Benjamin Joseph Rapone

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Education

- **Washington State University** Pullman, WA
  Ph.D. Mathematics *Fall 2013–Spring 2019 (Expected)*
  - Department of Mathematics RA, TA, TA-Mentor and Search Committee Member
  - Optimization, Algebraic Topology, Data Science: Cum-GPA 4.0
- **San Diego State University** San Diego, CA
  M.A. Mathematics *2009–2012*
  - Department of Mathematics TA
  - Modern Algebra and Cryptography: Cum-GPA 3.61
- **California State University San Marcos** San Marcos, CA
  B.S. Mathematics *2006–2009*
  - Department of Mathematics TA: Cum-GPA 3.2

Developmental Skills

- **Programming in Research:** Julia, Python, Cplex, Maple, Bash, Matlab/Octave, R, SAS, Ampl
  - Building Topological Data Analysis (TDA) pipelines for the application of the Optimal Homologous Chain Problem in conjunction with Persistent Homology software such as JavaPlex, Dionysus, and Phat on large data sets. Currently working with neuroscience data in collaboration with researchers from UPenn.
  - Developed optimization based models in Julia & Python that implement algorithms based on newly developed theory for Optimal Power Flow problems at Pacific Northwest National Lab (PNNL).
  - Formatting, processing, and statistical/predictive analysis of biomedical data sets in collaboration with MODAL/Freie University through the GRIPS program at IPAM/UCLA, and Oregon Health and Science University (OHSU) using personally developed script with R, SAS, Python, Bash and Octave.
  - Implemented smooth transitions between data set generation, meshing (Tetgen/Triangle), and mixed integer optimization model development and analysis with visual interactive output using Python and Cplex (optimization software) for 3d printing with Oak Ridge National Lab (ORNL).
- **Leadership and Reporting:** LaTeX, MSOffice
  - Generated presentation and reporting materials as instructional training conference team leader for in-service teachers using LaTeX, and Microsoft Office programs.
  - Developed lab content, instruction protocols, materials, and the mentor leadership program for the Calculus series using LaTeX.

Research and Work Experience

- **PNNL** Richland, WA
  Research Intern *Jan.–Jul. 2017*
  - Topology and Optimization techniques for Optimal Power Flow Equations.
- **ORNL** Oak Ridge, TN
  Research Collaborator *Feb. 2016–Jan. 2017*
  - Optimization and Geometry based approach for efficient 3D printing.
- **MODAL/ Freie University** Berlin, DE
  Research Intern via the GRIPS program through IPAM/UCLA *Summer 2016*
  - Genomic big data modeling with predictive analysis, and manuscript drafting.
- **Washington State University** Pullman, WA
  RA, TA, Mentor, Committee Member *May 2013–current*

  Research Assistant
  - **Mathematics:** Theoretical problems at the interface of Optimization, Algebraic Topology and Ecology/3D-Printing.

- **Math Education:** RA for large multi-million dollar NSF grant Making Math Reasoning Explicit (MMRE). Responsibilities included classroom observation, data collection, conference management, and theoretical research.
- **Math Education:** Internal WSU grant RA for conducting research concerning course content, and instruction of the Calculus series.

Teaching Assistant & Mentor

- **Calculus 2, Linear Algebra, Algebra, & Trigonometry:** Course instructor for classes up to 100 students. Responsibilities include supervising TAs, directing classroom policy, maintaining class websites, as well as creating/grading exams, quizzes, homework and other forms of assessment.

Committee Member

- **Search Committee:** Tenure track mathematics faculty position at WSU Pullman campus.

- **Oregon Health & Science University** — Portland, OR
  Research Affiliate under Dr. Jung Yoo (Chair, Department of Orthopedics) — *Summer 2015*
  - Statistical analysis, big-data modelling with predictive analysis, and manuscript drafting.
- **Summa Education** — San Diego, CA
  Developer — *Aug. 2012–May 2013*
  - SAT-Prep curriculum development for mathematics.
- **Southwestern College** — Chula Vista, CA
  Instructor — *Fall 2012*
  - Course Instructor for Pre-calculus and Intermediate algebra. Responsible for developing all course materials and assessing/assigning grades.

Publications

- **Minimal Homotopies**
  Article in Preparation — *2018*
- **Robust Feasibility of Systems of Quadratic Equations Using Topological Degree Theory**
  Article in Preparation — *2018*
- **Race and gender influence management of humerus shaft fractures**
  Journal of Orthopaedics,15,2,2018,540-544 — *Jan. 2018*
- **A framework for tool path optimization in fused filament fabrication**
  Refereed Poster in ACM Symposium on Computational Fabrication (SCF) — *Jun. 2017*
- **A Model for Systemic Change in Rural Schools**
  Article in the proceedings of Psychology of Mathematics Education Conference (PME 38/PME-NA 36) — *Jul. 2014*
- **Taking Square Roots over Finite Fields**
  Masters Thesis, San Diego State University — *Dec. 2012*

Presentations

- **American Mathematical Society (AMS) Sectional Meeting** — WSU, Pullman, WA
  Minimal Homotopy Area — *Apr. 2017*
- **4th Annual Cascade RAIN Meeting** — Simon Fraser University, Vancouver, Canada
  Minimal Homotopy Area — *Apr. 2017*
- **Psychology of Mathematics Education Conference: PME 38/PME-NA 36** — UBC, Vancouver, Canada
  A Model for Systemic Change in Rural Schools — *Jul. 2014*
- **Northwestern Association of Teacher Education (NWATE)** — WSU, Pullman, WA
  Supporting Systemic Changes — *Jun. 2014*

Honors and Awards

- **WSU College of Arts and Science (CAS) Research Assistantship Award 2015–2016**

  {Awarded yearly to a single PhD student in the Department of Mathematics and Statistics based on merit.}
- **Sidney G. and Evelyn Hacker Graduate Teaching Fellowship, 2015–2016**
- **WSU Graduate Department PhD Summer Research Fellowship, Summer 2013**