Gaoyang Fan

CONTACT
INFORMATION

Altos Labs
Redwood City, CA

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RESEARCH
INTERESTS

Applied Dynamical Systems; Mathematical Biology; Stochastic Processes; Bacterial Quorum Sensing; Biofilms; Gene Regulation; Synthetic Biology.

EDUCATION

University of Utah

Ph.D. in Mathematics, May 2020   Advisor: Paul C. Bressloff

Montana State University

M.S. in Mathematics, May 2015   Advisor: Tomáš Gedeon

B.S. in Mathematics, Minor in Finance, May 2014

PUBLICATIONS

(* co-first authors)

7. BF Magalhães*, **G Fan***, E Sontag, K Josić and MR Bennett, *Pattern formation and bistability in a synthetic intercellular genetic toggle, Submitted.*

6. RG Prabhakar, **G Fan**, RN Alnahhas, AJ Hirning, MR Bennett, and Y Shamoo *Indirect enrichment of desirable, but less fit phenotypes, from a synthetic microbial community using microdroplet confinement, Accepted.*

5. **G Fan**, G Russo and PC Bressloff, *Node-to-node and node-to-medium synchronization in quorum sensing networks affected by state-dependent noise*, SIAM J. Appl. Dyn. Syst. 18.4 (2019):1934-1953.

4. **G Fan** and PC Bressloff, *Modeling the role of feedback in the adaptive response of bacterial quorum sensing*, Bull Math Biol 81.5 (2019): 1479-1505.

3. **G Fan** and PC Bressloff, *Population Model of Quorum Sensing with Multiple Parallel Pathways*, Bull. Math. Biol. 79.11 (2017): 2599-2626.

2. C Xia, C Cochrane, J DeGuire, **G Fan** , E Holmes, M McGuirl, P Murphy, J Palmer, P Carter, L Slivinski, and B Sandstede, *Lagrangian Data Assimilation in Traffic-flow Models*, Physica D 346 (2017) 59-72.

1. **G Fan**, B Cummins and T Gedeon, *Convergence Properties of Post-translationally Modified Protein-Protein Switching Networks with Fast Decay Rates*, Bull. Math. Biol. 78.6 (2016): 1077-1120.

HONORS AND
AWARDS

University Graduate Research Fellowship	2019 – 2020
RTG Lab Rotation, The Biodynamics Lab at UCSD	Summer 2019
RTG Lab Rotation, IBM Research Lab in Ireland	Summer 2018
NSF Research Training Grant (RTG) Fellowship	2017 – 2018
RTG Lab Rotation, The Wai-Leung Ng Lab at Tufts University	Summer 2017

	Outstanding Graduating Seniors with Distinction	Fall 2014
	Montana INBRE Undergraduate Student Research Program Award	Summer 2013
	Montana State University President's Honor Roll (GPA: 4.0)	2012 – 2014

RESEARCH EXPERIENCE

Postdoctoral Research, University of Houston & Rice University 2020 – Present
Cell-cell Communication in Spatially Heterogeneous Environment

Doctoral Research, University of Utah 2015 – 2020
Quantitative Investigation of Quorum Sensing in Bacterial and Communication Networks

Graduate Research Assistant, Montana State University 2014 – 2015
Modeling Dynamic Signatures Generated by Regulatory Networks (DSGRN)

REU, Brown University Summer 2014
Transportation Traffic Flow Prediction Using Particle Filter

Undergraduate Research Assistant, Montana State University 2013 – 2014
Boolean Network Model for Transcriptional Cell-cycle Oscillator in Yeast

TALKS AND POSTERS

Pattern Formation in a Synthetic Quorum-Sensing Toggle Switch
PDE & Applied Math Seminar at UC Riverside, Zoom Oct. 2022

Pattern Formation in a Synthetic Quorum-Sensing Toggle Switch
SIAM Conference on the Life Science Jul. 2022
Pittsburgh, PA

Synchronization in quorum-sensing networks with state dependent noise
Workshop on Higher-order Interatction Networks (Poster) Sep. 2019
Oxford, UK

Modeling the Role of Feedback in the Adaptive Response of Bacterial Quorum Sensing
SIAM Dynamical Systems Minisymposium May 2019
Snowbird, UT

How Do Bacteria Talk?
University of Utah Undergraduate Colloquium Sep. 2018
Salt Lake City, UT

A Mathematical Model of Parallel Quorum Sensing
SIAM Conference on Applications of Dynamical Systems (Poster) May 2017
Snowbird, UT

Boolean Network Model for Transcriptional Cell-cycle Oscillator in Yeast
Montana State University Student Research Celebration (Poster) Apr. 2014
Bozeman, MT

Boolean Network Model for Transcriptional Cell-cycle Oscillator in Yeast
Third Biennial Western Regional IDeA Scientific Conference (Poster) Oct. 2013
Honolulu, HI

TEACHING	Instructor of Record, Discrete Mathematics	Fall 2020
	Co-Organizer, MathBio Journal Club	2019 – 2020
	Instructor of Record, Calculus I	Spring 2019
	Instructor of Record, Intro to Differential Equations	Fall 2018
	Lab Instructor, Calculus/Stats for Biologists	2017 – 2018
	Instructor of Record, Precalculus	Fall 2016
	Lab Instructor, Calculus for Engineers I & II	2015 – 2016
	Instructor of Record, College Algebra	Fall 2014
SERVICE	Mentor for Directed Reading Program (DRP) Salt Lake City, UT	Spring 2019
	Mentor for AWM Mentoring Network Salt Lake City, UT	Spring 2019
	Mentor for Graduate Student Mentorship Program Salt Lake City, UT	2018 – 2019
	Tutor for Math to Excite (Middle School Girls Camp) Bozeman, MT	Fall 2012

GRADUATE COURSEWORK

- ❏ Mathematical Analysis
- ❏ Abstract Algebra
- ❏ Complex Variables
- ❏ Ordinary Differential Equations
- ❏ Partial Differential Equations
- ❏ General Topology
- ❏ Geometry & Algebraic Topology
- ❏ Measure Theory
- ❏ Dynamical Systems
- ❏ Analysis of Numerical Methods
- ❏ Functional Analysis
- ❏ Asymptotic and Perturbation Methods
- ❏ Stochastic Processes in Cell Biology
- ❏ Physiology
- ❏ Bifurcation Theory
- ❏ Mathematical Finance

PROFESSIONAL MEMBERSHIPS

Association for Women in Mathematics (AWM)

Society for Industrial and Applied Mathematics (SIAM)

SKILLS

MATLAB, Python, R, Maple, Mathematica, HTML, C++

LANGUAGES

Mandarin Chinese: Native

English: Fluent