

JOHN A. GEMMER

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EDUCATION

Ph.D. Applied Mathematics, University of Arizona May 2012
Dissertation: Shape Selection in the non-Euclidean Model of Elasticity
Advisor: Shankar Venkataramani

M.S. Applied Mathematics, University of Arizona December 2008

B.S. Mathematics and Physics, Millersville University of Pennsylvania May 2006
Magna cum laude, honors in math and physics

ACADEMIC APPOINTMENTS

Postdoctoral Researcher, University of Arizona July 2012 – Present
Arizona Center for Mathematical Sciences

RESEARCH INTERESTS

I am interested in the modeling and analysis of phenomena occurring in the physical sciences. Many of the problems I study are nonlinear and the mathematical techniques I use in my research range from applied analysis, variational techniques, asymptotic analysis, differential geometry and the simulation of numerical models. Particular areas and problems I have studied include pattern formation in swelling thin elastic sheets and recently conical waves, filamentation, and pulse splitting in optics.

PUBLICATIONS AND PREPRINTS

J.A. Gemmer, S.C. Venkataramani, *Periodic patterns in hyperbolic non-Euclidean plates*, (2013), (Invited article in preparation to be submitted to Soft Matter)

J.A. Gemmer, S.C. Venkataramani, *Shape transitions in hyperbolic non-Euclidean plates*, arXiv1209.0031G (2012), (preprint)

J.A. Gemmer, S.C. Venkataramani, *Defects and boundary layers in non-Euclidean plates*, arXiv1203.4329G (2012), (to appear in Nonlinearity)

J. A. Gemmer, S.C. Venkataramani, *Shape selection in non-Euclidean plates*, Physica D: Nonlinear Phenomena, 240(19) (2011), pp. 1536-1552.

J. A. Gemmer, M. Nolan, R. Umble, *Generalizations of the brachistochrone problem*, Pi Mu Epsilon Journal, 13 (4) (2011), pp. 207-218

SCIENTIFIC ACTIVITIES

June 9-12, 2013 – Invited Speaker: *SIAM Conference on Mathematical Aspects of Material Science*, Philadelphia, PA

October 7-12, 2012 – Participant: *2012 COFIL 4th International Symposium on Filamentation*, Tucson, AZ

September 18, 2012 – Participant: *2012 Air Force Office of Scientific Research (AFOSR) Non-Linear Optics Meeting*, Albuquerque NM.

September 10, 2012 – Presented Poster: *Shape Transitions in Hyperbolic non-Euclidean Plates*. Oxford UK: International Conference on Nonlinear Partial Differential Equations

September 3, 2012 – Invited Speaker: *Shape Transitions in Hyperbolic non-Euclidean Plates*, Lorentz Institute (Leiden, NL): Modern perspectives on thin sheets: Geometry, Mechanics, and Statistical Physics.

June 21-29, 2012 – Participant: *NSF PIRE Summer School: New Frontiers in Multiplescale Analysis and Computing for Materials*: IMA.

May 24, 2012 – Invited Speaker: *Defects and Boundary Layers in non-Euclidean Plates*, TU Munich: Joint TU Munich – Augsburg Analysis Seminar.

April 27, 2012 – Invited Speaker: *Shape Selection in the non-Euclidean Model of Elasticity*, University of Arizona: Al Scott Memorial Lecture.

January 5, 2012 – Presented: *Periodic Rippling in Hyperbolic non-Euclidean Plates*. Boston: MAA Joint Mathematics Meeting - AMS Special Session.

November 14, 2011 – Presented: *Shape Selection in Hyperbolic non-Euclidean Plates*. San Diego: SIAM Conference on Partial Differential Equations.

October 14, 2011 – Presented Poster: *Shape Selection in Swelling Thin Elastic Sheets*. Fifth Annual Mathematical Field of Dreams Conference.

October 7, 2011 – Invited Speaker: *Periodic Shapes in Swelling Thin Elastic Sheets*. University of Arizona: Recent progress in wave processes in nature.

May 18, 2011 – Invited Speaker: *Shape Selection in Hyperbolic non-Euclidean Plates*. IMA Hot Topics Workshop, Strain Induced Shape Formation: Analysis, Geometry and Materials Science.

May 16, 2011 – Presented Poster: *Differential Growth and Ripples in Thin Elastic Sheets*. IMA Hot Topics Workshop Strain Induced Shape Formation: Analysis, Geometry and Materials Science.

April 2, 2011 – Presented: *Shape Selection in Hyperbolic non-Euclidean Plates*. Tucson: Los Arizona Days.

March 16, 2010 – Presented: *Shape Selection in Non-Euclidean Plates*. Portland Oregon: APS March Meeting.

April 16-17, 2009 – Participant: *Great Circles Workshop on Math Circles*. MSRI.

AWARDS, FELLOWSHIPS AND HONORS

- Al Scott Memorial Lecture, April 27, 2012
- University of Arizona VIGRE Fellowship, May 2010 – December 2010
- University of Arizona Galileo Scholar Award, May 2010
- University of Arizona Graduate College Fellowship, January 2007 – May 2007
- SSM Award for Outstanding Poster, May 2006
- Class of 1866 Award, May 2006
- Edna H. Myers Scholarship in Mathematics, August 2005
- SIAM Student Research Award, August 2005

TEACHING EXPERIENCE

University of Arizona, Tucson, AZ Fall 2006, Fall 2007 – Fall 2008

Graduate Teaching Assistant, Mathematics Department

Primary instructor: Responsible for the preparation and delivery of all lectures, construction of all exams and worksheets, and the grading of homework assignments and exams for the following courses:

1. Trigonometry – Fall 2006
2. College Algebra – Fall 2007
3. Calculus Preparation – Spring 2008
4. Calculus – Fall 2008

University of Arizona, Tucson, AZ June 2008 – August 2008

New Start Instructor, University of Arizona

New Start Summer Program, Tucson: Taught a summer Calculus Preparation course to incoming freshman. Prepared a workshop for students on how to apply for jobs. The program focused on preparing underrepresented students for college life both academically and socially.

University of Arizona, Tucson, AZ Fall 2008

Graduate “Super” Teaching Assistant, University of Arizona

Senior graduate teaching assistant for the first year course graduate course Principles of Analysis. Duties included running a weekly review session on topics ranging from point set topology, metric spaces, etc.

University of Arizona, Tucson, AZ Spring 2009, 2011, 2012

Graduate Mentor, University of Arizona

Mentor for a group of undergraduate students enrolled in University of Arizona's Mathematical Modeling course. Projects I have mentored include:

- Modeling of virion growth.
- Modeling crowd dynamics through agent based simulations.
- Modeling adaptation in Lotka-Volterra systems.

University of Arizona, Tucson, AZ
Graduate Mentor, University of Arizona

December 2009 – August 2010

Prepared graduate students for the University of Arizona's applied mathematics PhD qualifying exam. Duties included leading two three hour review hour sessions per week covering topics in applied analysis, techniques in applied mathematics and numerical analysis.

SERVICE TO THE UNIVERSITY AND COMMUNITY

Calculus Advisement Program, August 2012, *University of Arizona, AZ USA*. Advised entering freshman on how to succeed in their calculus courses, on specific mathematics courses to take in the future, and on internship opportunities.

Organizer of University of Arizona Calculus Workshop, August 2011, *University of Arizona, AZ USA*. Organized and ran a week long workshop preparing entering students for their calculus courses.

Founder and Organizer of University of Arizona Graduate Analysis Lecture Series, January 2010 – August 2011, *University of Arizona, AZ USA*. The graduate student analysis lecture series is a weekly meeting of applied and pure mathematics students that discusses current analytical tools that we use in our research.

SIAM Student Chapter Member at Large, January 2009 – May 2009: *University of Arizona, AZ USA*. Duties included helping out the club when needed. I specifically coordinated a panel discussion on how to apply for post doctoral positions and I organized a presentation by a physics faculty member.

Siam Student Chapter President, September 2009 – May 2010: *University of Arizona, AZ USA*. President of student run chapter of SIAM. Duties include arranging presentations from faculty, coordinating a mini conference on careers in applied mathematics, creating a fun day long mathematics activity for elementary school students, and overseeing the other SIAM officers.

Invited Speaker at Tucson High Magnet School, November 2009 – Presented *Mathematics in the 21-st Century*, a presentation given to motivate high school students to pursue a career in mathematics.

Tucson Math Circle Organizer, January 2009- May 2009: *University of Arizona, AZ USA*. Organizer for the Tucson Math circle. I constructed weekly mathematics activities for elementary and middle school students.

Student Brown Bag Organizer, August 2008 – May 2009: *University of Arizona, AZ USA*. Organizer for student run weekly colloquium.

SEMINAR PRESENTATIONS

2012 – *Spatially Localized Pulses*. University of Arizona: College of Optical Sciences MURI meeting.

2012 – *Conical Waves: An Overview*. College of Optical Sciences, ACMS meeting.

2011 – *Periodic Shapes in Swelling Thin Elastic Sheet*. University of Arizona: Analysis and its Applications Seminar.

2011 – *Introduction to Nonlinear Elasticity and non-Euclidean Plates*. University of Arizona: Brown Bag Graduate Student Colloquium.

2011 – *Shape Selection in Non-Euclidean Plates*. University of Arizona: Mathematical Physics Seminar.

2010 – *Shape Selection in Non-Euclidean Plates*. University of Arizona: Analysis and its Applications Seminar.

2010 – *Shape Selection in Non-Euclidean Plates Part 2*. University of Arizona: mathematics graduate colloquium.

2010 – *Shape Selection in Non-Euclidean Plates Part 1*. University of Arizona: Brown Bag graduate student colloquium.

2009 – *Elastic Discs and the Ripples in Leaves*, University of Arizona: Brown Bag graduate student colloquium.

2009 – *Inducible Shape Transitions in Thin, Non-Euclidean, Elastic Discs*. University of Arizona: Analysis and its Applications Seminar.

2008 – *How to Control a Front Wheel Drive Bike*. University of Arizona: Brown Bag graduate student colloquium.

2007 – *Nonlinear Dynamical Control Theory and How to Parallel Park a Car*. University of Arizona: RTG presentation.