Joel Zirkle

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Education

2015

Ph.D. Candidate in Applied Mathematics, *Indiana University - Purdue University Indianapolis (IUPUI).*
Passed the four required mathematics qualifying exams and the advanced topic exam (oral). Advisor: Dr. Leonid Rubchinsky. The subject is dynamical systems as they apply to neuroscience. My research consists (currently) mostly of mathematical modeling, numerical simulations, parameter analysis, and data visualization. I am also working towards a MS degree in Applied Statistics.

2011 – 2015

BSc with Highest Distinction in Pure Mathematics, *IUPUI*, 3.948 GPA.
Senior Capstone Project: Orthogonal Polynomials with Dr. Maxim Yattselev.

2011 – 2015

BSc Physics, *IUPUI*, 3.948 GPA.
Graduated with highest distinction.

2011 – 2014

Minor in Chemistry, *IUPUI.*

Teaching Experience

2015

Instructor, *Department of Mathematics, IUPUI.*

1. Business Calculus (M119) Spring 2016, Summer 2016.
2. Trigonometry (MA15400) Fall 2016, Spring 2017, Fall 2017, Summer 2018.
3. Fundamentals of Algebra I (MA11000) Fall 2017.
4. Calculus I (MA16500) Spring 2018, Fall 2018.
5. College Algebra (MA15300) Spring 2019.
6. Multidimensional Math (MA17100) Summer 2019.
7. Calculus I for Life Sciences (MA23100) Fall 2019.

2014 – 2015

Assistant Manager, *Mathematics Assistance Center (MAC) @ IUPUI.*
Oversaw daily operations for a facility that employed 100+ persons. Directly managed a team of approximately 10-15 students who tutored calculus. I spearheaded the conversion of Word documents to LaTeX, including the production of a 150+ page reference for the first-semester of calculus. I also produced an in-depth 35+ page reference guide for LaTeX.

2013 – 2014

Calculus Tutor, *MAC @ IUPUI.*
Tutored mathematics ranging from basic algebra to differential equations.

2012 – 2013

Physics Tutor, *Physics Learning Space @ IUPUI.*
Tutored students taking a first-year physics course.

Publications

1. J Zirkle, LL Rubchinsky (2019) Exploring mechanisms of intermittent patterns of neural synchrony. *BMC Neuroscience*, 20(Suppl 1): P270.

Presentations

1. Graduate Student Seminar, Fall 2015. *Bernoulli Polynomials and Numbers.*
2. Graduate Student Seminar, Fall 2016. *State of Stress and Strain.*
3. Graduate Student Seminar, Spring 2017. *Pattern Formation Mechanisms.*
4. On-campus SIAM event, Fall 2017. *Synchronization between Weakly Coupled Neurons.*
5. Graduate Student Seminar, Fall 2017. *Molecular Dynamics.*
6. 2018 Annual Meeting for Greater Indiana Society for Neuroscience. *Spike-timing-dependent plasticity effect on the patterns of neural synchrony.*
7. Computational and Systems Neuroscience Symposium. IUPUI 2018. *Spike-timing-dependent plasticity effect on the patterns of neural synchrony.*
8. Graduate Student Seminar, Spring 2019. *Introduction to Stochastic Differential Equations.*

Awards

1. Graduate Student Teaching Award, Spring 2018.
2. 2015 Yuri Abramovich Memorial Scholarship.
3. 2015 Pure Math Outstanding Senior.

Projects

2016 **Project Euler**, Currently 48 problems solved. Hardest difficulty level solved so far: 60%.

2014 **LaTeXReference Guide**, This is a personal project that details the correct syntax and implementation of a wide variety of LaTeX's uses. Current length is 35+ pages..

Computer Skills

Languages Python, R, LaTeX

Software MATLAB, XPP, SAS

References

Teaching and Professional

- Dr. Jeffrey X. Watt, *Dept. Chair, Mathematical Sciences at IUPUI.* 317 274 4070 or jwatt@iupui.edu
- Dr. Kevin Berkopes, *CEO of Crossroads Education.* berkopek@iupui.edu

Research and Academic

- Dr. Leonid Rubchinsky (doctoral advisor). *Associate Professor of Mathematics at IUPUI.* 317 274 9745 or lrubchin@iupui.edu