

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 mathematics and physics

Academic Appointments

- Assistant Professor**, Wake Forest University July 2016 - Present
Department of Mathematics and Statistics
- Visiting Assistant Professor**, University of Chicago Jan. 2020 - Mar. 2020
Committee on Computational and Applied Mathematics
- Visiting Assistant Professor**, University of North Carolina Aug. 2019 - Dec. 2019
Department of Mathematics
- NSF-RTG Postdoctoral Fellow**, Brown University July 2013 - June 2016
Division of Applied Mathematics
- Postdoctoral Research Associate**, University of Arizona July 2012 - June 2013
Arizona Center for Mathematical Sciences

Funding, Awards, Fellowships and Honors

1. Archie Fund for the Arts and Humanities	Jan. 2020 - March 2020
2. Sterge Faculty Fellowship	July 2019 - July 2022
3. CRADLE VI Fellow	Sep. 2017 - Sep. 2019
4. NSF-RTG Postdoctoral Fellowship	July 2013 - June 2016
5. University of Arizona, Al Scott Memorial Lecture	April 27, 2012
6. University of Arizona, VIGRE Fellowship	May 2010 - Dec. 2010
7. University of Arizona, Galileo Scholar Award	May 2010
8. University of Arizona, Graduate College Fellowship	Jan. 2007 - May 2007
9. Millersville University, SSM Award for Outstanding Poster	May 2006
10. Millersville University, Class of 1866 Award	May 2006
11. Millersville University, Edna H. Myers Scholarship	Aug. 2005
12. SIAM Student Research Award	Aug. 2005

Publications

In press:

1. Chen, Y., Gemmer, J. A., Silber, M., & Volkening, A. (2019). Noise-induced tipping under periodic forcing: Preferred tipping phase in a non-adiabatic forcing regime. *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 29(4), 043119.
2. Gemmer, J. A., Moon, G., & Raynor, S. G. (2018). Solutions to a two-dimensional, Neumann free boundary problem. *Applicable Analysis*, 1-18.
3. Sabbah, S., Gemmer, J. A., Berson, D., et. al. (2017). A retinal code for motion along the gravitational and body axes. *Nature*. 546(7659), 492-497.
4. Grimm, C., & Gemmer, J. A. (2017). Weak and strong solutions to the inverse-square brachistochrone problem on circular and annular domains. *Involve, a Journal of Mathematics*, 10(5), 833-856.
5. Gemmer, J., Sharon, E., Shearman, T., & Venkataramani, S. C. (2016). Isometric immersions, energy minimization and self-similar buckling in non-Euclidean elastic sheets. *EPL (Europhysics Letters)*, 114(2), 24003.
6. 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.
7. Gemmer, J. A., & Venkataramani, S. C. (2013). Shape transitions in hyperbolic non-Euclidean plates. *Soft Matter*, 9(34), 8151-8161.
8. Durfee, C. G., Gemmer, J., & Moloney, J. V. (2013). Phase-only shaping algorithm for Gaussian-apodized Bessel beams. *Optics express*, 21(13), 15777-15786.
9. Gemmer, J. A., & Venkataramani, S. C. (2012). Defects and boundary layers in non-Euclidean plates. *Nonlinearity*, 25(12), 3553.
10. Gemmer, J. A., & Venkataramani, S. C. (2011). Shape selection in non-Euclidean plates. *Physica D: Nonlinear Phenomena*, 240(19), 1536-1552.
11. Gemmer, J.A., Nolan M., Umble R. (2011), Generalizations of the brachistochrone problem, *Pi Mu Epsilon Journal*, 13(4), 207-218.

In progress:

12. Cofoid, C., Gemmer, J. A., Sandstede, B., Simper, M., Escape problem for perturbed gradient systems.
13. Zanetell, J., Gemmer, J.A., Most Probable Tipping Events in a Noisy Piecewise Linear System with Periodic Forcing

Scientific Activities

Invited conference and workshop talks:

1. May 2019 — SIAM Conference on Applications of Dynamical Systems, Snowbird, UT.
2. Apr. 2019 — 11th IMACS Conference. University of Georgia, Athens, GA.
3. Mar. 2019 — AMS Sectional Meeting. Auburn University, Auburn, AL.
4. Sep. 2018 — SIAM Conference on Mathematics of Planet Earth. Philadelphia, PA.
5. Sep. 2018 — Workshop on Calculus of Variations and Applications. University of Zagreb, Zagreb, Croatia.
6. July 2018 — SIAM conference on Mathematical Aspects of Materials Science. Portland, OR.
7. March 2018 — The 42nd SIAM Southeastern Atlantic Sectional Conference. University of North Carolina. Chapel Hill, NC.
8. Sep. 2017 — The 3rd Annual Meeting of SIAM Central States Section. Colorado State University. Fort Collins, CO
9. March 2017 — APS March Meeting special session: From isometry to reality, Geometric principles, mechanics, and morphology of thin solid structures. New Orleans, LA
10. June 2016 — The Fourth Annual Conference for the Exchange of Mathematical Ideas. Embry–Riddle Aeronautical University. Prescott, AZ.
11. Jan. 2016 — The Kavli Institute for Theoretical Physics: Geometry Elasticity, Fluctuations, and Order in 2D Soft Matter. Santa Barbara, CA.
12. Dec. 2015 — SIAM Conference on Partial Differential Equations (MS12). Scottsdale, AZ.
13. Aug. 2014 — SIAM Conference on Nonlinear Waves and Coherent Structures, University of Cambridge, UK.
14. Sep. 2012 — Lorentz Institute: Modern perspectives on thin sheets: Geometry, Mechanics, and Statistical Physics, Leiden, NL.
15. May 2011 — IMA Hot Topics Workshop, Strain Induced Shape Formation: Analysis, Geometry and Materials Science. Minneapolis, MN.

Invited colloquium talks:

1. Nov. 2019 — Mathematics Colloquium, United States Navel Academy, MD.
2. Sep. 2018 — Mathematics Colloquium, University of North Carolina A&T, NC.
3. Feb. 2018 — WFU Physics Colloquium, Wake Forest University, NC.
4. Feb. 2016 — Mathematics Colloquium, Vassar College, NY.
5. Jan. 2016 — Mathematics Colloquium, Wake Forest University, NC.

6. Sep. 2013 — Millersville University Physics Colloquium, Millersville University, PA.
7. Mar. 2013 — Millersville University and Franklin Marshall College Joint Mathematics Colloquium, Millersville University, PA.
8. April 2012 — Al Scott Memorial Lecture, University of Arizona, AZ.

Contributed and seminar talks:

1. Oct. 2019 — Brown Bag Seminar, University of Arizona, AZ.
2. Oct. 2019 — Uncertainty Quantification Seminar, University of Arizona, AZ.
3. Oct. 2019 — Applied Analysis Seminar, University of Arizona, AZ.
4. Oct. 2018 — 38th Southeastern-Atlantic Regional Conference on Differential Equations, University of Northern Georgia, GA.
5. Sep. 2018 — 6th Virginia Soft Matter Workshop, Virginia Tech, VT.
6. Oct. 2017 — Applied Mathematics Seminar, UNC Greensboro, NC.
7. Oct. 2017 — 37th Southeastern-Atlantic Regional Conference on Differential Equations, Kennesaw State University, GA.
8. July 2017 — SIAM Annual Meeting, Pittsburgh, PA.
9. May 2017 — SIAM Conference on Applications of Dynamical Systems, Snowbird, UT.
10. May 2017 — Applied Mathematics Seminar, University of Chicago, IL.
11. Nov. 2016 — AMS Sectional Meeting, Rayleigh, NC.
12. Oct. 2016 — Applied Mathematics Seminar, UNC Greensboro, NC.
13. May 2016 — SIAM Conference on Mathematical Aspects of Material Science, Philadelphia, PA.
14. Jan. 2016 — Joint Mathematics Meeting, AMS Special Session on Problems in Geometry and Design of Materials, Seattle, WA.
15. Oct. 2015 — SES 2015 Mechanics of Soft Materials, Texas A&M University, TX.
16. Sep. 2015 — Physical Mathematics Seminar, MIT, MA.
17. Apr. 2015 — Dynamical Systems Seminar. Boston University, MA.
18. Nov. 2014 — Applied and Computational Math Seminar, George Mason University, VA.
19. Sep. 2014 — Applied Math Seminar, Colorado State University, CO.
20. Sep. 2014 — Analysis and its Applications Seminar, University of Arizona, AZ.
21. July 2014 — Park City Mathematics Research Program, Park City, UT.
22. Apr. 2014 — Soft Matter Journal Club, University of Massachusetts Amherst MA.
23. Mar. 2013 — Division of Applied Mathematics LCDS Seminar. Brown University, RI.
24. May 2012 — Joint TU Munich – Augsburg Analysis Seminar, TU Munich, DE.
25. Jan. 2012 — Joint Mathematics Meeting, AMS Special Session on Some Nonlinear Partial Differential Equations: Theory and Application, Boston MA.
26. Oct. 2011 — Recent Progress in Wave Processes in Nature, University of Arizona, AZ.
27. Apr. 2011 — Los Arizona Days, University of Arizona, AZ.
28. Mar. 2010 — APS March Meeting, Portland, OR.

Poster presentations and participation in workshops and conferences:

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

Teaching Experience

Courses taught as primary instructor:

Wake Forest University:

- Fall 2018 — MST 351/651, *Introduction to Mathematical Modeling*.
- Fall 2018 — MST 205/605, *Applied Multivariable Calculus*
- Spring 2018 — MST 113, *Multivariable Calculus*.
- Spring 2018 — MST 711, *Real Analysis*.
- Fall 2017 — MST 326/626, *Numerical Linear Algebra*.
- Fall 2017 — MST 113, *Multivariable Calculus*.
- Spring 2017 — MST 383/683, *Applied Dynamical Systems*.
- Spring 2017 — MST 112, *Calculus with Analytic Geometry II*.
- Fall 2016 — MST 111 (2 sections), *Calculus with Analytic Geometry I*.

Brown University:

- 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.

University of Arizona:

- 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.

Graduate students mentored:

- Summer 2019 — Present: Nicholas Corak. Preliminary thesis titles: “*Noise induced tipping in a simple model of hurricane formation.*”
- Summer 2018 — Spring 2019: Maximilian Rezek. Thesis title: “*The formation of singularities in non-Euclidean plates.*”
 - *Position upon graduation:* Ph.D. student, University of Arizona, AZ.
- Spring 2017 — Spring 2018: Jessica Zanetell. Thesis title: “*Tipping points in stochastically perturbed linear Filippov systems.*”
 - *Position upon graduation:* Ph.D. student and University Fellow, University of Arizona, AZ.

Undergraduate research mentored:

- Summer 2019 — Present: Elizabeth Dicus (Senior Thesis).
- Fall 2019 — Present: Kevin Buck (Senior Thesis).
- Fall 2018 — Spring 2019: Hanwen Wang (Senior Thesis).
 - *Position upon graduation:* PhD Student, University of Pennsylvania, PA.
- Summer 2018 — Present: Addie Harrison (Senior Thesis).
- Fall 2017 — Spring 2019: Brady Gales (Senior Thesis).
 - *Position upon graduation:* PhD Student, University of Arizona, AZ.
- Fall 2017 — Spring 2018: Dylan King (Independent research).
- Fall 2017 — Spring 2018: Elizabeth Wallace (Senior Thesis)
 - *Position upon graduation:* Associate Integration Consultant at Workday
- Fall 2015 — May 2016: Ragna Eide. (Honors thesis).
 - *Position upon graduation:* Master’s student, Oxford University, UK.
- Summer 2015 — May 2017: Ekaterina Kryuchkova (Honors thesis).
 - *Position upon graduation:* Ph.D. student, Cornell University, Ithaca, NY.
- Summer 2015: Christian Cofoid and Mackenzie Simper. (REU project).
 - *Position upon graduation:* (Mackenzie): Ph.D. student, Stanford University, CA.
- Fall 2014 — May 2016: Chris Grimm (Brown University). Independent research project.
 - *Position upon graduation:* Ph.D. student, University of Michigan, Ann Arbor, MI.

Other types of teaching experience:

- Fall 2017 — *Applied Mathematics Seminar*, Wake Forest University. Organized a weekly seminar in which professional development was discussed as well research topics in applied mathematics were presented.
- 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 Department of Mathematics and Statistics at Wake Forest University:

- Member of following committees:
 1. Graduate Committee F18, S19
 2. Mathematics Curriculum Committee: F18, S19
 3. The Undergraduate Curriculum Committee: F16, S17, F17
 4. Statistics Tenure Track Hiring Committee: F16, S17
 5. Mathematical competitions: F16,S17, F17
 6. Mathematics Tenure Track Hiring Committee: F17
 7. Postdoc Hiring Committee: F16, S17, F17
- Chair of following committees:
 1. Colloquium Committee: F18, S19

Service to the University:

Wake Forest University:

- 2017–2019 — Lower-division adviser

- 2017-2019 — Faculty advisor for IRIS (Integrating Research In Science) conference.

Brown University:

- 2015, 2016 — *Member of qualifying exam committees for the following students*
 - Michael Monn (Engineering)
 - Kaushik Vijaykumar (Engineering)
 - Mrityunjay Kothari (Engineering)
- Spring 2015 — *Organizer for RTG Workshop on Agent Based Modeling.*
- Fall 2013 — Spring 2016: *Co-organizer for the Lefchetz Center for Dynamical Systems Seminar.*
- Fall 2013, Fall 2014 — *Co-organized RTG Recruitment Workshop entitled “Integrating Dynamics and Stochastics.”*

University of Arizona:

- 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:

- August 2019: *Organizer: MCRN summer school and academic year engagement program.*
- March 2017: *Organizer Session: Applied Dynamical Systems. The 42nd SIAM Southeastern Atlantic Sectional Conference.*
- 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
- Education Sciences
- Soft Matter
- SIAM Journal on Applied Dynamical Systems (SIADS)
- Canadian Journal of Physics
- Proceedings of the Royals Society A
- SIAM Journal on Applied Mathematics
- Journal of the Mechanics and Physics of Solids

References

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