of a First-Year Course Classification Scheme, poster presentation, American Society for Engineering Education annual conference, *Indianapolis, IN, June 2014*.
    - Self-Efficacy in First-Year Design Courses, Frontiers in Education, *Madrid, Spain, October 2014*.
    - Does an International Experience Introduce a Global Mindset for Rising Sophomore Engineering Students?, First Year Engineering Experience, Roanoke, VA, August 2015.

- Developing a Blended Classroom, The Center for Instructional Development and Educational Research, Virginia Tech, February 2016
- An Animated Discussion! Elaborating the challenges in instructional development for teaching animation to students with low digital literacy, EERA , February 2017
- Teaching Computer Programming to Primary School Students with Low Digital Literacy, EERA, February 2017
- Access Engineering : Capacity Building Institute, Washington University, April 2017
- Learning Management Systems (LMS) in Higher Education: Exploring Web Accessibility for People with Cognitive and Learning Disabilities, VERA, September 2017
- An Evaluation of Accessibility for a Large Foundations of Engineering Course, Accessing Higher Ground, November 2017
- Development of a First-Year Course Classification Scheme, International Journal of Engineering Education, January 2018
- Engineering Faulty Perceptions on Software Technologies and the Support of These Technologies, The Center for Instructional Development and Educational Research, Virginia Tech, February 2018
- Conversation: Digital Large Classroom Simultaneous Testing, The Center for Instructional Development and Educational Research, Virginia Tech, February 2018
- Best Practices in Completely Online Graduate Level Engineering Courses, The Center for Instructional Development and Educational Research, Virginia Tech, February 2018
- Computing Research Association: Graduate Cohort, March, 2018
- Literature Review on Disability Participation in the Engineering Field, ASEE, June, 2018
- Evaluation of Accessibility of Course Web sties for Foundations of Engineering Classes, HCII, July 2018
- Web Browser Extensions for Accessibility in Education, ASSETS, October 2018
- It Can Be More than Just Pulling Straws: A Large Scale Mixed Method Study of Engineering Major Discernment, JEE, Under review

Grants Helped to Secure

- DOIT Engineering, $3,000

Research Summary

- Co-author on 12 published, peer-reviewed conference papers
- Co-author on 3 peer-reviewed journal articles
- Co-facilitator to 3 conference workshops
- Reviewer for 2 K-12 engineering/mathematics textbooks
- Co-author for 1 K-12 engineering teacher edition textbook
- Sole author for K-12 engineering textbook workbook
- Sole author for K-12 mathematics textbook "Using Programming Logic to Solve Math Problems"
- Undergraduate Research Assistant designed an educational website for secondary teachers emphasizing knowledge updates for STEM curriculum (lead) and developed a classification scheme for Introduction to Engineering courses at the university level (team member).
- Classroom field experience teaching at the 7-12 grade levels, in the STEM areas, at eight different
- 2 posters and 3 papers accepted for conferences and journals in 2017

Projects

PhD Dissertation Project, Virginia Tech, Blacksburg

- August 2014 – present
- Canvas usability, accessibility, and design for engineering students

US News and World Report: Online Engineering Programs Survey, Virginia Tech, Blacksburg

- May 2018- October 2018
- Data collection around Virginia Tech
- Data analysis
- Collaboration with Virginia Tech institutional entities

Master's Project, Blacksburg, VA

- August 2017 – March 2018
- SASS analysis
- SiteImprove
- Canvas first year engineering course website analysis of accessibility compliance
- Workshops on improving compliance
- Data mining
- Regression
- Training guidelines

Cranwell Data Project, Blacksburg, VA

- February 2018 – April 2018
- R code
- Data analytics
- Tutoring in statistical design
- Presentation
- International student retention with living learning communities
- Logit Regression formula

Faculty Needs in Instructional Technology Project, Blacksburg, VA

- October 2016 – April 2017
- Survey development
- Faculty needs for engineering instructional technology
- Qualtrics
- R analysis

First Year Engineering Course Classification Scheme, Ada, Ohio

- August 2011 – May 2014
- Delfi type study
- Survey design
- Mapping and classifying skills in engineering courses
- National study

K-12 Online Async Modules for Teachers , Ada, Ohio

- January 2012 – May 2013
- Designed an educational website for secondary teachers emphasizing knowledge updates for STEM curriculum (lead) and developed a classification scheme for Introduction to Engineering courses at the university level (team member).
- Project Manager

Project Manager NASA Mars Rover Model, Ada, Ohio

- August 2012 – May 2013
- Neil Armstrong Air and Space Museum
- Shop and engineering work
- Programming work
- Worked with CAD drawings of the Mars Rover from NASA

Employment Experience

Instructional Technology Team: Information Technology Support, Graduate Assistant, Virginia Tech, Blacksburg

- August 2016 – present
- Provides technical support for the engineering software used by faculty and students throughout the College of Engineering
- DyKnow, OneNote, Microsoft, and Inking
- Support and editing of website content
- Documentation and creation of software tutorials
- Teaching of support classes
- Support for tablet use

Interim Assistant Director of Online Learning and CGEP Administrator, Virginia Tech, Blacksburg

- May 2018 – present
- College of Engineering, Dean's office
- Supports online engineering students at Virginia Tech
- Data collection and analysis
- Coordination of online engineering courses
- Support to the state chair
- Development online degree programs
- Market data research
- Timeline and building processes to ensure program growth and development

Freelance Information Technology Computer Support, Ada, OH, Blacksburg, VA

- August 2010 – present
- Trouble-shooting using problem-solving skills to fix personal computers
- Mac
- PC
- Creating website
- Creating mobile applications
- Trouble-shooting using problem-solving skills to fix cellular phones
- iPhone

Freelance Statistical Support and Analysis, Blacksburg, VA

- August 2016 – present
- R code
- Data analytics
- Tutoring in statistical design
- Support in survey design

Emergent Learning Contract Work, Remote

- August 2010 – present
- Write textbooks, workbooks, answer keys for engineering and mathematical concepts
- Map ABET and state standards to textbook information and learning objectives
- Create alternative text for images to support blind students

Instructor for Homeschool Co-op, Christiansburg, VA

- August 2016-2017
- Computer programming
- Web design
- Stop motion animation
- Robotics

Instructor for Robotics, John Hopkins Center for Talented Youth, Loyola Merimont University, Las Angeles, CA

- June 2017-August 2017
- Lead instructor of talented 10-12 year olds teaching them for 8 hours a day for 3 weeks physics, engineering, robotics, programming, and design
- Designed the curriculum and lesson plans

Instructor for Physics of Engineering, John Hopkins Center for Talented Youth, Stanford University, Palo Alto, CA

- July 2016-August 2016
- Lead instructor of talented 10-12 year olds teaching them for 8 hours a day for 3 weeks physics, engineering, mathematics, and design
- Designed the curriculum and lesson plans

Instructor of Record, Graduate teaching assistant, Virginia Tech, Blacksburg, VA

- August 2015 - May 2016
- Lead instructor of a section of Foundations in Engineering, the first year engineering course at Virginia Tech

Mentor and Supervisor to Undergraduate Graders, Virginia Tech, Blacksburg, VA

- August 2015 - May 2016
- Manage and mentor all of the undergraduate graders for all 60 sections of Foundations of Engineering
- Document and track all supporting employment information for all 18 undergraduate employees

Summer Research, Graduate research assistant, Virginia Tech, Blacksburg, VA

- May 2015 - August 2015
- Literature Review on K-12 Engineering standards
- Analysis of collegiate funding opportunities
- Work towards Journal of Engineering Education research article
- Produced an interview guide for the instructors of the course regarding the effectiveness of the curriculum

Summer Research, Graduate research assistant, Virginia Tech, Blacksburg, VA

- June 2014 – August 2014
- Led a project that redesigned the curriculum of a junior level Civil Engineering classroom. This redesign led to a blended classroom where there a blending of lecture and engaging activities that were related to the students.
- Helped in the development of a survey to gauge the effectiveness of this new pedagogy and its fulfillment of ABET criteria
- Produced an interview guide for the instructors of the class regarding the effectiveness of the course layout.

CAREER Work, Graduate teaching assistant, Virginia Tech, Blacksburg, VA

- August 2014 – May 2015
- Participating in the inductive qualitative analysis of focus groups data
- Participated in running a think aloud protocol to help inform survey development.
- Developed an interview guide and IRB proposal to expand upon the data found in the focus groups
    - Examined further the reasons in participating and not participating in co-curricular actives
    - Examined the perception of engineering and engineers from a student perspective

Machine Shop Mentor (Volunteer), Ohio Northern University, Ada, OH

- August 2013 - December, 2013
- Helped students in the machine shop understand the machines and answered questions

Research Internship, Olin College of Engineering, Needham (Boston), Massachusetts

- June 2013 – August 2013
- Research Topic: Self-Efficacy in First-Year Engineering Design Courses: Satisfaction, Sense of Belonging Team Roles and Gender
- Qualitative and quantitative data collection
    - MIT course on qualitative analysis
    - Introduction to R for qualitative analysis

Undergraduate Research Assistant, Ohio Northern University, Ada, Ohio

- January 2012 – May 2013
- Designed an educational website for secondary teachers emphasizing knowledge updates for STEM curriculum (lead) and developed a classification scheme for Introduction to Engineering courses at the university level (team member).