

# SHAO-TING (STEVEN) CHIU

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🔗 [stevengogogo](https://github.com/stevengogogo)

📄 [Shao-Ting Chiu](#)

🌐 [git.io/JiatN](https://git.io/JiatN)

🎓 [Shao-Ting Chiu](#)

link to this file (latest): <https://git.io/JP2My>

## HIGHLIGHTS

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- ECE Ph.D. student at Texas A&M University (since 2022 Fall)
- Intern at Pumas-AI, Inc., focusing on scientific machine learning (SciML) and its application to pharmaceuticals.
- Rich research experience across mathematical modeling, machine learning, and SciML for solving complex biosystems.
- Familiar with Python, C, and Julia for scientific computing. Established open-source packages for analyzing ODE systems.

## EDUCATION


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**Ph.D. student** Aug. 2022 - Current

*Dept. of Electrical and Computer Engineering, Texas A&M University - College Station*

**Master of Science** Sept. 2018 - Aug. 2021

*Graduate Institute of Biomedical Electronics and Bioinformatics (BEBI), EECS, National Taiwan University* GPA: 4.05/4.3

- Master Thesis: "Mathematical Modeling and Analysis of Mitochondrial Retrograde Signaling Dynamics" 
- Selected Courses: Medical Image Analysis, Intro. to Biomedical Informatics, Data Structure & Algorithms.

**Bachelor of Electrical Engineering** Sept. 2014 - July. 2018

*Dept. of Electrical Engineering, National Taiwan University* GPA: 3.76/4.3

- Featured Project: Image classification on mitochondrial toxicity with convolutional neural network (CNN).
- Selected Courses: Control Systems, Modeling and Simulation in Systems Biology, Switching Circuit and Logic Design, Genomics, Linear Algebra, Complex Variables, Information Theory.

**Dental Student (Fifth grade)** Feb. 2016 - Jan. 2022

*Dept. of Dentistry, National Yang Ming Chiao Tung University* GPA: 2.73/4.3

- Special Admission as Intel ISEF Grand Award Winner.
- Achievement: Passed National Board Dental Examination Part I[30310185].
- Featured Project: Applied U-Net for identifying calculus region with OCT tomography.

## TECHNICAL SKILLS

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- **Programming Language** C11, Python, Julia, T<sub>E</sub>X, Matlab, Makefile, Shell scripting, Bash, Git, YML
- **Machine learning & SciML** Scikit-learn, Keras, Flux.jl, DiffEqFlux.jl, DataDrivenDiffEq.jl, NeuralPDE.jl
- **Mathematical Modeling & Simulation** SciPy, NetworkX, ModelingToolkit.jl, DifferentialEquations.jl, Catalyst.jl, Pumas.jl
- **Image Processing** Scikit-image, OpenCV, Images.jl
- **High Performance Computing & Optimization** Numpy, JuMP, Distributed.jl, ForwardDiff.jl, Zygote.jl, Optim.jl
- **Debugging & CI/CD** gdb, gprof, valgrind, pdb, Infiltrator.jl, Github Action
- **Visualization & Literal Programming** Matplotlib, Makie.jl, Plots.jl, Tectonic, L<sup>A</sup>T<sub>E</sub>X, TikZ, StaticWebpages.jl, Documenter.jl

## PUBLICATION & PATENT

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- [1] Niklas Korsbo, Chris Elrod, Francesco Brizzi, Andreas Noack, **Shao-Ting Chiu**, Raj Dandekar, Julius Martenssen, Antoine Soubret, Christopher Rackaukas, and Vijay Ivaturi. "Automatic Identification of Non-obvious Prognostic Factors in Big Data with DeepNLME<sup>TM</sup> in Pumas". In: *American Conference on Pharmacometrics (ACoP12)*. 2021. Poster award.

- [2] **Shao-Ting Chiu**, Wen-Wei Tseng, and An-Chi Wei. "Mathematical Model for the Study of Mitochondrial Retrograde Signaling Dynamics". In: *bioRxiv* (2021). DOI: 10.1101/2021.03.27.437239 [Submitted to iScience](#) 
- [3] **Shao-Ting Chiu** and An-Chi Wei. "Understanding the System Dynamics of Mitochondrial Retrograde Signaling from a Differential Equation-based Framework". In: *The 20th International Conference on Systems Biology (ICSB2019)*. 2019, p. 22. [Oral](#) 
- [4] Chan-Min Hsu, An-Chi Wei, **Shao-Ting Chiu**, Zih-Hua Chen, and Ko-Hong Lin. "Subcellular mitochondria structure prediction in label-free microscope images using convolutional neural networks". In: *The 20th International Conference on Systems Biology (ICSB2019)*. 2019, p. 51. [Poster](#) 
- [5] **Shao-Ting Chiu**. "System and method for multi-direction searching feedback". patenttw I645386. **Shao-Ting Chiu**. Aug. 31, 2018 
- [6] **Shao-Ting Chiu**, Jun-Yi Leu, and An-Chi Wei. "The Influences of Mitochondrial Depolarization on Mitochondrial Network Structures". In: *2017 Annual Meeting of Biomedical Engineering Society (BMES2017)*. 2017, p. 243. [Oral](#) 
- [7] **Shao-Ting Chiu**, Jun-Yi Leu, and An-Chi Wei. "Information Transduction Capacity of Mitochondrial Retrograde Signaling". In: *Single-Cell Biophysics: Measurement, Modulation, and Modeling*. Biophysical Society, 2017, p. 57. [Poster](#) 

## WORK AND RESEARCH EXPERIENCE

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### Scientific Machine Learning Lab

*Ph.D. student*

Aug. 2022

Current

### Pumas-AI, Inc

*Intern*

May. - Dec. 2021

Remote 



- Applied **Scientific Machine Learning (SciML)** on recovering hidden dynamics with **nonlinear mixture effects (NLME)**.
- Used **Universal ODE** to provide personalized prediction from populational data with **Bayesian interference**.
- Established **neural indirect response model** with the mixture of physical modeling and CNN approximation.
  - Support **functional API for constructing neural ODE problem** with indirect response.
  - Implemented primarily with **DiffEqFlux.jl**, **Pumas.jl** and **DifferentialEquations.jl**.

### Biological Systems & Simulation Lab

*Dr. An-Chi Wei, BEBI, EECS, National Taiwan University*

June. 2017 - Sept. 2021

Taipei, Taiwan

- Proposed novel mathematical model of mitochondrial infra-cell communication.
  - Selected **oral presentation in ICSB2019**. 
- Established classification of mitochondrial depolarization with graphical network and CNN based on fluorescent images.
  - Selected **oral presentation in BMES2017**. 

### Taipei City Hospital

*Clerk of Dentistry. Instructed by Dr. I-Chiang Chou*

June. - Sept. 2020

Taipei, Taiwan

- Practical clinical training including oral diagnosis and treatment planning with panoramic and sectional X-ray images.

### Cardiovascular Biophysics Lab

*Dr. Brian O'Rourke, Dept. of Medicine, Johns Hopkins University*

June. 2018 - Sept. 2018

Baltimore, USA


- Researched on damage propagation of mitochondrial depolarization via **optogenetics method**.
  - Applied image segmentation from microscopic images with **OpenCV**, and extracted graphical topology with **NetworkX**.

## Evolutionary Genetics Lab

Dr. Jun-Yi Leu, *Inst. of Molecular Biology, Academia Sinica*

May. 2012 – Sept. 2016

Taipei, Taiwan

- Discovered necessary genetic conditions for rejuvenation in yeast via nucleus and mitochondrial genetic modification.
- 4<sup>th</sup> place grand award winner and 1<sup>st</sup> special award from American Association of Microbiology in Intel ISEF 2014. 


## PACKAGES

**FindSteadyStates.jl**: Multi-threaded Steady State Explorer (v0.1.1, Registered)  

**PotentialMap.jl**: Potential Map with A-type Integration 

**EstimHill.jl**: Ultrasensitivity Analysis for Dose-Response Curve 

**RetroSignalModel.jl**: Simulation toolbox for mitochondrial retrograde signaling 

**ReportTex**: A LaTeX template supporting both English and Traditional Chinese. Powered by Tectonic 

## SELECTED PROJECTS

**Selected Topics of Data Structure & Algorithms** (C11) (CI/CD)

Feb - May. 2021

Assignments of CSIE1212. Instructed by Dr. Hsuan-Tien Lin. 

**Circadian Simulation with ModelingToolkit.jl** (Julia)

Jan. 2020

Course Final Project of Neural Science (LS5083) 

- Applied **stiff ODE solver of DifferentialEquations.jl** for simulating circadian oscillations.

**Surrogation of Fokker-Planck Equation with Neural Differential Equation** (Julia)

Dec. 2019

Pilot project of graduate research 

- Used **Neural PDE** to simplify simulation of the PDE, and derive the potential map of **stochastic ODE**.

**Dental Calculus Segmentation with OCT Imaging and U-Net** (Python)

Feb. - May. 2019

Student project with Dr. Shyh-Yuan Lee at Dept. of Dentistry 

- Used **OpenCV** and **Keras** for preprocessing and landmark segmentation with **supervised learning method**.

**Mitosis classification with CNN and explainable model** (Python)

Feb. - June. 2018

Final project of Medical Image Analysis (DBME7019) 

- Performed **image classification** from light sheet microscopic images on mitosis stages with CNN via **Keras**.

- Applied **LIME algorithm** for the explanation of the trained neural network.

**Selected Topics of Biological Modeling & Simulation** (Python)

Feb. - June. 2017

Assignments of BEBI5009. Instructed by Dr. An-Chi Wei. 

## HONORS & AWARDS

**Electrical and Computer Engineering Merit Fellowship**, Texas A&M university – College Station


Feb. 2022

**Pen Wen Yuan Memorial Scholarship**, Industrial Technology Research Institute, Hsinshu, Taiwan

Nov. 2019

**Best Presentation**, International Student Science Forum, HCMC, Vietnam

Dec. 2018

- Essay: "Digital Dentistry: When dental sciences encounter Industry 4.0, what should we learn about it?" 

**Best Presentataion**, International Student Science Forum, HCMC, Vietnam

June. 2017

- Essay: "A Spectral Information Coding System for the Visually Impaired" 

**Selected participant**, Asian Science Camp, Bangalore, India



Aug. 2016

**Silver Award**, Wu Chien-Shiung Science Camp, Taiwan

Jul. 2015

**4<sup>th</sup> Place Winner in Grand Award**, Intel International Science Fair (Intel ISEF)

 May. 2014

- Essay: "The state of parental mitochondria influences the replicative life span of zygotes of *Saccharomyces cerevisiae*" 
- 1<sup>st</sup> Place Winner in Special Award**, Intel International Science Fair (Intel ISEF), LA, USA  *May. 2014*
- 1<sup>st</sup> Place & Young Scientist Award**, Taiwan International Science Fair *Jan. 2014*

## LANGUAGES

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**English** TOEFL iBT: R26/L26/S24/W24

*Aug. 2021*

**Traditional Chinese** Native

**Vietnamese** Intermediate (A2)