Brittany Cuchta

Contact Information	1529 Pershing Place Apt A Rolla, MO 65401	304.542.6050 bwb65@mst.edu

Education

Missouri University of Science and Technology, Rolla, MO

M.S., Applied Mathematics, May 2014

Marshall University, Huntington, WV

B.S., Mathematics and Applied Mathematics (Double Major), May 2012

- Capstone Project: *Modelling Gravitropism in Pea Plants using MATLAB*
- Advisors: Marcia Harrison, Ph.D. and Scott Sarra, Ph.D.

Teaching Experience

Elementary Differential Equations — Spring 2015–Present

A first course in differential equations, focused for engineers. First order differential equations and linear differential equations of higher order are studied. The Laplace transform and systems of linear equations as well as selected physical applications are covered.

College Algebra & Trigonometry — Falls 2012–2013

An accelerated course in college algebra in 10 weeks and trigonometry in 6 weeks. Algebra topics covered include linear equations, rational functions, radicals, quadratic equations, inequalities, determinants, progressions, theory of equations, permutations, combinations, and the binomial theorem. Trigonometric topics include a study of trigonometric functions, radian measure, graphing trigonometric functions, identities, trigonometric equations and inverse trigonometric functions. Solutions of general triangles and trigonometric representation of complex numbers are included. Requires writing and grading of all exams.

Trigonometry (10-week) — Spring 2013–Spring 2014

A 10-week course in trigonometry. Requires writing and grading of all exams.

College Algebra (6-week) — Fall 2014

A 6-week course offered as an opportunity to save a failing grade for those who failed the first portion of the college algebra/trigonometry dual-class semester plan.
After the college algebra final, those who do not pass are instead placed into the 6-week section where they review material to take a new final at the end of the regular semester. The course focuses on building study skills and practicing problems together, instead of the standard lecture-based class format. Freedom is given in how the class is organized and run. The goal is to help students pass algebra to continue to the calculus sequences, oftentimes working on their study techniques in the process.
Requires writing and grading of all exams, as well as changing the course structure to fit the individual class' needs.

Engineering Statistics — Springs 2013–2015

Usually taken by junior or senior level engineering majors, provides a basic understand of statistics and probability with a focus on equipping students with knowledge needed to run statistical analysis. Includes joint probability distributions and hypothesis testing. Requires writing and grading of all exams.

Problem Solving Workshop — Augusts 2013–2015

A week-long workshop for incoming freshmen students to review algebra skills prior to taking the university's math placement exam. Includes teaching two different sections of 30+ students each for a total of 2 hours per section per day. Topics covered include exponents, factoring, polynomials, rational expressions, and complex numbers.

Hit the Ground Running Julys 2013–2016

A three-week long intensive course for students to practice mathematics skills and prepare for the university's math placement exam. My section was devoted to trig skills, covering a semester's worth of material in 3 weeks. Required preparing recitation and grading quizzes.

Research Experience

Research Assistant May 2013 to May 2016

Department of Mathematics and Statistics,
Missouri S&T
Topic: *The Complete Iterative Inversion Methods*
Supervisors: David Grow, Ph.D. and Matt Insall, Ph.D.

The second coefficient of the virial expansion of the ideal gas law can hypothetically be used to infer microscopic information (such as bond length) from macroscopic information (such as temperature) about the system. We aim to provide a mathematical basis for this method which is currently used by physical chemists regularly, but has no true verification that it's a valid method. To do this, we employ both numerical techniques in MATLAB (cubic splines and quadratures) along with proofs to establish the validity of the CIIM.

Research Assistant May 2014 to Aug 2014

Department of Mathematics and Statistics,
Missouri S&T
Topic: *Exploring the Genetic Cause of Auxin Regulation in Arabidopsis*
Supervisors: Gayla Olbricht, Ph.D

A project in epigenomics with a RNASeq design. Using statistical analysis and the software program R, the effect of gene regulation in auxin is explored. Data is provided by a biology group at Missouri University–St. Louis.
Required the learning of new software (R), new statistical techniques (edgeR, bioconductor, voom), choosing a distribution which would best describe the genes, and learning some biological background of the auxin regulatory pathways.

Research Assistant May 2011 to May 2012

Department of Mathematics and Statistics,
Marshall University
Topic: *Modelling Gravitropism in Pea Plants using MATLAB*
Supervisors: Marcia Harrison, Ph.D. and Scott Sarra, Ph.D.

Plants undergo a response called "gravitropism" when placed on their side. We aim to find an equation which can model this, hopefully allowing us to predict the curvature rate of a plant. Image capturing software was used to create time lapses of the curving pea plants and MATLAB was used to analyses images. This opportunity was provided after completing a one-semester course in mathematical biology and being chosen from the enrolled students to conduct research. The project was funded by a grant from the NSF to promote mathematical biology among undergraduates.

Research Assistant May 2009 to May 2010

Department of Chemistry,
Marshall University
Topic: *Ab Initio Study of Pre-Reactive OH Radicals*
Supervisors: Rudolf Burcl, Ph.D.

Utilising state-of-the-art quantum computing, we aim to create potential energy surfaces for the reaction of OH radicals and simple molecules such as H_2, C_2H_2, CH_4. OH radicals are important in atmospheric chemistry, space exploration, and even simple reactions like rusting.

Awards

Student Awards — Marshall University

- First Place in Undergraduate Presentations — April 2012
  - The Biennial West Virginia Science, Technology and Research (STaR) Symposium was held concurrently with the annual West Virginia Academy of Science meeting in 2012. A total of 120 undergraduate and graduate students presented their research in 20 minute oral presentations. I presented my work on modelling gravitropism.

Student Awards — Missouri S&T

- We Love Your Class — May 2013
  - The freshman engineering students are given the opportunity to cast their votes for their favorite teacher during their first year at university. A total of 19 instructors were nominated in 2013.
- GTA Teaching Excellence Award (Honorable Mention) — Dec 2013
  - Each year, the Mathematics department at S&T honors two GTAs for excellence in teaching. Also noteworthy are the honorable mentions. The award is based off student feedback, student performance, among other things. It is awarded in December for the previous school year.

Skills

Technology:

- Skilled in Microsoft Office products and Blackboard
- Experienced with various online homework tools (MyMathLab, ALeKS)
- Proficient in MATLAB, Mathematica, LaTeX; acquainted with SAS, R, UNIX, and C++

Languages:

- Working knowledge of Spanish (reading, writing, and some speaking)

Other:

- Strong enthusiasm for teaching
- Effective interpersonal skills
- High level of organization
- Well-practiced and developed writing skills

More Information

Selected exams and student evaluations available upon request. References available upon request. Visit www.bcuchta.com for more information and auxiliary documents.