John A. Gemmer

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Education

PhD 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 mathematics and physics

Academic Appointments

NSF-RTG Postdoctoral Fellow, Brown University — July 2013 - Present
Division of Applied Mathematics

Postdoctoral Research Associate, University of Arizona
Arizona Center for Mathematical Sciences — July 2012 - June 2013

Funding, Awards, Fellowships and Honors

1. DMS, Applied Mathematics Grant (Pending) — November, 2015
2. NSF Postdoctoral Fellowship (Applied) — October, 2013
3. NSF Postdoctoral Fellowship (Applied) — October, 2012
4. University of Arizona, Al Scott Memorial Lecture — Apr. 27, 2012
5. University of Arizona, VIGRE Fellowship — May 2010 - Dec. 2010
6. University of Arizona, Galileo Scholar Award — May 2010
7. University of Arizona, Graduate College Fellowship — Jan. 2007 - May 2007
8. Millersville University, SSM Award for Outstanding Poster — May 2006
9. Millersville University, Class of 1866 Award — May 2006
10. Millersville University, Edna H. Myers Scholarship — Aug. 2005
11. SIAM Student Research Award — Aug. 2005

Publications

In press:

1. Gemmer, J. A., Venkataramani, S. C., Durfee, C. G., & Moloney, J. V. (2014). Optical beam shaping and diffraction free waves: a variational approach. *Physica D. Nonlinear Phenomena,* 283(15), 15-28.
2. Gemmer, J. A., & Venkataramani, S. C. (2013). Shape transitions in hyperbolic non-Euclidean plates. *Soft Matter*, 9(34), 8151-8161.
3. Durfee, C. G., Gemmer, J., & Moloney, J. V. (2013). Phase-only shaping algorithm for Gaussian-apodized Bessel beams. *Optics express*, 21(13), 15777-15786.
4. Gemmer, J. A., & Venkataramani, S. C. (2012). Defects and boundary layers in non-Euclidean plates. *Nonlinearity*, 25(12), 3553.
5. Gemmer, J. A., & Venkataramani, S. C. (2011). Shape selection in non-Euclidean plates. *Physica D: Nonlinear Phenomena*, 240(19), 1536-1552.
6. Gemmer, J.A., Nolan M., Umble R. (2011), Generalizations of the brachistochrone problem, *Pi Mu Epsilon Jounral*, 13(4), 207-218. (Undergraduate Thesis)

Preprints:

7. Sabbah, S., Gemmer, J., Berson, D., et. al. (2015) Topographic variation in directional tuning of ON-DS retinal ganglion cells. (preprint).
8. Gemmer, J. A., Venkataramani, S. C., Sharon, E. (2015) Isometric immersions and self-similar buckling in Non-Euclidean elastic sheets. (preprint).
9. Vijaykumar, K., Kesari, H., Gemmer, J. (2015). The HIC score is ill-posed. (preprint).

In progress:

10. Vijaykumar, K., Kesari, H., Gemmer, J. (2015). Effective toughness of materials with spatially dependent fracture energy density. (In preparation).
11. Cofoid, C., Gemmer, J, Sandstede, B., Simper, M,. (2015) Escape problem for perturbed gradient systems. (in preparation).

Scientific Activities

Invited talks:

1. Jan. 2016 — The Kavli Institute for Theoretical Physics: Geometry Elasticity, Fluctuations, and Order in 2D Soft Matter. Santa Barbara, CA.
2. Dec. 2015 — SIAM Conference on Partial Differential Equations (MS12). Scottsdale, AZ.
3. Sep. 2012 — Lorentz Institute: Modern perspectives on thin sheets: Geometry, Mechanics, and Statistical Physics, Leiden, NL.
4. April 2012 — Al Scott Memorial Lecture, University of Arizona, AZ.
5. May 2011 — IMA Hot Topics Workshop, Strain Induced Shape Formation: Analysis, Geometry and Materials Science. Minneapolis, MN.

Contributed and seminar talks:

6. Jan. 2016 — Joint Mathematics Meeting, AMS Special Session on Problems in Geometry and Design of Materials, Seattle, WA.
7. Oct. 2015 — SES 2015 Mechanics of Soft Materials, Texas A&M University, TX.
8. Sep. 2015 — Physical Mathematics Seminar, MIT, MA.
9. Apr. 2015 — Dynamical Systems Seminar. Boston University, MA.
10. Nov. 2014 — Applied and Computational Math Seminar, George Mason University, VA.
11. Sep. 2014 — Applied Math Seminar, Colorado State University, CO.
12. Sep. 2014 — Analysis and it Applications Seminar, University of Arizona, AZ.
13. Aug. 2014 — SIAM Conference on Nonlinear Waves and Coherent Structures, University of Cambridge, UK.
14. July 2014 — Park City Mathematics Research Program, Park City, UT.
15. Apr. 2014 — Soft Matter Journal Club, University of Massachusetts Amherst MA.
16. Sep. 2013 — Millersville University Physics Colloquium, Millersville University, PA.
17. Mar. 2013 — Millersville University and Franklin Marshall College Joint Mathematics Colloquium, Millersville University, PA.
18. Mar. 2013 — Division of Applied Mathematics LCDS Seminar. Brown University, RI.
19. May 2012 — Joint TU Munich – Augsburg Analysis Seminar, TU Munich, DE.
20. Jan. 2012 — Joint Mathematics Meeting, AMS Special Session on Some Nonlinear Partial Differential Equations: Theory and Application, Boston MA.
21. Oct. 2011 — Recent Progress in Wave Processes in Nature, University of Arizona, AZ.
22. Apr. 2011 — Los Arizona Days, University of Arizona, AZ.
23. Mar. 2010 — APS March Meeting, Portland, OR.

Poster presentations and participation in workshops and conferences:

24. July 2015 — Participant: PIRE Workshop: From Grain Boundaries to Stochastic Homogenization, Leipzig, DE.
25. June 2014 — Presented Poster: Retinal Neurobiology and Visual Processing Conference, Saxton River, VT.
26. Oct. 2012 — Participant: 2012 COFIL 4^{th} International Symposium on Filamentation, Tucson, AZ.
27. Sept. 2012 — Participant: 2012 Air Force Office of Scientific Research (AFOSR) Non-Linear Optics Meeting, Albuquerque, NM.
28. Sept. 2012 — Presented Poster: International Conference on Nonlinear Partial Differential Equations, Oxford University UK.
29. June 2012 — Participant: NSF PIRE Summer School: New Frontiers in Mulitplescale Analysis and Computing for Materials: IMA, Minneapolis MN.
30. May 2011 — Presented Poster: IMA Hot Topics Workshop Strain Induced Shape Formation: Analysis, Geometry and Materials Science, IMA, Minneapolis, MN.
31. April 2009 — Participant: Great Circles Workshop on Math Circles, MSRI, Berkeley, CA.

Teaching Experience

Courses taught as primary instructor:

- Spring 2016 — APMA 0360, *Methods of Applied Mathematics II,* Brown University.
- Fall 2015 — APMA 0200, *Introduction to Mathematical Modeling,* Brown University.
- Spring 2015 — APMA 1360, *Topics in Chaotic Dynamics*, Brown University.
- Fall 2014 — APMA 1930M, *Applied Asymptotic Analysis*, Brown University.
- Spring 2014 — APMA 1360, *Topics in Chaotic Dynamics*, Brown University.
- Fall 2013 — AMPA 2811Q, *Calculus of Variations,* Brown University.
- Fall 2008 — Math 124, *Calculus I,* The University of Arizona.
- Spring 2008 — Math 120R, *Calculus Preparation,* The University of Arizona.
- Fall 2007 — Math 112, *College Algebra,* The University of Arizona.
- Fall 2006 — Math 110, *Trigonometry,* The University of Arizona.

Undergraduate research mentored:

- Fall 2015 — Present: Ragna Eide (Brown University). Honors thesis.
- Summer 2015 — Present: Ekaterina Kryuchkova (Brown University). Honors thesis.
- Summer 2015 — Christian Cofoid (Boston College) and Mackenzie Simper (University of Utah). REU project.
- Fall 2014 — Fall 2015: Chris Grimm (Brown University) and Zachary Nado (Brown University). Independent research project.

Other types of teaching experience:

- Fall 2011 — *Organizer of The University of Arizona Calculus Workshop*, The University of Arizona. Organized a week long workshop preparing entering students for their calculus courses.
- Spring 2009, 2011, 2012, 2013 — *Graduate mentor for The University of Arizona's Mathematical Modeling course,* The University of Arizona. Projects mentored include modeling virion growth, modeling crowd dynamics through agent based simulations, modeling adaptation in Lotka-Volterra systems, analyzing the stability of inverted pendulums.
- Winter 2009, Summer 2010 — "*Super TA" for applied mathematics qualifying exam*, The University of Arizona. Facilitated weekly study sessions for the PhD qualifying exam in applied mathematics.
- Fall 2008 — *"Super TA" for Math 527: Principles of Analysis*, The University of Arizona. Ran weekly review sessions for the course. Duties included giving specialized lectures and facilitating problem sessions.
- Summer 2008 — *New Start Summer Program Instructor*, The University of Arizona. Taught a summer calculus preparation course to incoming freshman. Prepared a workshop for students on how to to apply for jobs. The program focused on preparing underrepresented students for college life both academically and socially.

Service

Service to the University:

- Summer 2015 — *Member of qualifying exam committee for Michael Monn (Engineering)*, Brown University.
- Spring 2015 — *Organizer for RTG Workshop on Agent Based Modeling,* Brown University.
- Fall 2013 — Spring 2016: *Co-organizer for the Lefchetz Center for Dynamical Systems Seminar,* Brown University.
- Fall 2013, Fall 2014 — *Co-organized RTG Recruitment Workshop entitled "Integrating Dynamics and Stochastics,"* Brown University.
- Fall 2012 — *Calculus Advisement Program*, The University of Arizona. Advised entering freshmen on how to succeed in their calculus courses, on specific mathematics courses to take in the future and on internship opportunities.
- Fall 2009 - Spring 2011 — *Founder and Organizer of the The University of Arizona Graduate Analysis Lecture Series.* Facilitated a weekly meeting with applied and pure mathematics students in which we discussed current analytical tools used in our research.
- Fall 2009 - Spring 2010 — *SIAM Student Chapter President,* The University of Arizona.
- Spring 2009 — *Tucson Math Circle Co-Organizer,* The University of Arizona. Facilitated weekly mathematics activities for elementary and middle school students.
- Fall 2008 - Spring 2009 — *SIAM Student Chapter Member at Large*. The University of Arizona.
- Fall 2008 - Spring 2009 — *Student Brown Bag Organizer.* The University of Arizona. Organized weekly student applied mathematics colloquium.

Service to the Community:

- Dec. 2015: *Co-Organizer Session M66: Free Boundary Problems Involving Interfaces and/or Elastic Deformations.* SIAM Conference on Analysis of Partial Differential Equations.

Referee:

- Nonlinearity
- Physical Review E
- Physical Review Letters
- SIAM Journal on Applied Dynamical Systems (SIADS)
- Canadian Journal of Physics

References

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