

ELANA JUDITH KLEIN FERTIG

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EDUCATION

University of Maryland, College Park, MD

Master of Science: Received May, 2005

Candidacy: Received May, 2005

Doctor of Philosophy: Expected May, 2007

Applied Mathematics and Scientific Computation

Area of Application: Atmospheric and Ocean Science

Brandeis University, Waltham, MA

Bachelor of Science: Received May, 2003

Thesis: *Statistical Topography of Noisy Self-Affine Surfaces*

High Honors Mathematics

Highest Honors Physics

RESEARCH EXPERIENCE

Research Assistantship, University of Maryland, College Park, MD, 2004-Present

Assimilating simulated non-local satellite observations with ensemble Kalman filter (EnKF) schemes, implemented an EnKF scheme to NASA fvGCM weather model, and compared 4D-VAR to 4D-EnKF

Research Assistant, Brandeis University, Waltham, MA, 2000-2003

Analyzed noisy self-affine surfaces with methods of statistical topography

Developed webpage for Condensed Matter Theory Group

REU Participant, Kitt Peak National Observatory, Tucson, AZ, Summer 2001

Documented and analyzed log files created during operation of Mayall 4m telescope for correlations between Seeing at the Mayall 4m telescope and its environment

Visiting Student Enrichment Program, Goddard Space Flight Center, Greenbelt, MD, Summer 2000

Developed GUI interface to automate ETA weather model

TEACHING EXPERIENCE

Introduction to Linear Algebra TA, University of Maryland, Spring 2006

Discussion section leader of Math 240

Field questions about and prepare problems to clarify the material

Hold office and tutoring hours

Proctor and grade examinations
Introduction to Probability Instructor, University of Maryland, Fall 2005
Sole contact instructor of Math 111
Prepared and delivered lectures
Wrote and graded quizzes
Proctored and graded examinations
Held office and tutoring hours
Mathematics Tutor, Ivy League Tutoring Connection, Bethesda, MD, Spring 2005
One-on-one tutoring for High School Students in Algebra II and Trigonometry
Mathematics Tutor, University of Maryland, College Park, MD, Fall 2004
One-on-one tutoring in Probability and Calculus for Athletics Department
Academic Support & Career Development
Teaching Assistant, Summer Science Program, Socorro, NM, Summer 2003
Trained and assisted students with nightly asteroid observations on telescope
and asteroid coordinate determination with photographic plates and “measuring
engines”
Tutored planetary science, astronomy, physics, trigonometry, calculus, spherical
trigonometry, and computer programming
Organizing recreational and social events
Mathematics Tutor, Brandeis University, Waltham, MA, 2002-2003
Tutored students (individually and in groups) in precalculus and calculus
Mathematics Grader, Brandeis University, Waltham, MA, Fall 2000
Graded calculus problem sets

COMPUTER LANGUAGES

C, C++; Perl; Fortran; Matlab; Unix Scripts; GRADS

PAPERS

Fertig, E., Harlim, J., and Hunt, B., A Comparative Study of 4D-VAR and 4D_LETKF:
Perfect Model Simulations with Lorenz-96. (Submitted to *Tellus A*)
Fertig, E., Hunt, B., Szunyogh, I., and Ott, E., Assimilating Nonlocal Observations with a
Local Ensemble Kalman Filter. (In Progress)
Liu, J., Fertig, E., Li, H., Szunyogh, I., Hunt, B., Kalnay, E., Kostelich, E., and Todling,
R., Application of Local Ensemble Kalman Filter: perfect model experiments with
NASA fvGCM model. (In Progress)

PRESENTATIONS

Li, H., Liu, J., Fertig, E., and Kalnay, E. (2006) Comparison between Local Ensemble
Transform Kalman Filter and PSAS in NASA finite volume GCM.
Invited talk (split between authors) at JCSDA/NCEP Seminar
Fertig, E., Liu, J., Li, H., Kalnay, E., Szunyogh, I., Kostelich, E., and Todling, R. (2006),
Data Assimilation with the Local Ensemble Transform Kalman Filter on NASA
fvGCM

Poster 35 at Dynamics Days 2006.

Fertig, E., Li, H., Liu, J., Kalnay, E., Szunyogh, I., Kostelich, E., and Todling, R. (2005), Local Ensemble Transform Kalman Filter Data Assimilation on the NASA fvGCM
Speaker at University of Maryland Math Department's Spotlight on Graduate Research

Klein, E., Li, H., Liu, J., Szunyogh, I., Hunt, B., Kalnay, E., Kostelich, E., and Todling, R. (2005), Data Assimilation on the NASA fvGCM with the Local Ensemble Transform Kalman Filter
Poster 1.68 at the 17th AMS Conference on Numerical Weather Prediction

Klein, E., Li, H., and Liu, J. (2005), Progress Report of Local Ensemble Transform Kalman Filter/fvGCM on AIRS
Speaker at AIRS Science Team Meeting

Klein, E., Li, H., and Liu, J. (2004), Progress Report of Local Ensemble Kalman Filter/fvGCM on AIRS
Speaker at AIRS Science Team Meeting

Klein, E. (2003), Statistical Topography of Noisy Self-Affine Surfaces
Keynote speaker at annual Brandeis University Stephan Berko Symposium

Klein, E. (2002), Statistical Topography of Noisy Self-Affine Surfaces
Contributed talk at 4th annual Greater Boston Statistical Mechanics Meeting

Sharp, N. and Klein, E. (2002), Analysis of Mayall 4m Environment
Poster 102.05 at 199th annual meeting of American Astronomical Society

SERVICE

Junior Science and Humanities Symposium Judge, Spring 2006
 Evaluate and rank high school student science fair poster presentations

Qualifying Examination Proctor, Fall 2005
 Proctored examination and answered student questions for Ordinary Differential Equations Qualifying Examination

Graduate School Panel Discussion Member, Fall 2005
 Panel for undergraduate math majors planning to pursue graduate school
 Discussed applying and choosing a graduate program
 Discussed life as a graduate student

Entering AMSC Graduate Student Panel Discussion Member, Fall 2005
 Panel for entering Applied Mathematics and Scientific Computation students
 Discussed course selection and qualifying examination procedures
 Discussed choosing an advisor and area of research

Incoming Student Mentor, 2004-2005
 Welcomed two first year graduate students per semester
 Advised students in appropriate course selections, qualifying examination procedure, and moving to the greater Washington, DC region

FUNDED WORKSHOPS

Mathematical Issues and Challenges in Data Assimilation for Geophysical Systems, IPAM, Los Angeles, CA, Feb 2005

Mathematical Problems in Industry, Olin College, Needham, MA, June 2006

Developed Matlab software to use quaternions to avoid encountering Gimbal lock from sensors for TIAX, LLC

AWM Workshop for Women Graduate Students and recent PhDs, SIAM Annual Meeting, Boston, MA, July 2006

Industrial Mathematical & Statistical Modeling Workshop for Graduate Students, North Carolina State University, Raleigh, NC, July 2006

FELLOWSHIPS AND SCHOLARSHIPS

NASA Fellowship, Goddard Space Flight Center, Greenbelt, MD, 2003-Present

Justice Brandeis Scholarship, Brandeis University, Waltham, MA, 1999-2003

AWARDS AND HONORS

Phi Kappa Phi: May 2005

Phi Beta Kappa: May 2003

Stephan Berko Memorial Prize for Undergraduate Research: May 2003

Schiff Memorial Award in Science: May 2003

Brandeis University Dean's List: 1999-2003

Memberships

American Mathematical Society

American Meteorological Society

The Association for Women in Mathematics

Society for Industrial and Applied Mathematics