

BENJAMIN PITTMAN-POLLETTA

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United States citizen

EDUCATION

University of Arizona

Ph.D., Applied Mathematics May 2010

Advisor: Doug Pickrell

Dissertation: Factorization in loop groups.

M.S., Applied Mathematics May 2007

Oberlin College

B.A., Neuroscience, Mathematics May 2002

RESEARCH INTERESTS

I am interested in using differential geometry, representation theory, and combinatorics to study infinite-dimensional objects. In my dissertation, I develop a refinement of triangular factorization for the group of loops into a compact simple Lie group. Conjecturally, the coordinates associated with this factorization allow us to write the invariant measure for this loop group as an infinite product measure. This research has led to a number of questions about affine Weyl groups, and I am currently investigating reduced decompositions in these groups.

PUBLICATIONS AND MATHEMATICAL WRITING

Unitary loop groups and factorization.

arXiv:0905.2911v2 (with Doug Pickrell; submitted to *Journal of Lie Theory*) May 2009

A geometric interpretation and explicit form for higher-order Hankel operators.

arXiv:0901.2953v1 (submitted to *Rocky Mountain Journal of Mathematics*) January 2009

A definition of scalar curvature on piecewise linear approximations to Riemannian manifolds.

(written component of Oral Comprehensive Exam) May 2007

SELECTED TALKS

Geometry Seminar, University of Arizona

Factorization and coordinates on Lie groups, I-III. September 2009

The representation theory of the Virasoro algebra and its connections to SLE. September 2008

Higher-order Hankel operators and conformally-invariant random functions. April 2008

Scalar curvature on piecewise linear approximations to Riemannian manifolds. April 2007

Applied Mathematics Brown Bag, University of Arizona

An elementary introduction to Hamiltonian and integrable systems. September 2009

The stochastic Loewner evolution in QFT and statistical mechanics. November 2008

Symmetry, hallucinations, and pronking about. October 2007

Graduate Colloquium, University of Arizona

Perspectives on quantum field theory. December 2008

SU(2) and the hydrogen atom. September 2007

What is curvature and does your iTunes library have it? January 2007

Science Salon, Graduate College of Science

Nature vs. culture: community and sexuality in the internet age.
Hard techniques for soft problems.

September 2009
 March 2009

High School and Community

Mathletics at the U of A: a love story. GEAR UP for College, Tucson High
Graphs and networks. Tucson GEAR UP, University of Arizona

October 2008
 April 2008

AWARDS AND FUNDING**VIGRE Fellowship**

University of Arizona
 University of Arizona

January 2009 – May 2010
 June – August 2008

IGERT Biomathematics Fellowship

University of Arizona

August 2004 – August 2005

Nathaniel Kleitman Summer Research Fellowship

Brigham and Women's Hospital

June – August 2000

Oberlin Science Scholarship

Oberlin College

September 1998 – May 2002

National Merit Scholarship

Oberlin College

September 1998 – May 2002

RELATED WORK EXPERIENCE**Teaching Assistant, University of Arizona**

Fall 2005 – Fall 2008

- Prepared all lessons, and prepared and graded all assignments and tests, as instructor for Math 160 – Basic Statistics (one semester), Math 113 – Elements of Calculus (one semester), and Math 110 – Collegiate Algebra (four semesters).
- Ran four semesters of discussion sections for a graduate core course, Math 527 – Principles of Analysis, and one semester of discussion sections for Math 523 – Real Analysis, an undergraduate course.

Research Engineer/Assistant Scientist, Applied Research Laboratories

June – August 2006

- Conducted classified research on sonar and navigation.
- Employed both numerical simulation in Matlab and analytical techniques.

Curriculum Developer, Sponsors for Educational Opportunity

June – August 2004

- Developed mathematics component of a summer enrichment program for minority high school students in NYC, including projects on group theory, dynamical systems, and game theory.

Instructor, Columbia Preparatory School

April – May 2004

- Taught two sections of high school algebra, one section of precalculus, and one section of statistics while filling in during a maternity leave at a high school in NYC.

SERVICE AND OUTREACH**Founder and Organizer, IPAM Class-to-Class Mentoring Program**

June 2009

(with Suz Tolwinski)

-present

- Augmented advising in the IPAM by employing the diverse experience of advanced graduate students.
- Built community and kept administrative and material costs low with a bi-semesterly class-to-class meeting format.

- Founder and Organizer, Graduate College of Science's Science Salon** December 2008
(with Tom LaGatta, Cory Christenson) -present
- Promoted the exchange of ideas between graduate students in the sciences, about topics on and beyond the frontiers of natural science, with a biweekly event series.
- Graduate Mentor, IPAM Qualifying Examination Preparation** Summer 2008/9
- Led weekly review sessions to help first-year Applied Math graduate students prepare for their qualifying examinations.
- Graduate Mentor, Math 483 – Mathematical Modeling** Spring 2009
- Led an undergraduate team to create a model of evolution in the presence of spatial population structure and sexual reproduction.
- Organizer, Graduate Mathematical Physics Seminar** Fall 2008
- Increased interaction between physics and mathematics graduate students by organizing a weekly series of interdepartmental talks on basic topics in mathematical physics.
- Graduate Mentor, Mathematics Department Integration Workshop** August 2008
- Assisted entering graduate students with group projects designed to introduce them to graduate-level mathematics.

CONFERENCES ATTENDED

- Current Topic Workshop: Mathematical Developments Arising from Biology**
Mathematical Biosciences Institute November 2009
- XVI International Congress on Mathematical Physics**
Prague, Czech Republic August 2009
- Stochastic Processes and Their Applications**
Berlin, Germany August 2009
- Function Spaces and Their Operators**
Washington University in St. Louis May 2008
- Miniconference on Mathematics in Climate Change**
MAA/AMS Joint Meetings January 2008
- Analysis on Homogeneous Spaces**
University of Arizona April 2007

REFERENCES

- Prof. Doug Pickrell, University of Arizona, pickrell@math.arizona.edu
- Prof. David Glickenstein, University of Arizona, glickenstein@math.arizona.edu
- Prof. John Palmer, University of Arizona, palmer@math.arizona.edu
- Prof. Philip Foth, University of Arizona, foth@math.arizona.edu
- Kerima Ratnayaka, University of Arizona, kerima@math.arizona.edu