

Anna V. Little

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EDUCATION

- Duke University, PhD mathematics May 2011
 - Duke University, MS mathematics Sept. 2008
 - Samford University, BS mathematics, minor political science May 2005
- Outstanding Math Senior; Samford Honors Society

APPOINTMENTS

- Assistant Professor of Mathematics, Jacksonville University Aug. 2012 - Present

RESEARCH INTERESTS

High-dimensional data analysis, multiscale methods, clustering algorithms, and machine learning. My research has utilized tools from statistics, linear algebra, random matrix theory, probability, and harmonic analysis.

FELLOWSHIPS AND GRANTS

- Jacksonville University Faculty Research Grant Spring 2015
- NSF S-STEM Grant: Mathematics, Engineering, & Physics Scholars (co-PI) Fall 2014 - Present
- MAA Project NExT Fellowship Summer 2012 - Summer 2013
- Duke Math Graduate Award Fall 2006, Spring 2008
- Supported by PhD advisor's NSF and ONR grants Summer 2008, 2009, 2010; Fall 2009; Spring 2011

PUBLICATIONS

- A Little, M Maggioni, L Rosasco; "Multiscale geometric methods for data sets I: Multiscale SVD, noise and curvature," to appear in *Applied and Computational Harmonic Analysis (ACHA)*, 2016.
- L Hart, A Little; "Translating Evidence into Practice: Interpreting Measures of Risk"; to appear in *The Nurse Practitioner*, August 2016
- A Little, X Mountrouidou, D Moseley; "Spectral Clustering Technique for Classifying Network Attacks", in proceedings of *IEEE International Conference on Intelligent Data and Security (IDS)*, New York City, April 2016
- A Little, A Byrd; "A Multiscale Spectral Method for Learning Number of Clusters"; in proceedings of *14th IEEE International Conference on Machine Learning and Applications (ICMLA)*, Miami, Dec. 2015
- G. Chen, A.V. Little, M. Maggioni; "Multi-Resolution Geometric Analysis for Data in High Dimensions"; in *Excursions in Harmonic Analysis*, Vol. 1, Editors T.D. Andrews et al., Birkhauser, 2013
- G Chen, A Little, M Maggioni; "Some recent advances in the geometric analysis of point clouds"; in *Wavelets and Multiscale Analysis: Theory and Applications*, Editors J. Cohen and A. Zayed, Birkhauser, 2011
- A Little, M Maggioni, L Rosasco; "Multiscale Geometric Methods for Estimating Intrinsic Dimension"; *9th International Conference on Sampling Theory and Applications (SampTA)*, Singapore, May 2011
- A Little, Y Jung, M Maggioni; "Multiscale Estimation of Intrinsic Dimensionality of Data Sets"; *Association for the Advancement of Artificial Intelligence (AAAI) Fall Symposium (FS-09-04)*, 2009
- J Lee, A Little, Y Jung, M Maggioni; "Estimation of Intrinsic Dimensionality of Samples from Noisy Low-dimensional Manifolds in High Dimensions with Multiscale SVD"; *15th IEEE Workshop on Statistical Signal Processing (SSP)*, Cardiff, 2009
- T Ladner, A Little, K Marks, A Russell; "Positive Solutions to a Diffusive Logistic Equation with Constant Yield Harvesting"; *Rose-Hulman Undergraduate Math Journal*, ISSN Vol. 6, Issue 1, 2005

TEACHING EXPERIENCE

- **Jacksonville Univ. Classroom Instructor** Aug. 2012 - present
Classes taught include Business Calculus, Calculus I and II, Elementary Statistics, Biostatistics, Actuarial Exam P Prep, Mathematical Modeling (graduate class), and Linear Algebra (graduate class). Have extensive experience with using technology in the classroom and engaged learning.
- **Duke Univ. Classroom Instructor** Fall 2008, 2009, 2010; Spring 2009, 2010
Taught five semesters of Calculus I and II to students with diverse backgrounds in math; presented lectures, wrote exams, organized classroom activities, assigned final grades.
- **Duke Univ. Lab Instructor** Spring 2007
Supervised discovery-based mathematics learning in weekly lab sessions for Calculus II students.

PROFESSIONAL PRESENTATIONS

International conferences:

- “A Multiscale Spectral Method for Learning Number of Clusters,” *14th IEEE International Conference on Machine Learning and Applications*, Miami, Dec. 2015 (poster)
- “Estimating the Intrinsic Dimension of High-Dimensional Data Sets,” Institute of Mathematical Statistics Asia Pacific Rim Meeting (IMS-APRM), Taipei, June 2014
- “Estimation of Intrinsic Dimensionality of Samples from Noisy Low-dimensional Manifolds in High Dimensions with Multiscale SVD,” IEEE Workshop on Statistical Signal Processing, Cardiff, Sept. 2009

Conferences (non-international):

- “A Multiscale Spectral Method for Learning Number of Clusters,” IEEE 14th International Conference on Machine Learning and Applications (ICMLA), December 2015 (Poster)
- “Estimating the Intrinsic Dimension of High-dimensional Data Sets,” Invited speaker at *First Annual Workshop on Data Sciences*, Tennessee State University, April 2015
- “A Multiscale Spectral Algorithm for Estimating the Number of Clusters in a Data Set,” FL-MAA and FTYCMA Joint Mathematics Meetings, St. Petersburg, Jan. 2015
- “A Multiscale Spectral Algorithm for Estimating the Number of Clusters in a Data Set,” Joint Mathematics Meetings, San Antonio, Jan. 2015
- “Teaching the Physics of Calculus,” FL-MAA and FTYCMA Joint Mathematics Meetings, Fort Myers, Feb. 2014
- “Estimating the Intrinsic Dimension of High-dimensional Data Sets,” Joint Mathematics Meetings, San Diego, Jan. 2013
- “Intrinsic dimensionality estimation for data sets,” 4th Annual Graduate Student Probability Conference, Duke Univ., April 2010
- “Pythagorean Triples with a Fixed Difference,” MAA Southeastern Conference, 2005
- “Trigonometric Fibonacci Sequences,” National Conference of Undergraduate Research, 2004

Seminars:

- “A Brief Introduction to Minitab,” Jacksonville University Faculty Fall Conference, Aug. 2015
- “Classifying data into meaningful groups via spectral clustering,” Jacksonville University Science and Engineering Lecture Series, March 2014
- “Finding Low-dimensional Structure in Data Sets,” Jacksonville University Mathematics Society, March 2013
- “An Effron Stein Inequality,” Probability Working Group, Duke Univ., Nov. 2009
- “Intrinsic Dimensionality Estimation for Data Sets,” Graduate/Faculty Seminar, Duke Univ., Sept. 2009
- “Introduction to Random Matrix Theory,” Probability Working Group, Duke Univ., March 2009

SERVICE

- **Statistical Consultant, Jacksonville Univ.** August 2012 - present
Served as a statistical consultant for Jacksonville University faculty and student research; assisted with data analysis and running statistical software, and led an initiative to make statistical software more widely available on campus.
- **MEPS Program Member, Jacksonville Univ.** August 2014 - present
As co-PI on the MEPS (Mathematics, Engineering, & Physics Scholars) NSF S-STEM Grant, I assisted in the implementation of a learning community scholarship program. Served as student mentor, hosted social event, and oversaw the academic support structures of the grant.
- **MAA Committee on Contributed Paper Sessions** Jan. 2016 - present
Evaluate proposals for Contributed Paper Sessions at both Mathfest and the Joint Mathematics Meetings.
- **STEM Workshop for Girls Organizer, Jacksonville Univ.** Spring 2014
Worked with computer science and engineering faculty to organize a one-day STEM workshop for local high school girls. Secured funding, organized background checks for volunteers, and ran mathematics activities.
- **Mathematical Contest in Modeling (MCM) Coach, Jacksonville Univ.** Feb. 2014 & 2015
Coached teams of undergraduates participating in the MCM; both teams won an honorable mention designation and presented their solution at the Jacksonville University Research Symposium.
- **Graduate Faculty Seminar Organizer, Duke Univ.** Spring 2010
Member of team of three graduate students who scheduled and introduced speakers at a weekly seminar designed to foster communication between faculty and graduate students.

GRADUATE STUDENTS MENTORED

- Alicia Byrd Graduated May 2015
Master's Thesis: *A Multiscale Spectral Algorithm for Estimating the Number of Clusters*

OTHER RELEVANT EXPERIENCE

- **Project Next Fellow** Summer 2012 - Summer 2013
Obtained training and mentoring in teaching, scholarship, and professional activities through a professional development program of the MAA for recent mathematics PhD's.
- **Math Coder, WebAssign** June 2011 - present
Coded and randomized math questions using WebAssign's educational software for online homework and grading; provided mathematical and educational expertise to support original content initiatives in Calculus.
- **Actuarial analyst, Vesta Insurance Company** June 2005 - Feb. 2006
Analyzed the company's disaster related exposure and assisted in the running of disaster simulation software; obtained actuarial exam certification in probability and financial mathematics.
- **Member of Noetherian Ring, Duke Univ.** Spring 2010 - Spring 2011
Active member of organization for supporting women in mathematics.

CONFERENCES ATTENDED

- 14th IEEE International Conference on Machine Learning and Applications, Miami, Dec. 2015
- First Annual Workshop on Data Sciences, Tennessee State University, April 2015
- FL-MAA and FTYCMA Joint Mathematics Meetings, St. Petersburg, January 2015
- Joint Mathematics Meetings, San Antonio, January 2015
- Institute of Mathematical Statistics Asia Pacific Rim Meeting (IMS-APRM), Taipei, June 2014
- FL-MAA and FTYCMA Joint Mathematics Meetings, Fort Myers, February 2014

- Winter Workshop: Dimension Reduction and High Dimensional Inference, University of Florida, January 2014
- MAA Mathfest, Hartford, August 2013
- Joint Mathematics Meetings, San Diego, January 2013
- MAA Mathfest, Madison, August 2012
- Joint Mathematics Meetings, Boston, January 2012
- Joint Mathematics Meetings, New Orleans, January 2011
- Workshop on Algorithms for Modern Massive Data Sets, Stanford University, June 2010
- 4th Annual Graduate Student Conference in Probability, Duke University, April 2010
- IEEE Workshop in Statistical Signal Processing, Cardiff, Sept. 2009
- Machine Learning Summer School, University of Chicago, June 2009
- 3rd Annual Graduate Student Conference in Probability, UNC Chapel Hill, May 2009
- IPAM Workshop: Multiscale Representation, Analysis and Modeling of Internet Data and Measurements, UCLA, Sept. 2008

SKILLS

- **Software:** Matlab, Latex, R, SPSS, Minitab, Mathematica, Maple
- **Language:** advanced Romanian; beginning German

PROFESSIONAL MEMBERSHIPS

- Mathematical Association of America