Rachel Trana

Assistant Professor
Department of Computer Science
Northeastern Illinois University

EDUCATION

Ph.D. Applied Mathematics   Aug. 2012
Northwestern University, Evanston IL
> Thesis Title: Modeling of subthreshold voltage responses, synaptic integration
> and backpropagating action potentials in CA1 pyramidal neurons.
> Thesis advisor: William Kath

M.S. Applied Mathematics   Dec. 2003
Northwestern University, Evanston IL

B.S. Mathematics   May 2002
University of Arkansas, Monticello AR

EXPERIENCE: ACADEMIC

Assistant Professor of Computer Science   Aug. 2016 - current

Northeastern Illinois University, Chicago IL
Website: http://racheltrana.com

- Educational Research: NSF Improving Undergraduate STEM Education (IUSE) grant targeting the enhancement of academic engagement and learning experience of undergraduate STEM majors, Development of a pre-programming assessment skills test for CS1 preparedness

- Other Research: Machine learning for the detection of cyberbullying in images, Backcalculation of sulfur-dioxide in volcanic emissions, Population dynamics of Leedy's roseroot

- Teaching: Programming I and II, Server-Side and Client-Side Web Development, Discrete Structures, Computational Methods in Biology, Event-Based Programming

- Service: Centralized departmental graduate advisor (Aug. 2016 - current), Primary advisor for Master student projects, Faculty advisor for Google igniteCS Funding (May/June 2017), Programming I/II Coordinator, Student Center for Science Engagement Executive Board (Jan. 2019 - current)

Adjunct Instructor - Computer Science   Jan. 2014 - Aug. 2016

Northeastern Illinois University, Chicago IL

- Research: NSF IUSE grant targeting the enhancement of academic engagement and learning experience of undergraduate STEM majors, Natural Language Processing: Evaluation of statistical models for determining topics in a collection of documents.

- Teaching: Programming I and II, Server-Side and Client-Side Web Development, Discrete Structures, Computational Methods in Biology, Event-Based Programming

- Advising: Primary advisor for Master student projects

Ph.D. Candidate - Applied Mathematics   Sep. 2003 -
                                                             June 2010

Northwestern University, Evanston IL

- Teaching: Differential Equations, Complex Analysis, Multiple Integration and Vector Calculus, Linear Algebra, Engineering Analysis, Physics

- Research: Interdisciplinary approach to the development of biologically realistic models of hippocampal neurons to determine how hippocampal neurons and neuronal networks integrate and process synaptic information.

EXPERIENCE: PROFESSIONAL

Developer/Consultant   June 2010 -
                                                             Mar. 2013

ThoughtWorks, Inc

Project Descriptions

Client: Major Digital Communications Company, Atlanta/Chicago, Apr. 2012 - Mar. 2013

- Participated as part of a remote team that developed a stand-alone Ruby on Rails application to be used as a system of record for all online transactions.

- Used ActiveMQ and ActiveRecord (MySQL) and collaborated with multiple teams to integrate the system with existing applications.

- Maintained best software development practices through Test-Driven Development (Jasmine, RPsec, Cucumber) and frequent client interaction.

Client: Major US Airline, Dallas TX, Feb. 2011 - Mar. 2012

- Worked on a critical web-based initiative to extend the functionality of a large airline's online site. This consisted of modifications to the primary booking, change, and other flows to allow integration of flights from partner airlines.

- Used agile best practices to implement new features and functionality identified for each development iteration using Java and JavaScript. Code quality was ensured via thorough unit-testing using JUnit, Mockito, and Jasmine.

- Maintained previous functional test suites developed in Ruby.

Client: National Telecommunications Company, Calgary AB, Oct. 2010 - Feb. 2011

- Worked as both developer and UX designer as part of an agile team engaged in developing a Greenfield application using Microsoft Windows Presentation Foundation (WPF).

- The application implemented a representational state transfer (REST) style architecture along with a service-oriented architecture (SOA), which allowed the application to communicate with seven different services including its outside vendors.

Client: Major US Airline, Dallas TX, Feb. 2011 - Mar. 2012

- Worked as a quality assurance analyst during the final stages of a large website release to verify and update existing functionality as previous versions of the website were integrated with new components and framework.

- Maintained and developed automated (Selenium/Ruby) functional tests to enable developers to catch problems in source code quickly prior to manual testing.

TECHNICAL SKILLS

- Programming Languages: Java, C# (.NET), Java, Ruby (Rails), Python, JavaScript, CoffeeScript, HTML, CSS, Groovy, R, Cucumber, MySQL, SQL

- UX Tools: OmniGraffle, Balsamiq Mockups

- Continuous Integration and Code Management Tools: GitHub, TeamCity, Hduson, Jenkins

- Research Software: Matlab, Mathematica, IGOR Pro, Prism, NEURON

- Operating Systems: MacOS, Linux, Windows, Android

AFFILIATIONS

- Association for Computing Machinery

- Society for Neuroscience

- Society for Industrial and Applied Mathematics (SIAM)

- American Physical Society

- Alpha Chi-Zeta Honor Society (Inducted 2001)

AWARDS/FELLOWSHIPS/GRANTS

- Teaching Excellence Award for the 2016-17 Academic Year

- 2018 Student Center for Science Engagement Training Program Grant: Development of a cross-platform application for visualization and back-calculations of volcanic SO2 emissions

- 2017 Student Center for Science Engagement Training Program Grant: Population Dynamics of Leedy's roseroot: A combined field study and mathematical modeling approach

- Google Ignite grant award, March 2017

- National Science Foundation Improving Undergraduate STEM Education (IUSE) grant (2015-current)

- Neurobiology of Information and Storage Training Grant (National Institute of Health, 2006 – 2007)

- National Science Foundation Integrative Graduate Education and Research Traineeship Fellowship 2004 - 2005

- Marine Biological Laboratory Scholarship, August 2004

- Walter P. Murphy Fellowship, Northwestern University, 2002 - 2003

- University of Arkansas at Monticello Division of Music Piano Study and Performance Grant, 2000 - 2002

- Jack Thorpe Scholarship, University of Arkansas at Monticello, 2000

- Laverne Noyes Scholarship, University of Colorado at Boulder, 1996

PEER-REVIEWED JOURNAL PAPERS

1. D.A. Nicholson, R.E. Trana, Y. Katz, W.L. Kath, N. Spruston, Y. Geinisman, "Distance-dependent differences in synapse number and AMPA receptor expression in hippocampal CA1 pyramidal neurons." Neuron 50: 431-442, 2006.

COLLOQUIA

1. Development of an Open-Source Application to Visualize and Backcalculate Volcanic Sulfur Dioxide Emissions. Andrea Valenzuela, Daniela Arriaga, Tamanna Sultana, Elisabet Head, Rachel Trana. 2018 SACNAS The National Diversity in STEM Conference, San Antonio, TX, October 11 - 13, 2018.

2. Visualizing and Analyzing Volcanic Sulfur Dioxide Emissions. Daniela Arriaga, Tamanna Sultana, Andrea Valenzuela, Purushotham Valathur, Elisabet Head, Rachel Trana. 10th Annual SCSE Student Research Symposium, Chicago, IL September 21, 2018.

3. Experiential Research in Introductory STEM Courses: The PEERS project at Northeastern Illinois University. Elisabet Head, Joseph Hibdon Jr., Ken Nicholson, Sudha Srinivas, Rachel Trana. Gordon Research Conference, Physics Research and Education, Rhode Island. June 10-15, 2018.

4. The PEERS project: Engaging Undergraduate Computer Science Students through Research Modules. Rhys Gunther, Akkady Tchaba, Rachel Trana. NEIU Annual Student Research and Creative Activities Symposium, Chicago, IL April 20 2018.

5. Incorporating Student Research into the Introductory STEM Curriculum. Elisabet Head, Joseph Hibdon Jr., Rachel Trana, Ken Nicholson, Paulo H. Acioli, Scott Mayle, and Sudha Srinivas. Chicago Symposium 2018, NEIU and North Park University, April 13 2018.

6. Population Dynamics and Viability Analyses of the Rare and Endangered Plant Leedy's Roseroot (Rhodiola Integrifolia ssp. Leedyi) Rachel Trana, Computer Science; Joel Olfelt, Biology. NEIU 8th Annual Faculty Research & Creative Activities Symposium, Chicago, IL. November 17, 2017.

7. Peer Enhanced Experiential Research, Ken Nicholson, Chemistry; Paulo Acioli, Physics; Sudha Srinivas, Physics; Elisabet Heah, Earth Science; Joseph Hibdon, Mathematics; Lidia Filus, Mathematics, Marcelo Sztainberg, Computer Science, Rachel Trana, Computer Science. NEIU 8th Annual Faculty Research & Creative Activities Symposium, Chicago, IL. November 17, 2017.

8. Introducing Experiential Research in the STEM Classroom: A Tiered Community of Learners and Peer-Leaders. Paulo H. Acioli, Elisabet Head, Joseph Hibdon Jr., Rachel Trana, Ken Nicholson, Sudha Srinivas. AACU Transforming STEM Education, San Francisco, Nov. 2-4 2017

9. A Demographic Study Of Minnesota's Leedy's Roseroo (Rhodiola Integrifolia ssp. Leedyi) Populations Using Logistic Regression Analysis and Projection Matrices, Haiyang Zhu[1], Sergio Batres[1], Stefany Roman[1], Joel Olfelt Ph.D.[1], Rachel Trana Ph.D. Northeastern Illinois University, Chicago, Illinois 9th Annual Student Center for Science Engagement Research Symposium, September 22, 2017.

10. Implementing peer-led research activities in Computer Science: The Peer Enhanced Experiential Research in STEM (PEERS) project at Northeastern Illinois University. Rachel Trana, Sudha Srinivas, Paulo Acioli, Elisabet Head, Joseph Head, Joseph Hibdon, Ken Nicholson. 2017 Summer SENCER Institute, Stony Brook, NY. August 3-7, 2017.

11. The NEIU Peer Enhanced Experiential Research in STEM (PEERS) Project. S. Srinivas, P. Acioli, E. Head, J. Hibdon, and R. Trana. American Association of Physics Teachers Winter Meeting, February 2017. Online.

12. Embedding Research in Undergraduate STEM Curricula: The NEIU PEERS Project. P. Acioli, S. Srinivas, E. Head, K. Nicholson, and R. Trana. American Association of Physics Teachers Winter Meeting, February 2017. Online.

13. The Peer Enhanced Experiential Research in STEM (PEERS) project at Northeastern Illinois University: Mathematics Component. J. Hibdon, S Srinivas, P. Acioli, K. Nicholson, E. Head, R. Trana, M. Sztainberg, and L. Filus. Joint Mathematics Meetings, Seattle, WA., January 2016. Online.

14. The Peer Enhanced Experiential Research in STEM (PEERS) Project at Northeastern Illinois University. S. Srinivas, P. Acioli, K. Nicholson, E. Head, R. Trana, M. Sztainberg and L. Filus. The American Association of Colleges and Universities (AACU) Project Kaleidoscope (PKAL) meeting, November 2015, Transforming STEM Education, Seattle, WA. Online

15. Innovation in Microsatellite Cataloguing: Finding Markers in Midwestern Cattails (Typha Species). R. Strauss, C. Moran, P. Geddes, J. Olfelt, R. Trana, F. Iacobelli. Twenty-Third Annual Student Research and Creative Activities Symposium, April 2015, Student Center for Science Engagement, Northeastern Illinois University. Online (http://bit.ly/1NqEHnw).

16. Dendritic excitability imposes limits on synaptic scaling. R.E. Trana, W.L. Kath, N. Spruston. Program No. 728.9. 2005 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2005. Online.

17. Computational modeling of scaled synaptic inputs on CA1 dendritic shafts and spines. R.E. Trana, Y. Katz, W.L. Kath, N. Spruston. Program No. 737.16. 2004 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2004. Online.

18. Transposon Mutagenesis of Igepon Metabolizing Bacteria. R.E. Trana, R. Nordeen. Journal of the Arkansas Academy of Science, Vol. 56, 2002.