

MARK J. PANAGGIO

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EDUCATION

Doctor of Philosophy, Applied Mathematics September 2014
Northwestern University, Evanston, IL GPA: 3.96/4.00

Master of Science, Applied Mathematics June 2010
Northwestern University, Evanston, IL GPA: 3.81/4.00

Bachelor of Arts, Mathematics May 2009
Bachelor of Science, Engineering with Electrical Emphasis Summa Cum Laude
Hope College, Holland, MI GPA: 3.98/4.00

ACADEMIC APPOINTMENTS

Assistant Professor August 2016 - Present
Mathematics Department, Hillsdale College, Hillsdale, MI

Visiting Assistant Professor August 2014 - June 2016
Mathematics Department, Rose-Hulman Inst. of Technology, Terre Haute, IN

RESEARCH EXPERIENCE

Research Mentor
Student: Justin Rogers (Hillsdale College) Fall 2017 - Present
Title: "Classification of audio signals through machine learning"
Student: Nicholas Rush (Hillsdale Academy) Fall 2017
Title: "The effects of twisting on distance measurements in track and field"
Students: Dylan Linville (Rose-Hulman) Summer 2016
and Daniel Trugillo Martins Fontes (University of Sao Paolo)
Title: "Spontaneous synchrony on graphs and the emergence of order from disorder"

Graduate Research Assistant September 2010 - June 2014
Department of Engineering Science and Applied Mathematics, Northwestern University, Evanston, IL
Advisor: Professor Daniel Abrams
Dissertation: Spot and spiral chimera states: dynamical patterns in networks of coupled oscillators

Undergraduate Research Assistant January 2007 - July 2009
Department of Engineering, Hope College, Holland, MI
Advisor: Professor Roger Veldman

PUBLICATIONS

1. "Chimera states in two populations with heterogeneous phase lag", with EA Martens & C. Bick, Chaos (2016)
2. "Basins of attraction for chimera states" with EA Martens & DM Abrams, New Journal of Physics (2016).

3. “Chimera states in networks of phase oscillators: the case of two small populations” with DM Abrams, P Ashwin & CR Laing, *Physical Review E* (2016).
4. “Elvis lives: mathematical surprises inspired by Elvis, the Welsh corgi” with SJ Bacinzi & TJ Penning, *College Mathematics Journal*, (2015).
5. “Chimera states: coexistence of coherence and incoherence in networks of coupled oscillators” with DM Abrams, *Nonlinearity*, (2015).
6. “Chimera states on the surface of a sphere” with DM Abrams, *Physical Review E*, (2015).
7. “Improving a Fuel Cell Assembly Process” with I Diakite, DA Edwards, B Emerick, AL Peace, C Raymond & M Zumbur, *Mathematics-in-Industry Case Studies*, (2014).
8. “Symmetry breaking in optimal timing of traffic signals on an idealized two-way street” with BJ Ottino-Löffler, P Hu, & DM Abrams, *Physical Review E*, (2013).
9. “Chimera states on a flat torus” with DM Abrams, *Physical Review Letters*, (2013).
10. “A model balancing cooperation and competition explains our right-handed world and the dominance of left-handed athletes” with DM Abrams, *Journal of the Royal Society: Interface*, (2012).
11. “Lightweight blast mitigating materials for structures under close-in blast loading” with R Veldman & J Ari-Gur, *AIAA Proceedings*, (2009).

TECHNICAL PRESENTATIONS

1. “Mathematical models of oscillation and synchronization on networks.”
Rose-Hulman Undergraduate Research Conference, April 21, 2017, Terre Haute, IN (short course).
2. “Elvis lives: An exploration of greedy and global path optimization in a game of fetch”
MAA Mathfest, August 5-8, 2015, Washington, DC (contributed talk).
Indiana MAA Section Meeting, March 13-14, 2015, Upland, IN (contributed talk).
Hillsdale College, February 28, 2017, Hillsdale, MI (KME Lecture).
3. “Swarms of fireflies to restarting the heart: modeling the onset of synchrony”
Calvin College, February 4, 2016, Grand Rapids, MI (department seminar).
Hillsdale College, January 27, 2016, Hillsdale, MI (department seminar).
Hope College, February 7, 2017, Holland, MI (department seminar).
4. “Not so sinister after all: How mathematical models can explain the resilience of the left-handed minority”
Joint Mathematics Meetings, January 6-9, 2015, Seattle, WA (contributed talk).
Rose-Hulman Institute of Technology, February 19, 2014, Terre Haute, IN (department seminar).
Grace College, February 17, 2014, Winona Lake, IN (department seminar).
Alma College, February 5, 2014, Alma, MI (department seminar).
Hope College, January 27, 2014, Holland, MI (department seminar).
Albion College, November 3, 2016 Albion, MI (department seminar).
Hillsdale College, November 10, 2016, Hillsdale, MI (department seminar).
5. “Greedy and global optimization from the beach to the boardroom”
Rose-Hulman Institute of Technology, February 1, 2016, Terre Haute, IN (department seminar).
6. “Basins of attraction for chimera states”
Network Frontier Workshop, December 6-7, 2015, Evanston, IL (contributed talk)
7. “Synchronization and pattern formation in networks of coupled oscillators”
Rose-Hulman Institute of Technology, September 23, 2015, Terre Haute, IN (department seminar)
Michigan MAA Section Meeting, April 10-11, 2015, Holland, MI (contributed talk).
Ball State University, April 9, 2015, Muncie, IN (department seminar).
8. “Chimera states on periodic spaces”

- Chicago Area Student SIAM Conference, April 5, 2014, Evanston, IL (invited talk).
 Northwestern University, February 7, 2014, Evanston, IL (student seminar talk).
 Joint Mathematics Meetings, January 15-18, 2014, Baltimore, MD (contributed talk).
 SIAM Dynamical Systems Conference, May 19-23, 2013, Snowbird, UT (contributed talk).
 Dynamics Days, January 3-6, 2013, Denver, CO (poster).
9. "Chimera states in networks of non-locally coupled oscillators"
 Network Frontier Workshop, December 4-6, 2013, Evanston, IL (contributed talk).
 10. "Fuel Cell Assembly Process Flow for High Productivity"
 Mathematical Problems in Industry Workshop, June 11-15, 2012, Newark, DE (final results report).
 11. "A model balancing cooperation and competition explains our right-handed world and the dominance of left-handed athletes"
 Dynamics Days, January 4-7, 2012, Baltimore, MD (poster).
 12. "Study of pressure waves from close-in blasts"
 Hope College Celebration of Undergraduate Research, March 27, 2009, Holland, MI (poster).
 Midstates Consortium for Math and Science Undergraduate Research Symposium, October 31 - November 2, 2008, St. Louis, MO (poster).
 Hope College Celebration of Undergraduate Research Luncheon, July 11, 2008, Holland, MI (invited talk).
 13. "The investigation of blast mitigating materials for aircraft hardening"
 Hope College Celebration of Undergraduate Research, March 28, 2008, Holland, MI (poster).

OTHER PRESENTATIONS

1. "Mathematics graduate school."
 Kappa Mu Epsilon, November 9, 2017, Hillsdale College, MI (panel presentation).
2. "Non-academic careers for mathematicians."
 Applied Math Club, October 3, 2017, Hillsdale College, MI (talk).
3. "The academic job market: applications and pre-campus interviews."
 Indiana MAA Section Meeting, March 19, 2016, Franklin, IN (graduate student workshop).

TEACHING EXPERIENCE

Department of Mathematics, Hillsdale College, Hillsdale, MI August 2016 - Present
 Assistant Professor

Courses: Calculus I, Calculus II, Multivariable Calculus, Differential Equations, Mathematical Modeling, Numerical Analysis, Scientific Computing

Mathematics Department, Rose-Hulman Inst. of Technology, Terre Haute, IN August 2014 - June 2016
 Visiting Assistant Professor

Courses: Calculus II, Differential Equations, Vector Calculus, Mathematical Modeling, Engineering Statistics

Summer EXCEL Program, Northwestern University, Evanston, IL June 2013 - July 2013
 Instructor

Courses: Calculus III

Department of Engineering Science and Applied Mathematics September 2010 - June 2013
 and Department of Mathematics, Northwestern University, Evanston, IL
 Graduate Teaching Assistant

Courses: Calculus III and IV, Honors Calculus for Engineers, Methods of Applied Mathematics, Differential Equations of Mathematical Physics

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Freelance	January 2007 - June 2014
Academic Support Center, Hope College, Holland, MI	November 2006 - May 2009
Department of Engineering, Hope College, Holland, MI	January 2007 - December 2008
Mathematics and Engineering Tutor	
Courses: Calculus I and II, Multivariate Calculus I and II, Functions, Statistics and Trigonometry, Engineering Analysis, Electronics I, Scientific Computer Programming	

SERVICE

Colloquium Series Co-organizer	August 2017 - Present
Academic Technology Committee Member	August 2017 - Present
Mathematics Hiring Committee Member	August 2017 - Present
WeBWorK Online Homework System Administrator	December 2016 - Present
Hillsdale College, Hillsdale, MI	

Alfred R. Schmidt Freshman Mathematics Competition Judge	September 2014, September 2015
Volunteer Aide, High School Mathematics Competition	November 2014
Rose-Hulman Institute of Technology, Terre Haute, IN	

Referee/Reviewer	January 2013 - Present
Chaos, Europhysics Letters, International Journal of Modern Physics B, Journal of Physics A, Journal of Theoretical Biology, Nonlinearity, Physica A, Physica D, Physical Review Letters, Physical Review E, Physics Letters A, PLOS ONE, Proceedings of the National Academy of Sciences of the USA, Scientific Reports	

Undergraduate Research Poster Judge	
Joint Mathematics Meetings, San Antonio, Texas	December 2014
Joint Mathematics Meetings, Seattle, Washington	December 2015

Math Placement Advisor, McCormick School of Engineering	September 2013
Bilingual Recruiter for The Graduate School at XXVIII Seminario	February 2013
Interuniversitario de Investigación Matemática, Universidad Metropolitana, San Juan, Puerto Rico	
Volunteer Instructor, ESAM Preliminary Exam Review Sessions	October 2010
Northwestern University, Evanston, IL	

ADVISING AND MENTORING

Applied Math Club Faculty Advisor, Hillsdale College	September 2017 - Present
Major Advisor, Hillsdale College	August 2017 - Present
Core Advisor (6 students), Hillsdale College	August 2017 - Present
Ultimate Frisbee Club Advisor, Hillsdale College	June 2017 - Present
Mathematical Contest in Modeling Coach, Hillsdale College	January 2017 - Present

WORKSHOPS AND TRAINING

Online coursework	July 2017 - Present
Python Programming, Object Oriented Programming, Data Analysis, Data Science, Machine Learning, Probabilistic Graphical Models, Game Theory	

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Mathematical Problems in Industry Workshop
University of Delaware, Newark, DE

June 2015, June 2012

Project NExT Professional Development Workshops
Mathematical Association of America

August 2014 - August 2015

Graduate Teaching Certificate Program
Searle Center for Advancing Learning & Teaching, Northwestern University, Evanston, IL

September 2012 - August 2013

Graduate Student Mathematical Modeling Camp
Rensselaer Polytechnic Institute, Troy, NY

June 2012

SKILLS

Mathematics: Modeling, perturbation theory, ordinary and partial differential equations, numerical methods, bifurcation theory, numerical optimization.

Statistics/Machine Learning: Modeling, hypothesis testing, confidence intervals, ANOVA, regression, classification, support vector machines, decision trees, random forests, neural networks.

Programming: MATLAB, Python, Maple (advanced). R, Mathematica, Minitab, C++, Java, VBA, SQL (basic).

CAD/FEA (engineering): Pro-Engineer WildFire (intermediate). LS-DYNA, ANSYS 11 (basic).

Languages: Spanish (fluent).

Communication: LaTeX, Microsoft Word, Excel, PowerPoint (advanced).

HONORS AND MEMBERSHIPS

Project Next Fellow (2014)

Mathematical Association of America (2014)

American Society for Engineering Education (2014)

Society for Industrial and Applied Mathematics (2013)

Royal E. Cabell Society of Fellows (2010)

Phi Beta Kappa National Honor Society (2009)

Pi Mu Epsilon Mathematics Honor Society (2008)

Hope College Dean's List (2005-2009)

AWARDS

Royal E. Cabell Terminal Year Fellowship (2013)

Royal E. Cabell First Year Fellowship (2009)

Hope College Senior Engineering Prize (2009)

Hope College Sigma Xi Research Award (2009)

Physics and Engineering REU Da Vinci Research Notebook Competition 1st Place (2008)

Hope College Dean's Science Division Research Award (2008)

Hope College John Kleinhessel Mathematics Award (2007)

Hope College Freshman Engineering Award (2006)