

## Rebecca E. Gasper

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CONTACT INFORMATION      *E-mail:* RebeccaGasper@creighton.edu      Department of Mathematics  
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NEW IN 2017      ⊗ **A Bold-Star Combination denotes new contributions in 2017 Calendar Year.**

RESEARCH INTERESTS      Mathematical Biology, Audiology, Differential Equations, Stochastic Processes,  
Mathematical Ecology, Parameter Fitting and Estimation

EDUCATION      **The University of Iowa**, Iowa City, Iowa USA  
Ph.D., Applied Mathematical and Computational Sciences, August 2014  
Dissertation Title: “Action Potentials in the Peripheral Auditory Nervous System:  
a Novel PDE Distribution Model”  
Advisor: Colleen Mitchell, Department of Applied Mathematical and Computational Sciences  
Co-Advisor: Paul Abbas, Department of Speech and Hearing Sciences  
Comprehensive Exam (Thesis Proposal) Completed February 2011  
Qualifying Exams Completed August 2009  
Certificate in College Teaching, May 2014  
M.S., Mathematics, May 2010

**The University of Minnesota-Twin Cities**, Minneapolis, Minnesota USA  
B.S., Magna Cum Laude, Mathematics (with Honors), May 2008  
Senior Thesis / REU Project: “An Introduction to Minimizing Energy Functions”  
Thesis Advisor: Maria Carme Calderer  
Minors in Russian and in Spanish Studies

**Math in Moscow**, Moscow Russia  
*Study Abroad Program at Independent University of Moscow*  
Graduate Courses in Mathematics and Russian Language, Fall 2007

**IES Madrid**, Madrid Spain  
*Study Abroad Program at Universidad Complutense de Madrid*  
Spanish Language and Culture Program, Summer 2005

TEACHING EXPERIENCE      **Assistant Professor, Creighton University, 2014-Present**

*Instructor (sole responsibility)*

Choose textbooks and learning objectives, write syllabus. Prepare and give lectures for the entire course, determine grades; write/assign and grade homework, design and grade quizzes, tests, and projects, and hold office hours.

- Calculus for the Biological Sciences (with WeBWorK), Spring 2018, Fall 2016, Spring 2016 and Fall 2015 (\*Course Designer & Course Coordinator\*)
- ⊗ **Math in the Modern World, Spring 2018, Fall 2017, Spring 2017**
- ⊗ **Math in Medicine and the Life Sciences I (with Mathematica), Fall 2017, Fall 2016, Fall 2015, Fall 2014**
- ⊗ **Calculus I (with WebWork), Fall 2017, Fall 2014 (2 sections)**

- ⊗Intro to Abstract Mathematics (formerly Fundamentals of Mathematics), Spring 2017, Fall 2016, Fall 2015
- ⊗Calculus II (with WeBWorK), Spring 2017
- Epidemiology, Summer 2016
- Linear Algebra, Spring 2016
- Math in Medicine and the Life Sciences II (with Mathematica), Spring 2016 (\*Course Designer & Course Coordinator\*)
- Directed Independent Research: Mathematical Physiology, Fall 2015-Spring 2016
- Directed Independent Research: Mathematical Ecology: Parasite-Host Interactions, Fall 2015-Spring 2016
- Applied Mathematics, Spring 2015
- Calculus III (with Mathematica), Spring 2015
- Directed Independent Research: Partial Differential Equations and Numerical Methods, Spring 2015
- Directed Independent Study: Differential Equations for Action Potentials, Fall 2014
- Directed Independent Study: Symmetries in Genetics, Biology, and Chemistry, Fall 2014

### Graduate Teaching Assistant, The University of Iowa, 2008-2014

#### *Instructor (sole responsibility)*

Prepare and give lectures for the entire course, determine grades, assign homework, design and grade quizzes, tests, and projects, and hold office hours.

- Elementary Functions (with WebAssign), Fall 2012
- Qualifying Exam Preparation Seminar in Differential Equations, Summer 2012  
\*Graduate Level Course
- Intermediate Algebra, Fall 2010

#### *Discussion Leader*

Lead discussion sessions which complement the lectures, determine grades, design quizzes, grade tests, quizzes, and homework, and hold office hours.

- Engineering Math II: Multi-Variable Calculus (with Mathematica), Spring 2014
- Calculus for Biological Sciences, Spring 2013
- Partial Differential Equations with Numerical Methods (with MATLAB), Spring 2012  
\*Graduate Level Course
- Nonlinear Dynamics with Numerical Methods, Fall 2011  
\*Graduate Level Course
- Engineering Math II: Multi-Variable Calculus (with Mathematica), Spring 2010
- Engineering Math I: Calculus, Fall 2009
- Calculus for Business, Spring 2009
- Math for Business, Fall 2008

#### *Teaching Practicum Student*

Create and deliver lecture material, assign homework, write assessment problems, and make minor modifications to the syllabus.

- Calculus III, Spring 2014

#### *REU Mentor*

Attend and discuss summer REU lectures with undergraduate students, evaluate progress in basic and research skills (ungraded), clarify and simplify research problem posed by faculty member, supervise work, and assist students in creating original research presentation.

- MathBio, Summer 2011

#### *Math Lab Tutor*

Give one-on-one help and group help to students at the Math Tutorial Lab. Tutor students in courses ranging from basic Algebra to Multi-Variable Calculus and proofs courses such as Linear Algebra.

- Math Tutorial Lab, 2008-Present

#### *Other Grading*

Grade student homework and post solutions.

- Continuous Models, Fall 2013  
\*Graduate Level Course
- Ordinary Differential Equations I, Fall 2013  
\*Graduate Level Course
- Introduction to Ordinary Differential Equations, Fall 2010
- Linear Algebra, Fall 2008

#### **Teaching Practicum Student, Coe College, 2013**

##### *Student Teacher*

Observe a Modified Moore Method classroom. Implement minor changes to syllabus and final exam. Create and evaluate an assignment. Suggest fresh examples for script.

- Foundations of Advanced Mathematics, Spring 2013

#### **Undergraduate Teaching Assistant, The University of Minnesota, 2006**

##### *Discussion Leader*

Lead discussion sessions which complement the lectures, determine grades, design quizzes, grade tests, quizzes, and homework, and hold office hours.

- College Algebra and Probability, Fall 2006

## ADVISING

### **Advising Student Research**

- ⊗Shari Tanaka, Spring 2018-Present, *Modeling Effects of Obesity on the SinoAtrial Node with Bifurcation Analysis*.
- ⊗Noah Brady, Spring 2018-Present, *African Sleeping Sickness in the Democratic Republic of Congo*.
- ⊗Grace Rants, Fall 2016-Spring 2017, *Effects of obesity on cardiac action potentials at the sino-atrial node*.
- A.K. Satpathy, Summer 2016, *TS-19 Outbreak after Aggressive Intracranial Medical Therapy*.
- Mary Luckasen, Grace Rants, Nina Thakur, and Emma Harwood, Spring 2016, *Effects of Obesity on the Cardiac Action Potential*.
- Monika Satkauskas, Emma Schlagenhauff, Sruti Prathivadhi, Chris Connor, Tommy Nemmers, and Robert James, with co-advising of an additional eight biology students, Summer 2015-Spring 2016, *A Host-Parasite-Commensal ecological model based on field studies in the Great Plains*.
- Nina Thakur and Emma Harwood, Fall 2015, *Neuron ODE Models*.
- Anh Vo, Spring 2015-Summer 2015, *Numerical Methods for Nonlinear Population Models*. CURAS Dean's Scholarship awarded for this research.
- Sarah Budney, Spring 2015, *Modeling Spread of HPV in College "Hook-up" Culture*.
- Monika Satkauskas, Fall 2014, *A Short Introduction: Group Theory and its Applications*.
- Anh Vo, Fall 2014, *System of First Order Linear Differential Equations and Its Application in Study of Membrane*.

### **Academic Advising**

- ⊗Freshman Pre-Major Advising, 15 Students, Class of 2021.
- ⊗Jackie Ramos, Class of 2019

- ⊗ **Dominic (Dom) Theis, Class of 2019**
- Anna Rossini, Class of 2020
- Cameron Kell, Class of 2019
- Patrick O’Neill, Class of 2018
- Freshman Pre-Major Advising, 14 Students, Class of 2019
- Fernanda Sandoval, Class of 2018 (advised for 2015-2016 only)
- Meixuan (Michelle) Yu, Graduated in 3 years, Class of 2017
- Blake Wach, Class of 2017
- Monika Satkauskas, Class of 2017
- Pre-Health Professions Advising, 2015-Current

GRANTS

PI: CURAS Faculty Research Fund, (competitive internal grant) *A Scaffolded “Laboratory” in Mathematics to Discover and Uncover a Robust Mathematical Biology Population Model*. \$2000, 2015-2016 year.

Co-PI, with Dr. John F. Shea: Dr. George F. Haddix Presidents Faculty Research Fund Award (competitive internal grant), Interdisciplinary, *Interdisciplinary Collaboration to Serve Creighton’s Mission with Biological Field Research-Learning and Mathematical Modeling*. \$15,000, Summer 2015.

RECOGNITION

IGGY Award, for outstanding mentorship of Freshman students, 2015.

PUBLICATIONS

⊗ **Ciocanel V, Docken SS, Gasper RE, Dean C, Carlson BE, and Olufsen MS, *Cardiovascular Regulation in Response to Multiple Hemorrhages: Analysis and Parameter Estimation***. Submitted January 2018 to *Biological Cybernetics*.

⊗ **Gasper RE, *Post-stimulus firing time and action potential properties at a single node of Ranvier with stochastic ion channel opening*** (working title). In Progress.

⊗ **Gasper RE and Rants, G, *Effects of obesity on cardiac action potential at the sino-atrial node*** (working title). In Progress.

MATHEMATICAL TALKS

⊗ ***Effects of Obesity on Cardiac Action Potentials at the Sino-Atrial Node*** (Poster). **Math Biosciences Institute Emphasis Workshop 3: Control of Disease: Personalized Medicine Across Heterogeneous Populations, Columbus OH, October 30, 2017.**

*Stochastic Gating in a Peripheral Auditory Neuron: Effects on Post Stimulus Time and Firing Efficiency of Action Potentials*. AMS Special Session, Joint Mathematics Meetings, Seattle WA, January 9, 2016.

*New Results in Population Models in Auditory Neurology* (Poster). Midwest Auditory Research Conference (MARC-MANS), Omaha NE, July 24, 2015.

*Mathematical models of action potentials in the auditory nerve fiber*. Neuroscience Journal Club, Creighton University, January 27, 2015.

*Action potentials in peripheral auditory nervous system: A novel PDE distribution model*. Joint Mathematics Meetings, Baltimore MD, January 16, 2014.

*All my circuits*. Math and Computer Science Colloquium, Goucher College (MD), November 20, 2013.

*Can you hear me now?, or, A mathematician's journey to get people in other disciplines to listen.* Math Colloquium, Truman State University (MO), April 17, 2013.

*Action potentials in peripheral auditory nervous system: A novel PDE distribution model.* Joint Mathematics Meetings, San Diego CA, January 10, 2013.

*Mathematical biology.* Math Colloquium, University of Wisconsin-La Crosse (WI), November 9, 2012.

*Auditory midbrain implant: A review (H.H. Lim, M. Menarz, T. Menarz).* Math Biology Lunch, University of Iowa, April 6, 2012.

*Excitation in the auditory system: A novel PDE model.* Comprehensive Exam, Panel: (Mathematics) Colleen Mitchell, Bruce Ayati, Tong Li, Rodica Curtu, (Biology) Alan Kay, (Hearing Science) Paul Abbas, University of Iowa, February 24, 2011.

*Excitation in the auditory system: A novel PDE model.* Math Biology Seminar, University of Iowa, February 21, 2011.

*A stochastic model of the electrically stimulated auditory nerve: single-pulse response (Ian C. Bruce et al).* Math Biology Lunch, University of Iowa, November 5, 2010.

*The auditory brain stem and the Poisson distribution.* Math Seminar, Grinnell College (IA), March 12, 2010.

*Poisson Processes in the auditory brain stem.* Graduate and Undergraduate Student Seminar (GAUSS), University of Iowa, March 9, 2010.

PROFESSIONAL  
DEVELOPMENT  
TALKS

⊗ ***Changing tracks: More Applied Courses Make a Med-Ready Major.* MAA Themed Contributed Paper Session, Joint Mathematics Meetings, Atlanta GA, January 6, 2017.**

*The new diversity.* Iowa Section-NExT, Wartburg College (IA) October 18, 2013.

*Creating a course site on Facebook.* Math Biology Lunch, University of Iowa, February 17, 2012.

*A love-hate relationship with Wolfram Alpha.* Math Biology Lunch, University of Iowa, September 23, 2011.

*Creating a mathematical multimedia slideshow in Beamer.* Math Biology Lunch, University of Iowa, February 18, 2011.

CONFERENCES AND  
WORKSHOPS  
ATTENDED

⊗ **Seminar on Jesuit Higher Education, Omaha, NE, Fall 2017-Spring 2018.**

⊗ **Math Biosciences Institute Emphasis Workshop 3: Control of Disease: Personalized Medicine Across Heterogeneous Populations, Columbus, OH, October 30-November 3, 2017.**

⊗ **Nebraska Conference for Undergraduate Women in Mathematics, Lincoln, NE, February 3-5, 2017.**

⊗ **Joint Mathematics Meetings, Atlanta, GA, January 4-7 2017.**

Mathematics Research Community in Mathematics in Physiology and Medicine, Snowbird, UT, June 19-25, 2016.

Midwest Undergraduate Mathematics Symposium, Indianola, IA, April 9, 2016.

Joint Mathematics Meetings, Seattle, WA, January 6-9, 2016.  
 NIMBioS Undergraduate Research Conference at the Interface of Mathematics and Biology, Knoxville, TN, November 21-22, 2015.  
 MAA MathFest, Washington D.C., August 5-8, 2015.  
 Midwest Auditory Research Conference (MARC-MANS), Omaha NE, July 23-25, 2015.  
 Midwest Undergraduate Research Symposium, Indianola, IA, April 10-11, 2015.  
 Nebraska Conference for Undergraduate Women in Mathematics, Lincoln, NE, January 23-25, 2015.  
 Joint Mathematics Meetings, Baltimore, MD, January 15-18, 2014.  
 MAA Iowa Section and Iowa Section-NExT Meetings, Wartburg College, October 18-19, 2013.  
 Joint Mathematics Meetings, San Diego, CA, January 9-12, 2013.  
 MAA Iowa Section and Iowa Section-NExT Meetings, Simpson College, October 5-6, 2012.  
 Heartland Partnership Annual Meeting, The University of Iowa, 2009-2012.  
 MAA Mathfest, Madison, WI, August 2-4, 2012.  
 Summer School on Recent Advances in the Theory of Homogenization, The University of Chicago, June 18-29, 2012.  
 Symmetries of Differential Equations: Frames, Invariants and Applications (Peter J. Olver Birthday Conference), The University of Minnesota, May 17-19, 2012.  
 Mathematical Biology Micro-Conferences, The University of Iowa, 2009-2011.  
 Women and Mathematics Summer Program: Program on Geometric PDEs, Institute for Advanced Studies, June 2009.  
 Blackwell-Tapia Conference, University of Minnesota, 2008.

PROFESSIONAL  
MEMBERSHIPS

American Mathematical Society (AMS)  
 Phi Beta Kappa  
 Iowa Section-NExT (former member)

UNIVERSITY AND  
DEPARTMENT  
SERVICE

⊛ **Pre-Health Professions Advisor, attendance of related monthly workshops and meeting with prospective students, 2015-current.**  
 ⊛ **Faculty Preceptor, for Ratio Studiorum Program, Summer 2017-Spring 2018 and Summer-Fall 2015.**  
 ⊛ **Host to five visiting scholars for collaboration workshop, Omaha, NE, April 20-24, 2017.**  
 ⊛ **College of Arts and Sciences Mission Catalysts Committee, Spring 2016-Spring 2017.**  
 ⊛ **Hiring Committee, for Assistant Professor in Statistics, Fall 2016-Spring 2017.**  
 ⊛ **WeBWorK Administrator, Fall 2016-current.**  
 ⊛ **Selection Committee, for PBK Visiting Scholar to Creighton University, April 2016-February 2017.**  
**Course Designer and Author of Magis Core Proposal, MTH 448 [Previously MTH 548], Fall 2015-Fall 2016.**  
**Course Coordinator, MTH 231, 2015-current.**  
**Hiring Committee, for Assistant Professor of Mathematics, Fall 2015-Spring 2016.**  
**Panelist, Women in Sciences/Clare Boothe Luce Seminar, March 2016 and March 2015.**  
**Selection Committee, for PBK Visiting Scholar to Creighton University, January-November 2015.**

**Scholarship Committee**, Clare Booth Luce Scholarship, March-April 2015.

**Hiring Committee**, for Visiting Assistant Professor of Mathematics, Fall 2014-Spring 2015.

COMMUNITY  
SERVICE

**Committee Chair and Volunteer**, Sonia Kovalevsky Day for Women in Mathematics, 2008-2013,  
Iowa City, Iowa.

**Lead Organizer**, Sonia Kovalevsky Day for Women in Mathematics, 2011, Iowa City, Iowa.

SERVICE IN  
MATHEMATICS

⊛ **Reviewer in Focus Group, MAA Instructional Practices Guide, January 2017.**

**Book Reviewer**, 1 textbook, Summer 2016.

**Breakout Session Chair**, Nebraska Conference for Undergraduate Women in Mathematics, January 2015.

**Presentation Judge**, Iowa Math Modeling Competition, October 2012.

**Co-Organizer**, American Mathematical Society Central Section Meeting Special Event (Poster Session for Graduate Students, a first in the history), 2011.

OTHER WORK  
EXPERIENCE

**Lincoln Adult Education Center**, Minneapolis, Minnesota USA, 2006-2007

*Volunteer Math Teacher*

Create and teach math lessons for immigrants and other adults (often without a textbook) in GED mathematics subjects. Supervise computer lab when needed.

**Minnesota Center for Industrial Mathematics**, Minneapolis, Minnesota USA, 2006-2007

*Consultant to Wand Corporation, Eden Prairie, Minnesota USA*

Advisor, Fadil Santosa (University of Minnesota, IMA, MCIM)

Analyze current model and create a predicative sales model to be used in software for popular restaurant franchises. Create and present a report for management with my advisor.

REFERENCES

**Randall Crist**

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Creighton University  
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Omaha NE 68178  
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**Colleen Mitchell**

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The University of Iowa  
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