HWAYEON RYU

Department of Mathematics
Duke University, Box 90320
Durham, NC 27708-0320

Office: (919) 660-2829
Email: hwayeon@math.duke.edu
Website: https://sites.google.com/site/hwayeonryu123/

Education

Duke University, Durham, NC, USA — Expected May 2014
Ph.D., Mathematics (with Certificate in College Teaching)

- Thesis Topic: "Feedback-mediated Dynamics in the Kidney: Mathematical Modeling and Stochastic Analysis"
- Advisors: Anita T. Layton and James Nolen

M.S., Mathematics — Aug 2011

Korea University, Seoul, South Korea — Aug 2008
B.S., Mathematics
Korean National Teacher Certificate, Secondary School Mathematics (Middle and High School Levels)

University of Pennsylvania, Philadelphia, PA, USA — 2006-2007
Study abroad

Honors, Awards, and Fellowships

Mathematical Biosciences Institute (MBI) Poster Award at the AWM poster session — Jul 2013
Travel award for one MBI workshop between Fall 2013 and Fall 2014

Research Fellowship — Aug 2012 - present
NSF Research Training Group fellowship (DMS-0943760) in Mathematical Biology

Study Abroad Full Tuition Scholarship — 2006-2007
Korea University to University of Pennsylvania

The Korea Science and Engineering Foundation (KOSEF) Fellowship — 2004-2008
4-year college fellowship (full tuition) in Korea University

Teaching Experience

Course Instructor, Duke University — 2010-Present
MATH 216 : Linear Algebra & Differential Equation — Summer 2014 (upcoming)
MATH 112L : Laboratory Calculus II — Fall 2012, Spring 2014
MATH 111L : Laboratory Calculus I — Fall 2010, Fall 2011
Full teaching responsibilities:
Designed course policies, delivered three 50-minute lectures each week, designed and graded quizzes and exams, held office hours, and supervised laboratory assistants.

Laboratory Instructor, Duke University — Fall 2009
MATH 111L : Laboratory Calculus I
Teaching responsibilities:
Led a weekly 105-minute laboratory session. Designed and graded lab reports and lab quizzes. Held office hours in the Math Help Room.

Student (Intern) Teacher, Godeok Middle School, South Korea — Apr 2008
Teacher Practicum, 7th and 8th grades
As a part of qualifications for National Teaching Certificate, had teaching experience in middle school levels

of algebra, geometry, and statistics over one month. Developed course materials, helped class management, participated in various school activities under supervision of senior teachers.

Departmental Service

Assistant and Mentor, Noetherian Ring Mentoring Program, Duke University Fall 2011 - Present
Have served as an advanced graduate mentor for one first-year Ph.D. student in mathematics through Noetherian Ring, an informal network of female mathematicians in the Duke Mathematics Department. Have also been an assistant for organizing the special events and for mentoring female undergraduate mathematics majors.

Assistant, Undergraduate Research Programs, Duke University Fall 2012 - Present
Have served as a graduate assistant for undergraduate summer research projects in Mathematical Biology. Participated in oral/poster presentations to introduce participants interesting research problems in mathematical biology.

Research Interests

My research interests are focused on mathematical modeling in renal physiology and neurobiology, specifically in biological fluid dynamics and bifurcation analysis. Other interests include stochastic analysis and numerical analysis.

Publications

H. Ryu and A.T. Layton, Feedback-Mediated Dynamics in a Model of Coupled Nephrons with Compliant Short Loop of Henle, *AMS Contemporary Mathematics, Biological Fluid Dynamics: Modeling, Computations, and Applications*, in press (2013)

H. Ryu and A.T. Layton, Tubular Fluid Flow and Distal NaCl Delivery Mediated by Tubuloglomerular Feedback in the Rat Kidney, *J Math Biol*, in press (2013)

H. Ryu and A.T. Layton, Effect of Tubular Inhomogeneities on Feedback-Mediated Dynamics of a Model of a Thick Ascending Limb, *Math Med Biol*, vol. 30 no. 3 (2013), pp. 191-212

A.T. Layton, P. Pham, and **H. Ryu**, Signal Transduction in a Compliant Short Loop of Henle, *Int J Numer Meth Biomed Engng*, vol. 28 no. 3 (2012), pp. 369-380

Research Experience

Graduate Research Assistant, Duke University Summer 2011 - Present
Study the dynamical behaviors of the tubuloglomerular feedback (TGF) system in the rat kidney, using analytical and numerical approaches under supervision of Anita T. Layton. In addition, study the effect of stochastic components on the stability of the TGF-mediated dynamics with James Nolen and Anita T. Layton.

WhAM! A Research Collaboration Workshop at IMA, Minneapolis, MN Sep 2013
Participated in group project (with other three participants) on clustering in neural networks over the duration of the program guided by Victoria Booth and Sue Ann Campbell. A paper of this project work will be submitted for publication in IMA Proceedings.

Summer Graduate Workshop on Stochastics Applied to Biological Systems Participant, Mathematical Biosciences Institute (MBI) Jun 2012
Participated in two-week summer workshop and conducted a group project on parameter sensitivities and continuous Markov chain under supervision of David F. Anderson and Hye-Won Kang.

Selected Presentations

Oral Presentations,
North Carolina State University Biomath Seminar, Raleigh, NC March 2014
Feedback-Mediated Dynamics in the Kidney: Mathematical Modeling

Duke Grad/Faculty Seminar, Durham, NC Oct 2013
Time-Delayed PDEs with Stochastic Boundary in Mathematical Modeling of Kidney

Duke Mathematical Biology REU, Durham, NC May 2013
Delay Differential Equation in Mathematical Modeling of Kidney

The 8th Annual UNCG Regional Conference, Greensboro, NC Nov 2012
Feedback-Mediated Dynamics in a Model of Coupled Nephrons with Compliant Short Loop of Henle

Duke Grad/Faculty Seminar, Durham, NC Mar 2012
Effect of Tubular Inhomogeneities on Feedback-Mediated Dynamics of a Model of a Thick Ascending Limb

Symposium on Biomathematics and Ecology: Education and Research (BEER), Portland, OR Dec 2011
Effect of Tubular Inhomogeneities on Feedback-Mediated Dynamics of a Compliant Thick Ascending Limb

Poster Presentations

AWM Workshop at SIAM Annual Meeting, San Diego, CA Jul 2013
Feedback-mediated dynamics in the kidney: mathematical modeling and analysis
(**Winner of MBI Conference Award at the AWM poster session**)

Career Options for Women in Mathematical Sciences, Minneapolis, MN Mar 2013
Feedback-Mediated Dynamics in a Model of Coupled Nephrons

Experimental Biology, San Diego, CA Apr 2012
Tubular Fluid Oscillations Mediated by Tubularglomerular Feedback in a Compliant Short Loop of Henle

NIMBioS Workshop: Mathematical Modeling and Experimental Investigations in Renal Hemodynamics, Knoxville, TN Aug 2011
Bifurcation Analysis of the Tubular Fluid Oscillations Mediated by Tubularglomerular Feedback in a Compliant Short Loop of Henle

Travel Awards

AWM Workshop at 2014 SIAM Annual Meeting, Chicago, IL Jul 2014
WhAM Workshop, Minneapolis, MN Sep 2013
AWM Workshop at 2013 SIAM Annual Meeting, San Diego, CA Jul 2013
IMA Workshop, Minneapolis, MN May 2013
Career Options for Women in Mathematical Sciences, Minneapolis, MN Mar 2013
SACNAS National Conference, Seattle, WA Oct 2012
MBI Summer Graduate Workshop, Columbus, OH Jun 2012
BEER-2011, Portland, OR Dec 2011

Computer Skills

- Languages: C++, C, XPP, Matlab, and Mathematica; Operating Systems: Unix/Linux, Windows.

References

Anita T. Layton
Department of Mathematics
Duke University
alayton@math.duke.edu

James Nolen
Department of Mathematics
Duke University
nolen@math.duke.edu

Michael C. Reed
Department of Mathematics
Duke University
reed@math.duke.edu

Sarah Schott (Teaching)
Department of Mathematics
Duke University
schott@math.duke.edu