CURRICULUM VITAE
RICHARD CORBAN HARWOOD

CONTACT INFORMATION

Department of Mathematics and Applied Sciences
George Fox University
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EDUCATION

2011 **Ph.D. in Mathematics** — Washington State University
Operator Splitting Method and Applications for Semilinear Parabolic Partial Differential Equations

2008 **M.Sc. in Mathematics** — Washington State University

2006 **B.Sc. in Mathematics** *summa cum laude* — Whitworth University

PROFESSIONAL EMPLOYMENT

2011-present **Assistant Professor of Mathematics** — Dept. of Mathematics and Applied Science, George Fox University

2011 **Instructor** — Dept. of Mathematics, Washington State University

2010-2011 **Research Support** — Microelectronics Research and Communications Institute, University of Idaho
Funded by Exide Industries and Spark Technologies

PUBLICATIONS

Refereed Journal Articles

2011 **R. Corban Harwood**, V. S. Manoranjan, Dean Edwards, "Lead-Acid Battery Model under Discharge with Fast Splitting Method," *IEEE Transactions On Energy Conversion*, Vol. 26 (4) pp. 1109-1117, 2011.

2008 V. S. Manoranjan, M. A. O. Gomez, and **R. C. Harwood**, "Modeling Algae Self-Replenishment," *Journal of Interdisciplinary Mathematics*, Vol. 11, pp. 681-694, 2008.

2008 L. Bai, M. Stamps, **R. Harwood**, C. Kollmann, "An Evolutionary Method for the Minimum Toll Booth Problem: the Methodology," *Academy of Information and Management Sciences Journal*, Vol. 11, No. 2, pp. 33-51, 2008.

Manuscripts Under Review

R. Corban Harwood, "Logistics of Mathematical Modeling-Focused Projects." Under Review by *PRIMUS: Special Issue on Project-Based Curricula*.

R. C. Harwood, Likun K. Zhang, and V. S. Manoranjan, "Oscillation-Free Method for Semilinear Diffusion Equations." Under Review by the *Journal of Applied Mathematics and Computations*.

AWARDS AND HONORS

2015 Holman Summer Research Grant
Proposal: *Oscillation-Free Stability and Its Application*
Holman Fund, George Fox University

2014 Faculty Advisor: Richter Scholars Program Grant, Zihao Wang
Proposal: *Quantifying Uncertainty in the Financial Market by Analyzing the Assumptions of the Black-Scholes Model*, Paul K. Richter Memorial Fund and the Evalyn E.C. Richter Memorial Fund, George Fox University

2013 Holman Summer Research Grant
Proposal: *A Stronger Definition of Numerical Stability*
Holman Fund, George Fox University

2013 Faculty Development Committee Summer Research Grant
Proposal: *Methods You Can Trust: Using Operator Splitting Techniques to Ensure Stability of Numerical Methods for Nonlinear Partial Differential Equations*
Faculty Development Committee, George Fox University

2012 Mathematics for Planet Earth Module Tester Travel Grant
Center for Discrete Mathematics and Theoretical Computer Science, Rutgers University

2012 2012-2013 Project NExT Fellow
Project NExT, Mathematical Association of America

2011 Outstanding Graduate Student Award
College of Sciences, Washington State University

2011 Graduate Student Travel Grant for Joint Mathematics Meetings
American Mathematical Society

2009 Sidney G. and Evelyn Hacker Graduate Research Award
Washington State University

2008 Distinguished Researcher Award
Allied Academics

2008 Nancy J. Robertson Graduate Fellowship in Mathematics
Washington State University

2007 Sidney G. and Evelyn Hacker Graduate Research Award
Washington State University

PRESENTATIONS

Invited Seminar Presentations

2011 "Research in Applied Mathematics," *Preparing for a Career in STEM*, Whitworth University, Spokane, WA

2008 "Graduate Studies in Mathematics," *Math Club*, Gonzaga University, Spokane, WA

2008 "Research in Mathematical Modeling," *Career and Vocation*, Whitworth University, Spokane, WA

Conference Presentations

2014 "Encouraging Deeper Understanding Through Mathematical Modeling-Focused Projects," *Project-Based Curriculum*, Math Fest, Portland, OR

2014 "Connecting Numerical Oscillations to Eigenvalues in Solving Partial Differential Equations, *Junior Faculty Research*, Pacific Northwest MAA Section Meeting, Missoula, MT

2013 "A Stronger Definition of Numerical Stability," *Research in Applied Mathematics*, Math Fest, Hartford, CT

2013 "Oscillation-Free Stability Analysis for Linear and Semilinear Diffusion Equations," *Numerical Methods and Inverse, Optimization, and Variational Problems*, Joint Mathematics Meetings, San Diego, CA

2012 "Surprising Benefits of Operator Splitting Techniques," *Junior Faculty Research*, Pacific Northwest MAA Section Meeting, Portland, OR

2011 "Lead-Acid Battery Model under Discharge with Fast Splitting Method," SIAM Conference on Computational Science and Engineering, Reno, NV

2011 "Oscillation-Free Operator Splitting Method for Semilinear Diffusion Equations," Joint Mathematical Meetings, New Orleans, LA

2005 "A Genetic Algorithm for the Minimum Tollbooth Problem," Central AMS Section Meeting, Lincoln, NE

Advised Student Presentations

2014 "Quantifying Uncertainty of the Black-Scholes Model by Relaxing its Unrealistic Assumptions," Zihao Wang, Poster Presentation, *Richter Scholars Poster Session*, George Fox University

2014 "Quantifying Uncertainty of the Black-Scholes Model by Relaxing its Unrealistic Assumptions," Zihao Wang, *Math Fest*, Portland, OR

2013 "Identifying Numerical Oscillations in Parabolic Differential Equations," Mitch Main, *Richter Scholars Seminar*, George Fox University

2013 "Identifying Numerical Oscillations in Parabolic Differential Equations," Mitch Main, Poster Presentation, *Murdock College Science Research Program Conference*, Vancouver, WA

2013 "An Elementary Proof of Dodgson's Condensation Method," Micah Donor and Mitch Main, Pacific Northwest MAA Section Meeting, Salem, OR

2013 "Stable and Instability: Affine Drama of Transformations," Erika Stutts and Michael Vandeburg, Pacific Northwest MAA Section Meeting, Salem, OR

2013 "Exotic Vector Spaces," Sarah Gibson and Josiah Shoemaker, Pacific Northwest MAA Section Meeting, Salem, OR

PROFESSIONAL ACTIVITIES AND SERVICE

Invited Peer-Review of Journals

2011-present IEEE Transactions on Energy Conversion

2015-present PRIMUS: Problems, Resources, and Issues in Mathematics Undergraduate Studies

Consulting

2014 Mathematical Verification of a Retirement Planning Tool, *Employee & Institution Securities Research Corporation*, Newberg, OR

Organization

2013 Special Panel Session, *Scholarship of Teaching and Learning*, Joint Mathematics Meetings, San Diego, CA

Sessions Chaired

2013 Invited Session Chair, *Research in Applied Mathematics*, Math Fest

2013 Invited Session Chair, *Numerical Methods and Inverse, Optimization, and Variational Problems*, Joint Mathematics Meetings, San Diego, CA

Judging Student Research

2015 *Liberal Arts and Critical Issues Poster Session*, George Fox University, Newberg, OR

2015 *NUMS Student Presentations Session*, Pacific Northwest MAA Section Meeting, Tacoma, WA

2014 *Liberal Arts and Critical Issues Poster Session*, George Fox University, Newberg, OR

2013 *MAA Student Papers Session*, Joint Mathematics Meetings, San Diego, CA

University Service

2013-present First Year Seminar Committee

2013 Serve Day Team Leader

TEACHING EXPERIENCE

George Fox University (times taught)

The World of Mathematics (2, Online)

Trigonometry (2, Online)

Pre-Calculus (1)

Calculus I (2)

Calculus II (2)

Discrete Mathematics (1)

Calculus III (3)

Numerical Methods (2)

Differential Equations with Linear Algebra (11)

Advanced Linear Algebra (2)

Topics: Partial Differential Equations (1)

Topics: Mathematical Modeling (1)

2006, 2008-11 **Graduate Teaching Assistant**, Washington State University
College Algebra
Pre-Calculus
Trigonometry
Tutorial for Pre-Calculus
Tutorial for Business Pre-Calculus
Calculus for Business and Economics
Linear Algebra
Mathematical Computing

RESEARCH EXPERIENCE

2010-2011 **Research Support**:   Microelectronics Research and Communications Institute
Funded by Exide Industries and Spark Technologies   University of Idaho
Modeled performance enhancements for automotive batteries   Moscow, ID

2007-2008 **Graduate Research Assistant**: *Funded by Office of Naval Research*   Washington State University
Collaborative mathematical modeling of batteries   Pullman, WA

2006 **Research Assistant**: *Funded by Boeing*   Washington State University
Biological population model development and analysis   Pullman, WA

PROFESSIONAL MEMBERSHIPS

2006-present Mathematical Association of America (MAA)

2011-present Society of Industrial and Applied Mathematics (SIAM)

2011-present Association of Christians in the Mathematical Sciences (ACMS)

2013-present Systematic Initiate Modeling Investigations and Opportunities with Differential Equations (SIMIODE)

2006-2012 American Mathematical Society (AMS)

PROFESSIONAL DEVELOPMENT

2014 Project NExT Workshop, "Why, What, and How! Everything You Need to Know about Incorporating Sustainability into Mathematics Courses" (2014), Math Fest, Portland, OR

2014 Project NExT Workshop, "Preparing for Leadership Positions" (2014), Pacific Northwest Regional Meeting of the MAA, Missoula, MT

2013 Project NExT Workshop, "Guiding Undergraduate Student Research" (2013), Math Fest, Hartford, CT

2012 Project NExT Workshop, "Research Grants/Getting Your Research Off the Ground " (2012), Math Fest, Madison, WI

2012 MathWorks Webinar, "GPU Computing with MATLAB" (2012)

2011 COMSOL Multiphysics Webinar, "Expanding Multiphysics Applications with COMSOL 4.2" (2011)

2010 Pacific Northwest Numerical Analysis Seminar (registration assistant, 2010) Washington State University

2010 Graduate Grant Writing Workshop (2010)
Office of Grant and Research Development, Washington State University

2010 COMSOL Multiphysics Workshop, "Introduction to COMSOL Multiphysics 4.1" (2010)
Washington State University

2010 MathWorks Seminar, "Technical Computing with MATLAB & Simulink" (2010)
Washington State University

PROFESSIONAL SKILLS

Scientific Computing

- Programming Languages: C++, MPI/Cuda, VBA
- Packages: MATLAB/Octave, Maple, Mathematica, COMSOL, Minitab, FreeFem++
- Platforms: Unix/Linux, Windows
- Publishing: LaTeX, HTML/CSS/XML/SVG

Instructional Technology: Moodle, ALEKS, eLearning/Blackboard, Maple, MATLAB