CURRICULUM VITAE
Sean Gasiorek

Contact Information

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Education

- **Ph.D., Mathematics**, University of California Santa Cruz, 2019
  Dissertation Title: *On the Dynamics of Inverse Magnetic Billiards*
  Advisor: Prof. Richard Montgomery (rmont@ucsc.edu)

- **M.S., Mathematics**, California Polytechnic State University, San Luis Obispo, 2011

- **B.S., Mathematics**, California Polytechnic State University, San Luis Obispo, 2009

Academic Employment Experience

- **California Polytechnic State University San Luis Obispo**, *Assistant Professor*, 2022 – Present

- **University of Sydney**, *Postdoctoral Research Associate*, 2019 – 2022

- **University of Sydney**, *Instructor*, Semester 2, 2020

- **Stanford Pre-Collegiate Studies**, *Mathematics Instructor, Application Reader*, 2014 – 2019

- **University of California Santa Cruz**, *Teaching Assistant*, 2013 – 2019

- **Mathematical Sciences Research Institute**, *Program Associate*, August – December 2018

- **Center for Innovation in Teaching and Learning, University of California Santa Cruz**, *Summer GSI Pedagogy Mentor*, Summer 2018

- **University of California Santa Cruz**, *Instructor*, Spring 2016

- **California Polytechnic State University, San Luis Obispo**, *Full-Time Lecturer* 2011 – 2013

- **California Polytechnic State University, San Luis Obispo**, *Teaching Associate*, 2009 – 2011

- **Mathematics Department, California Polytechnic State University, San Luis Obispo**, *Research Associate*, 2010 – 2011

Note: Student evaluation information available upon request.

Publications and Preprints (: 0000-0003-1062-8056)

7. S. Gasiorek and M. Radnović, *Periodic Trajectories and Topology of the Integrable Boltzmann System*. Contemporary Mathematics: Special Functions (AMS Book Series), *to appear*

6. S. Gasiorek, *Linear Stability of Periodic Trajectories in Inverse Magnetic Billiards*. arXiv:2106.05676 [math.DS], 2022 (under review).

5. V. Dragović, S. Gasiorek, and M. Radnović, *Integrable Billiards on a Minkowski Hyperboloid: Extremal Polynomials and Topology*. Sbornik: Mathematics, Vol. 213, no. 9, pp. 34–69 (2022). DOI: 10.4213/sm9662

4. V. Dragović, S. Gasiorek, and M. Radnović, *Billiard Ordered Games and Books*. Regular and Chaotic Dynamics, Vol 27, no. 2, pp. 132-150 (2022). DOI: 10.1134/S1560354722020022.

3. S. Gasiorek, *On the Dynamics of Inverse Magnetic Billiards*, Nonlinearity, Vol 34, no. 3, pp. 1503-1524 (2021). DOI: 10.1088/1361-6544/abe2f1.

2. S. Gasiorek and M. Radnović, *Pseudo-Euclidean Billiards within Confocal Curves on the Hyperboloid of One Sheet*, Journal of Geometry and Physics, (2020) DOI: 10.1016/j.geomphys.2020.104032.

1. S. Gasiorek, *Counting Collisions in an N-Billiard System Using Angles Between Collision Subspaces*, Symmetry, Integrability and Geometry: Methods and Applications (SIGMA), Volume 16 (2020), No. 119, 13 pages. DOI: 10.3842/SIGMA.2020.119.

Articles, Theses, and Books

5. S. Gasiorek, *Integrability in Magnetic Variants of Billiard Systems*, DSWeb The Magazine, SIAM, July 2020 Issue.

4. S. Gasiorek, *On the Dynamics of Inverse Magnetic Billiards*, (Ph.D. thesis), 2019. https://escholarship.org/uc/item/4dn4d2z1

3. S. Gasiorek and D. Paquin, *Logic & Problem-Solving, 2nd Ed.*, 2019 (141 pages). Course text for Stanford Pre-Collegiate Summer Institutes course in logic and problem-solving.

2. S. Gasiorek and D. Paquin, *Number Theory, 6th Ed.*, 2019 (335 pages). Course text for Stanford Pre-Collegiate Summer Institutes course in number theory.

1. S. Gasiorek and T. Woolf, *The Kakeya Needle Problem* (Undergraduate Senior Thesis), 2009.

Research Interests

Mathematical billiards; billiards in confocal families; charged particles in magnetic fields; electricity and magnetism; integrable systems, dynamical systems and Hamiltonian systems; N-body problem; celestial mechanics; symplectic geometry; mathematical physics; differential geometry; mathematics education.

Awards, Fellowships, and Honors

- **Project NExT Fellow, 2022-23**, Red '22 Cohort, Mathematical Association of America

- **Chancellor's Dissertation Year Fellowship, 2018 – 19**, University of California Santa Cruz

- **Regents Fellowship, 2016 – 19**, University of California Santa Cruz

- **Outstanding Mathematics Department Teaching Assistant of the Year, 2017 – 18**, University of California Santa Cruz

- **Outstanding Professor in the College of Science and Math Award, 2012 – 13**, California Polytechnic State University, San Luis Obispo

- **Outstanding Teaching Associate Award, 2010 – 11**, California Polytechnic State University, San Luis Obispo

- **Graduate Equity Fellowship, 2010 – 11**, California Polytechnic State University, San Luis Obispo

- **Cover Story, 2009**, *Polymath*, Annual California Polytechnic State University Mathematics Department Newsletter

Research Talks and Conference Presentations

- **Mathematical Billiards: at the Crossroads of Dynamics, Geometry, Analysis, and Mathematical Physics**, Simons Center for Geometry and Physics, Stony Brook, NY, USA, October 30, 2023: *Dynamics and Periodicity Conditions for the Integrable Boltzmann System*

- **Cal Poly Simple Group**, Cal Poly Math Department, San Luis Obispo, CA, October 18, 2023: *Mathematical Billiards, Part I*

- **Symmetry for Group Actions in Differential Geometry**, Matrix, Creswick, Vic., Aus., May 25, 2022: *Minkowski Billiards on the Hyperboloid of One Sheet*

- **Nijenhuis Geometry and Integrable Systems**, Matrix, Creswick, Vic., Aus., February 14, 2022: *A Tale of Two (Integrable?) Billiards*

- 65th **Annual Conference of the Australian Mathematical Society** *Online*, University of Newcastle, Newcastle, NSW, Aus., December 9, 2021: *Minkowski Billiards on the Hyperboloid of One Sheet*

- 65th **Annual Conference of the Australian Mathematical Society** *Online*, University of Newcastle, Newcastle, NSW, Aus., December 8, 2021: *Linear Stability of Periodic Trajectories in Inverse Magnetic Billiards*

- **SIAM Conference on Applications of Dynamical Systems** *Online*, Portland, OR, USA, May 26, 2021: *Linear Stability of Periodic Trajectories in Inverse Magnetic Billiards*, Dynamics Down Under Minisymposium

- **Mechanics Seminar, Mathematical Institute of the Serbian Academy of Sciences and Arts** *Online*, Belgrade, Ser., May 19, 2021: *Minkowski Billiards on the Hyperboloid of One Sheet*

- **Sydney Dynamics Group Workshop**, Jervis Bay, NSW, Aus., November 26, 2020: *Open Problems in Magnetism and Billiards*

- **UNSW Applied Maths Seminar** *Online*, Sydney, NSW, Aus., July 9, 2020: *Minkowski Billiards on the Hyperboloid of One Sheet*

- **UNSW Pure Maths Seminar** *Online*, Sydney, NSW Aus., June 16, 2020: *Playing Billiards with* π

- **UC Santa Cruz Geometry and Analysis Seminar** *Online*, Santa Cruz, CA, USA, May 29, 2020: *Minkowski Billiards on the Hyperboloid of One Sheet*

- **Sydney Dynamics Group** *Online*, Sydney, NSW Aus., April 24, 2020: *Magnetic Variants of Billiard Systems*

- **Joint Math Meetings**, Denver, CO, USA, January 17, 2020: *Inverse Magnetic Billiards: A Survey* AMS Contributed Paper Session on Dynamical Systems and Ergodic Theory

- **Joint Math Meetings**, Denver, CO, USA, January 15, 2020: *Counting Billiard Collisions Using Angles Between Subspaces*, AMS Special Session on Hamiltonian Systems

- 63rd **Annual Conference of the Australian Mathematical Society**, Monash University, Melbourne, Vic., Aus., December 5, 2019: *On the Dynamics of Inverse Magnetic Billiards*

- **SIAM Conference on Applications of Dynamical Systems**, Snowbird, UT, USA, May 21, 2019: *Billiards Inside, Circles Outside: Dynamics of a Charged Particle in a Piecewise-Constant Magnetic Field*

- **AMS Western Sectional Meeting**, Honolulu, HI, USA March 23, 2019: *On the Dynamics of Inverse Magnetic Billiards* (Invited Speaker, AMS Special Session on Geometric Approaches to Mechanics and Control)

- **Joint Math Meetings**, Baltimore, MD, USA, January 16, 2019: *Billiards Inside, Circles Outside: Dynamics of a Charged Particle in a Piecewise Constant Magnetic Field*

- **AMS Fall Western Sectional Meeting**, San Francisco, CA, USA October 27, 2018: *Billiards Inside, Circles Outside: Charged Particles in a Piecewise Constant Magnetic Field*

- **MAA Southern California-Nevada Fall Section Meeting**, San Luis Obispo, CA, USA November 15, 2015, *Osculating Curves and the Tait-Kneser Theorem*

Poster Presentations

- **Differential Geometry, Billiards, and Geometric Optics**, CIRM, Luminy, France; October 7, 2021: *Inverse Magnetic Billiards: Periodic Orbits and Stability*

- **College of Science and Mathematics Student Research Conference**, San Luis Obispo, CA, USA, May 25, 2011: *Hereditary Matrices*

- **College of Science and Mathematics Student Research Conference**, San Luis Obispo, CA, USA, May 20, 2009: *The Kakeya Needle Problem*

Mathematical Outreach Talks

- **Monterey Bay Area Math Teachers' Circle**, Santa Cruz, CA, February 12, 2019: *How Many Squares are in a Lattice?*

- **Monterey Bay Area Math Teachers' Circle**, Santa Cruz, CA, April 10, 2018, *A Four Numbers Game*

- **Monterey Bay Area Math Teachers' Circle**, Santa Cruz, CA, October 10 & November 14, 2017: *Finite Geometries — Infinite Fun! (Parts 1 and 2)*

- **UC Santa Cruz Mathematics Department Undergraduate Colloquium**, UC Santa Cruz, March 2, 2017: *The Mathematics of Doodling*

- **Monterey Bay Area Math Teachers' Circle**, Santa Cruz, CA, December 8, 2016: *The Mathematics of Doodling*

- **UC Santa Cruz Mathematics Department Undergraduate Colloquium**, UC Santa Cruz, November 2 & 30, 2016: *The ABC's of the ABC Conjecture (Parts 1 and 2)*

- **Monterey Bay Area Math Teachers' Circle**, Santa Cruz, CA, November 10, 2016: *An Exploration of Area: Pick's Theorem and More*

- **Monterey Bay Area Mathematics Project Winter Math Conference: Leveraging the Power of Technology**, UC Santa Cruz, February 27, 2016: *GeoGebra in the Classroom*

Competitive Funding Experience

- AMS Simons Travel Grant, 2020-22 ($5000)

- AMS Travel Grant for Western Sectional Meeting, March 2019 ($250)

- UC Santa Cruz Graduate Student Association Travel and Research Grant, 2019 ($1000)

- Chancellor's Dissertation Year Fellowship, 2018 – 19, (Tuition, Fees, Stipend)

- MSRI Program Associate Support Grant, 2018 ($8000)

- UC Santa Cruz Departmental Travel Grants, 2015 – 2019 (varying amounts)

List of Courses Taught

Below is a list of courses for which I have been the instructor of record. Each course is referred to by its topic rather than institution-specific course number, followed by the number of academic terms in which I taught the course (if more than once). Multiple lectures of the same course are not included in this number; e.g. three lectures of Calculus III from Spring 2012 are listed once.

- The Nature of Modern Math (*elective*)
- Precalculus I
- Precalculus (x4)
- Calculus I (x3)
- Calculus I Online
- Calculus II (x6)
- Calculus III (x3)
- Multivariable/Vector Calculus (x4)
- Linear Algebra I
- Number Theory (2 sessions per summer, x6)
- Logic and Problem Solving
- Advanced Methods for Applied Math (Honours)

As a graduate student I was the Teaching Assistant/Tutor for the following courses: College Algebra, Precalculus, Calculus II for Life Sciences, Multivariable Calculus for Life Sciences, Calculus 1 Online, Calculus II Online (x2), Multivariable/Vector Calculus I Online, Multivariable/Vector Calculus I, Multivariable/Vector Calculus II, Linear Algebra I, Introduction to Proofs (x2), Complex Analysis, Systems of Differential Equations, Number Theory, and History of Mathematics.

Professional Associations

- Australian Mathematical Society (AustMS)
- American Mathematical Society (AMS)
- Mathematical Association of America (MAA)
- Society of Industrial and Applied Mathematics (SIAM)
- Aboriginal and Torres Strait Islander Mathematics Alliance (ATSIMA)

Organizational and Departmental Service

- **Joint Mathematics Meetings, 2023**, Co-organizer of Special Session MAA Project NExT - Navigating the Early Years of the Faculty Experience, 2023

- **CSMC Competition Committee**, Member of the *Canadian Senior and Intermediate Mathematics Contests* Competition Committee; organised through the Centre for Education in Mathematics and Computing, Waterloo University (ON, Canada), 2021 – present

- **Sydney Dynamics Group**, Organizer of the fortnightly Sydney Dynamics Group seminar, 2020 – 22

- **Integrable Systems Workshop**, Co-organizer of annual workshop held at the University of Sydney, 2020 – 21

- **Norbert Quirk Prizes of the University of Sydney**, Judgment panel for a student competition, 2020

- **Joint Mathematics Meetings, 2020**, Lead organizer of Special Session on Hamiltonian Systems, 2020

- **University of California Santa Cruz**, Graduate Colloquium Organizer, 2017 – 18

- **University of California Santa Cruz**, Departmental Tea Coordinator, 2016 – 18

- **California Polytechnic State University San Luis Obispo**, Graduate Student Mentor, 2010 – 11

- **California Polytechnic State University San Luis Obispo**, SOAR Academic Advisor, Summer 2010

- **California Polytechnic State University San Luis Obispo**, Head Tutor, Stenner Glen Student Housing Tutoring Center, 2007 – 09