

Guangyuan Liao, PhD

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I have been a teaching and research assistant for the past five years. For teaching, I was the recitation leader of 1-2 courses for each semester and a computational lab instructor. For research, I completed a project and my dissertation. I developed a deep understanding of dynamical systems, mathematical biology and circadian rhythms. I also developed many skills including programming, mathematical modeling, data analysis and scientific article writing.

EDUCATION

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| PhD | New Jersey Institute of Technology, Applied Mathematics GPA: 3.844/4 Advisor: Dr. Amitabha Bose Dissertation: Mathematical models and tools to understand coupled circadian oscillations and limit cycling systems. | 2020 |
| MS | Sichuan University, Computational Mathematics Advisor: Dr. Bing Hu | 2014 |
| BS | Sichuan University, Mathematics | 2011 |

RESEARCH INTERESTS

Dynamical System: limit cycling systems, invariant manifold computation, poincare maps.

Mathematical biology: neural networks, circadian rhythms, modeling, model reduction techniques.

Data sciences: parameter estimation, machine learning.

PUBLICATIONS AND CONFERENCE PRESENTATIONS

Guangyuan Liao, Casey Diekman, Amitabha Bose (2020). Entrainment dynamics of forced hierarchical circadian systems revealed by 2-dimensional maps. SIADS, in press, [arXiv](#).

Guangyuan Liao, Casey Diekman, Amitabha Bose. Mathematical Models and Tools for understanding the Entrainment of Hierarchical Circadian System. SIAM Conference on Appl. Dyn. Syst., 2019. [Poster](#).

Guangyuan Liao, Casey Diekman, Amitabha Bose. Entrainment dynamics of forced hierarchical circadian systems. Dynamics Days, 2020. [Poster](#).

Guangyuan Liao, Amitabha Bose. Maps for coupled hierarchical kuramoto oscillators with discontinuous forcing. In preparation.

RESEARCH EXPERIENCE

Research assistant

2016 - 2020

Advisor: Dr. Amitabha Bose

Dissertation

- Two mathematical models of hierarchically coupled circadian systems.
- First order phase-amplitude approximation of limit cycling systems.
- Isochron visualization of two dimensional limit cycling systems.
- Low dimensional mapping tools for high dimensional systems.

Project: Develop models and novel tools to understand circadian systems.

- Developed two mathematical models to study the entrainment of circadian oscillators.
- Developed a method, entrainment map, to predict the entrainment time and direction of entrainment.

TEACHING EXPERIENCE

New Jersey Institute of Technology, Newark, NJ

August 2015 - May 2020

Teaching assistant, Department of Mathematical Sciences

- Taught Calculus I,II, an undergraduate course averaging 40 students per semester, covering the following topics: differentiation, integration, limits, elementary functions.
- Graded quizzes, exams, and homework.

Lab instructor, Department of Mathematical Sciences

Fall 2019

- Taught two lab sections of two courses (Mathematical modeling, Teaching in mathematics).
- Taught students basic programming skills to solve scientific computing problems.
- Developed homework and final projects, see [course materials](#).

Sichuan University, Chengdu, China

September 2012 - July 2014

Teaching assistant, Department of Mathematical Sciences

- Assisted the instructors of two graduate courses (Linear Algebra, Analysis).
- Graded homework and exams.

COMPUTER SKILLS

Programming: MATLAB, LaTeX, Julia, Mathematica, Python, C++, HTML.

Platforms: Windows, Linux, MAC.