Nicholas P. Henscheid

Program in Applied Mathematics
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Education

Ph.D. Applied Mathematics, University of Arizona, August 2017 (expected).

M.S. Mathematics, Western Washington University, June 2012.

B.S. Mathematics *With Distinction*, Western Washington University, August 2010.

Research Interests

I use mathematical, computational and statistical techniques to quantify uncertainties in medical imaging systems. Specifically I use the theory of stochastic processes, mathematical inverse problems, probability and statistical decision theory to quantify how well medical decisions can be made using a given imaging system. While my primary goal is to provide rigorous proof whenever possible, I also use high performance parallel computing as a tool to perform large-scale simulations and statistical analyses of imaging systems. I am additionally interested in optimization theory, machine learning and high dimensional data analysis, signal and image processing, computer vision and computer graphics, GPU computing, sparsity, applied harmonic analysis, and personalized medicine.

Employment

Graduate Research Associate, Center for Gamma Ray Imaging, University of Arizona, June 2015–present.

Graduate Teaching Assistant, Department of Mathematics, University of Arizona, August 2012–May 2015.

High Energy Density Physics Intern, Lawrence Livermore National Laboratory, June 2014-August 2014.

Graduate Teaching Assistant, Mathematics Department, Western Washington University, September 2010–June 2012.

NASA-USRP Undergraduate Research Intern, Caltech Jet Propulsion Laboratory, January–May 2010.

Web Developer II, Western Washington University Center for Instructional Innovation. June 2008–December 2009.

Research Assistant, Prof. Richard Gardner, Western Washington University. Fall 2009.

Refereed Publications

Glimm, T. and Henscheid, N. (2013). "Iterative scheme for solving optimal transportation problems arising in reflector design", *ISRN Applied Mathematics*, vol. 2013, Article ID 635263

Working Publications

Henscheid, N. and Barrett, H. (2016). "Learning Physiological Markov Random Field Models from Imaging Data".

Henscheid, N. and Jha, A.K. (2016). "Comparison of the Fourier Crosstalk Matrix for Photon Counting and Photon Processing Detectors".

Henscheid, N. (2016). "Task-based Image Quality Assessment of Sparse Reconstruction Techniques in Cone-Beam CT".

Henscheid, N. *et al.* (2016). "High Performance Parallel Toolbox for Computing Task-Based Figures of Merit".

Toreja, A., Henscheid, N. *et al.* (2016) "Implementation of the Reference Jacobian Mesh Optimization Method in KULL".

Invited Talks

SIAM Conference on Imaging Science, May 2016 'Task-based Image Quality Assessment of Sparse Reconstruction Methods in Cone-Beam CT'.

Inverse Problems Seminar, University of Washington, March 2015 'Wavelet Frame Based Numerical Analysis of Inverse Problems'.

Mathematics Colloquium, Western Washington University, May 2014.

Contributed Talks and Posters

Gordon Conference on Image Science, June 2016 (Poster).

International Congress of Industrial and Applied Mathematics 2011 (Poster).

Honors, Awards, & Fellowships

2016-2017 ARCS Scholar Award recipient.

2016 Galileo Circle Award recipient.

WWU Richard Greene Graduate Scholarship, 2011 and 2012.

2010-2011 WWU Elias A. Bond Graduate Fellowship.

Professional Activities and Service

Reviewer for *Journal of Machine Learning Research.*

Website redesign consultant for Program in Applied Mathematics, 2016.

Program in Applied Mathematics Graduate Representative, 2014-2015.

Program in Applied Mathematics Brown Bag Seminar coordinator, 2013-2014.

Student Member, American Mathematical Society 2010-present.

Student Member, Society of Industrial and Applied Mathematics 2010-present.

Conferences and Workshops Attended

Center for Gamma Ray Imaging Small Animal Imaging Workshop, Jan 10-14, 2016, Tucson, Arizona.

Applied Inverse Problems Summer School and Conference, May 15-30, 2015, Helsinki, Finland.

Inverse Problems Conference in honor of Gunther Uhlmann, June 18-22, 2012, Irvine, CA.

IPDE Summer School, University of Washington, Summer 2011.

ICIAM 2011, July 18-22, 2011, Vancouver, British Columbia.

Mathematical Biology Workshop and IGTC Summit, July 14-16, 2011, Victoria, British Columbia.

Teaching

As a graduate teaching assistant at WWU and UA, I have been responsible for teaching full lecture courses with 30-35 students. This includes planning material and lecturing, writing, administering and grading assessments, meeting with course supervisors, and holding office hours.

University of Arizona

Math 527 Principles of Analysis, Fall 2014 - Spring 2017 (TA).

Program in Applied Mathematics graduate qualifying exam review, Summer 2015 and 2016.

Math 263 Statistics and Biostatistics, Spring 2015.

Math 122B Calculus I, Spring 2014 and Fall 2014.

Math 120R Precalculus, Fall 2013.

Math 323, Formal Reasoning and Writing, Spring 2013 (TA).

Math 111 Trigonometry, Fall 2012 and Spring 2013.

Western Washington University

Math 157 Business Calculus, Spring 2012.

Math 115 Pre-calculus II, Spring 2011, Winter 2012.

Math 114 Pre-calculus I, Winter 2011, Fall 2011.

Math 112 Functions and Algebraic Methods, Fall 2010.

Software Expertise

Expert user of MATLAB, Mathematica, LaTeX, HTML, CSS, Javascript, C/C++, Python, CUDA, UNIX and Linux systems.

Proficient user of Fortran, Java, Git, GNU Make, R, Drupal.
