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## RESEARCH INTERESTS

Pattern Formation, Coherent Structures, Dynamical Systems, PDE, Mathematical Modeling

## EDUCATION

**Ph.D. Mathematics** *June 2016*  
 College of Science and Engineering, University of Minnesota-Twin Cities, Minneapolis, MN  
 Thesis: Pattern formation in the wake of external mechanisms  
 Advisor: Arnd Scheel

**M.Sc. Mathematics** *January 2014*  
 College of Science and Engineering, University of Minnesota-Twin Cities, Minneapolis, MN

**B.S. Mathematics & B.A. Physics** *both with High Honors* *May 2011*  
 College of Natural Science, Michigan State University, East Lansing, MI

## EMPLOYMENT

**NSF Postdoctoral Fellow** *2016 - 2019*  
 Boston University, Department of Mathematics and Statistics,  
 ◦ MA124 - Calculus II *Spring 2018*  
 ◦ MA775 - Ordinary differential equations *Fall 2017*

**UMN Doctoral Dissertation Fellow** *2015 - 2016*  
 University of Minnesota, School of Mathematics,

**NSF Graduate Fellow** *2012 - 2015*  
 University of Minnesota, School of Mathematics,  
 Pattern Formation from a Dynamical Systems viewpoint

**Graduate Teaching Assistant**  
 University of Minnesota, School of Mathematics,  
 ◦ MATH 3592H - 3593H - Honors Mathematics I & II *2013 - 2015*  
 ◦ MATH 1271 - Calculus I *2011 - 2012*

**Research Aid** *May 2010 - May 2011*  
 Michigan State University, Chemistry and Mathematics Departments  
 Mathematical modeling of Dye-Sensitized Solar Cells, Advisor: Keith Promislow

**REU Participant** *May 2009 - July 2009*  
 University of Minnesota, School of Mathematics  
 Modeling and dynamics of Liesegang Patterns, Advisor: Arnd Scheel

**Professorial Assistant** *August 2007 - May 2009*  
 Michigan State University, Chemistry and Mathematics Departments  
 Basins of Attractions and Bi-stability of Piecewise-Linear Discontinuous Maps, Advisor: Keith Promislow

## HONORS, AWARDS, AND SCHOLARSHIPS

◦ Outstanding Reviewer Award, Nonlinearity *February 3, 2017*  
 ◦ SIAM Student Chapter Certificate of Recognition, University of Minnesota *May 6, 2016*  
 ◦ 2014-2015 Outstanding TA Award, School of Mathematics, University of Minnesota *April 7, 2016*  
 ◦ NSF Postdoctoral Fellowship *January 2016*  
 ◦ Red Sock Award for best poster, SIAM Conference on Application of Dynamical Systems *May 21, 2015*  
 ◦ Doctoral Dissertation Fellowship, University of Minnesota *April 2015*

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◦ SIAM Student Travel Award, Conference on Application of Dynamical Systems	<i>May 17 - 21, 2015</i>
◦ AMS Student Travel Award, AMS Central Sectional Meeting	<i>March 13 - 15, 2015</i>
◦ SIAM Student Travel Award, Conference on Nonlinear Waves and Coherent Structures	<i>August 11 - 14, 2014</i>
◦ Charles and Dorothy Andrew Bird Award, Sigma Xi Society, UMN Chapter	<i>May 2013</i>
◦ National Science Foundation Graduate Research Fellowship	<i>April 2012</i>
◦ MSU College of Natural Science Dean's List	<i>2007 - 2011</i>
◦ Mathematical Endowed Scholarship, MSU Dept. of Mathematics	<i>May 2011</i>
◦ L.C. Plant Award, MSU Dept. of Mathematics	<i>May 2010</i>
◦ Member of Honors College, MSU	<i>2007 - 2011</i>
◦ Distinguished Freshman Scholarship, MSU	<i>2007 - 2011</i>

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## JOURNAL PUBLICATIONS

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- R. Goh, C.E. Wayne. **Vortices in stably-stratified rapidly rotating Boussinesq convection**, Submitted.
  - R. Goh, A. Scheel. **Pattern-forming fronts in a Swift-Hohenberg equation with directional quenching - parallel and oblique stripes**, J. London Math. Soc, to appear.
  - Z. Wang, R. Goh, K. Bazargan, A. Scheel, N. Saraf. **Stochastic Implementation and Analysis of Dynamical System Similar to the Logistic Map**, IEEE Transactions on Very Large Scale Integration Systems 99, (2016), 1-13..
  - R. Goh, R. Beekie, D. Matthias, J. Nunley, A. Scheel. **Universal wavenumber selection laws in apical growth**, Phys. Rev. E. 94, (2016), 022219.
  - R. Goh, A. Scheel. **Pattern formation in the wake of triggered pushed fronts**, Nonlinearity 29 (2016), 2196. (a 2016 highlighted paper)
  - R. Goh, A. Scheel. **Hopf bifurcation from fronts in the Cahn-Hilliard equation**, Arch. Ration. Mech. An. 3 (2015), 1219-1263.
  - R. Goh, A. Scheel. **Triggered Fronts in the Complex Ginzburg Landau Equation**, J. of Nonlinear Science 24 (2014), 117-144.
  - R. Goh, S. Mesuro, A. Scheel. **Spatial wavenumber selection in recurrent precipitation**, SIAM J. Appl. Dyn. Sys. 10 (2011), 360-402.
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## TALKS AND POSTERS

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- **Vortices in Rapidly Rotating Boussinesq Convection**,
  - (Poster) SIAM Conf. on Nonlinear Waves and Coherent Structures, Anaheim, CA, June, 2018.
  - (Invited talk) SIAM Conf. on Analysis of PDE, Baltimore, MD, Dec., 2017.
  - (Seminar talk) MIT seminar on numerical methods for PDE, Cambridge, MA, Nov. 15, 2017.
- **Patterns in growing domains/Pattern formation in the wake of growth mechanisms**,
  - (Seminar Talk) Brown University, Dynamics seminar, Providence, RI, Feb. 26, 2018.
  - (Invited talk) SIAM central sectional meeting, Fort Collins, CO, Oct. 1, 2017.
  - (Seminar Talk) U. of Arizona Analysis seminar, Tuscon, AZ, Oct. 10, 2017.
  - (Seminar Talk) U. Mass. Boston Physics Colloquium, Boston, MA, Sept. 21, 2017.
  - (Seminar Talk) Knobloch Research Group, Berkeley, CA, Jul. 6, 2016.

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- **Oblique stripes in a triggered Swift-Hohenberg equation,**
    - (Poster) FIDDS17-Llavest, Barcelona, Spain, Jun. 14, 2017.
    - (Mini-symposium talk) SIAM Conf. on Applications of Dynamical Systems, Snowbird, UT, May 24, 2017.
    - (Seminar talk) Knobloch Research Group, Berkeley, CA , May 18, 2017.
    - (Seminar talk) Analysis and Modeling Oberseminar, Institut für Analysis, Dynamik und Modellierung, Stuttgart, Germany, Apr. 3, 2017.
  
  - **Hopf bifurcation from fronts in the Cahn-Hilliard equation,**
    - (Invited Talk) SIAM Conf. on Nonlinear Waves and Coherent Structures, Philadelphia, Aug. 7-11, 2016.
    - (Invited Talk) SIAM Conf. on Analysis of PDE, Scottsdale, AZ, Dec. 7-10, 2015.
    - (Invited Talk) Applied Math Seminar, Michigan State Univ., East Lansing, MI, Dec. 4, 2015.
    - (Invited Talk) Special Session on Nonlinear waves, AMS central sectional meeting, East Lansing, MI, Mar. 14, 2015.
    - (Contributed Talk) SIAM Conf. on Nonlinear Waves and Coherent Structures, Cambridge, England, Aug. 12, 2014.
  
  - **Front-dynamics and pattern selection in the wake of triggered instabilities,**
    - (Poster) SIAM Conf. on Applications of Dynamical Systems, Snowbird, UT, May 19, 2015.
    - (Poster) KUMU Conf. in PDE, Dynamical Systems and Applications, Lawrence, KS, Apr. 18, 2015.
  
  - **Pattern formation in the wake of external mechanisms,**
    - (Poster) BU Conf. on Analysis of Partial Differential Equations using Dynamical Systems Techniques , Boston, MA, Jun. 1-3, 2016.
    - (Poster) KUMU Conf. in PDE, Dynamical Systems and Applications, Columbia, MS, Apr. 23, 2016.
    - (Poster) UMN Doctoral Research Showcase, Minneapolis, MN, Apr. 6, 2016.
    - (Invited Talk) UMN School of Math Open House, Minneapolis, MN. Apr. 2, 2015.
    - (Seminar Talk) Junior Colloquium, Department of Mathematics, University of Minnesota, Nov. 11, 2015.
  
  - **Front-Dynamics and Pattern Selection in Semi-Bounded Domains,** (Contributed Talk) SIAM Conf. on Analysis of PDE, Lake Buena Vista, Florida, Dec. 10, 2013.
  - **Shear Band Formation in Bulk Metallic Glasses,** IMA Workshop on Mathematical Modeling in Industry, Minneapolis, MN, Aug. 16, 2013.
  - **Triggered Fronts in the Complex Ginzburg Landau Equation,** (Poster) IMA Special Workshop on Interactions among Localized Patterns in Dissipative Systems, Minneapolis, MN, Jun. 4, 2013
  - **Coherent Triggered Fronts in Complex Ginzburg Landau,** (Poster) Sigma Xi Chapter meeting, Minneapolis, MN, May 5, 2013
  - **Nature's Art: Pattern formation in the world around us,** Junior Colloquium, Department of Mathematics, University of Minnesota, Oct. 17, 2012.
  - **Liesegang Patterns: Phase-Field Dynamics,** Summer Workshop on Analysis, Topology and Applications, Department of Mathematics, University of Wisconsin-Eau Claire, Jul. 10, 2009.

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## BOOK CHAPTERS

- R. Goh, S. Mesuro, A. Scheel. **Coherent structures in reaction-diffusion models for precipitation**, Special volume on "Precipitation patterns in reaction-diffusion systems", Research Signpost (2010), 73-93.

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## SERVICE

◦ **Referee**

Nonlinearity, SIAM J. Appl. Dyn. Sys., Physica D, DCDS

◦ **Organizer**

Dynamics Seminar, Boston University.

*Fall 2017 - Present*

Brown-BU PDE seminar, Boston University.

*Fall 2017 - Present*

School of Mathematics Junior Colloquium, University of Minnesota.

*Fall 2012 - Spring 2014*

◦ **Mini-symposium Organizer**

SIAM Conf. on Applications of Dynamical Systems

*May 2017*

SIAM Conf. on Nonlinear Waves and Coherent Structures

*Planned June 2018*

SIAM Annual Meeting

*Planned July 2018*

◦ **REU co-mentor**

Complex Systems, School of Mathematics, University of Minnesota.

*Summer 2015*

Pattern Formation in Chemotaxis, School of Mathematics, University of Minnesota.

*Summer 2012*

◦ **President; Vice President**

*2013 - 2014; 2014-2016*

SIAM Student Chapter at the University of Minnesota

◦ **Seminar/Panel talk**

Applying to postdocs, Boston University AMS student chapter.

*April 20, 2017*

Math PostDoc Panel, Brown University SIAM Student Chapter.

*March 23rd, 2016*

Graduate School Panel Discussion, Macalester College.

*July 23, 2015*

Graduate School Panel Discussion, IMA Applied Math REU.

*July 16, 2013*

◦ **Graduate Student peer-mentor**

School of Mathematics, University of Minnesota.

*2013-2015*

◦ **Organizer/Judge**

*Fall 2012- Fall 2015*

Mathematical Modeling Competition, University of Minnesota.

◦ **Volunteer and exhibit organizer**

Mathematical Toys, Math and Science Family Fun Fair, University of Minnesota.

*November 22 2014*

Fun with Fibonacci, Math and Science Family Fun Fair, University of Minnesota.

*November 15 2013*

◦ **Volunteer**

CSE Expo, MathCEP exhibit, University of Minnesota.

*Spring 2014*

◦ **Judge**

Undergraduate Poster Symposium, University of Minnesota.

*April 16 2014*

## COMPUTER LANGUAGES

**Programs:** MATLAB, Mathematica, AUTO,

**Languages:** L<sup>A</sup>T<sub>E</sub>X, Python

**Operating Systems:** UNIX, Windows