

# Shunsuke Kikuchi

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## Education

**University of California, Los Angeles (Current)**

Bachelor of Science in Computational and Systems Biology  
Bachelor of Science in Applied Mathematics

Expected Graduation: Spring 2025

**Arkansas State University**

Bachelor of Science in Exercise Science

(Left for transfer, August 2023)

## Publication

**Kikuchi, S.** Kouno, A. Matsuzaki, S. “MaxViT Unet++ Extension for surgical tools segmentation in Colonoscopy video”. Manuscripts in Preparation.

## Research Experience

Institute for Quantitative and Computational Biosciences, University of California, Los Angeles

**Undergraduate Researcher** under Dr. Xia Yang, October 2024 - Present

scGRNdb - single-cell Gene Regulatory Network database project

Constructed spatial transcriptomics GRN analysis pipeline and its validation via scanpy and squidpy  
Create an Interactive Webserver using PHP, JavaScript, Neo4j, Docker, and Python.

**Bruins-In-Genomics (B.I.G.) Summer Program, URC-sciences Summer Scholar**, 2024 Summer

Adapted resolution-based community detection optimization algorithm for GRNs.

Benchmarked GRNs prediction performance using perturb-seq data.

Developed disease modeling module for cell-type filtering using GRNs.

Constructed scGRNdb pipeline, using Python and Shell Scripts.

Adjusted post-processing algorithms for better performance on GRNs prediction.

Ultrafine Particle Effect on Coronary Artery Disease Development

Worked with Dr. Araujo Lab, Analyzed single-cell data via Seurat and R.

**In-class Project** (BIOMATH 206 Under Dr. Mary Sehl), April-June 2024

Message-passing, dynamics-based network modeling for cancer mechanism and drug discovery

**In-class Project** (C&S BIO 185 Under Dr. Roy Wollman), January-March 2024

Improving Gradient Boosting in SCING to aid GRN inference from single cell transcriptomics

Jmees Inc., Tokyo, Japan (Remote)

**Research Internship**, Oct 2024 - Present,

- Developed video recognition model for ureter segmentation for hysterectomy Endoscopic surgery support system, affiliated with National Cancer Center Japan.
- Developed multiple point tracking model for endoscopic surgical support system and accident prevention.
- Developed Depth Estimation Model for accident prevention alert system.

**Summer Internship** (Machine Learning Engineer), June – October 2024

- Applied stereo vision multi-pts tracking model to MICCAI24 EndoVis STIR Challenge (2D/3D section)
- Customized Surgical Tools / Fold Edge Segmentation model for EndoVis SegCol Challenge (Task1)
- Proposed clustering-based Active Learning Algorithm for EndoVis SegCol Challenge (Task2)
- Customized Surgical Phase recognition and Tools segmentation model for EndoVis PhaKIR Challenge
- Developed Open Suturing skills Evaluation models for EndoVis Open Suturing Skills Challenge.

Arkansas Biosciences Institute / NYITCOM /Arkansas State University tri-institutional Research Labs

**Undergraduate Researcher** under Dr. Jennifer Xie, October 2021- August 2023

Potential Mechanism and its Medicine for Pain in Central Nervous Systems- Mouse Project

RgIA5474 on Sciatic Nerve Injury

- Sub-Q Injection, Sciatic Nerve Crush Surgery, Behavioral Testing and Statistical Testing
- Tissue Collection and Cryostat, Blood Collection and ELISA
- Drug Synthesis, Mouse Colony administration

RgIA4 on Cephalic Pain

- Drug Injection on Skull via Dural Injection, Behavioral Testing and Statistical Analysis
- Cardiac Perfusion and Brain Tissue Collection

### Conferences/ Research Presentation

Title: GRNComm - Unsupervised Inference of Cell-cell Communication via Gene Regulatory Networks

- Undergraduate Research Week, May. 2025, UCLA, **Poster Presentation**

Title: MaxViT Unet++ Extension for surgical tools segmentation in Colonoscopy video

- The 1<sup>st</sup> Japan-US Science Forum in Southern California, Feb. 2025, UCLA. **Poster Presentation**

**MICCAI 2024** Satellite Event “**Endoscopic Vision Challenge Cluster 2024**”, Oct. 10, 2024, Marrakech, Morocco

- SegCol Challenge: Top-Solution Presentation (Segmentation, Active Learning), **Oral Presentation**
- PhaKIR Challenge: Top-Solution Presentation (Segmentation, Phase Recognition), **Oral Presentation**
- STIR Challenge: Top-Solution Presentation (2D, 3D tracking), **Oral Presentation**
- Open Suturing Skills Challenge: Top-Solution Presentation (Task1, Tas2), **Oral Presentation**

Title: scGRNdb - Cell Type Level Gene Regulatory Network Database for Single-cell Analysis Framework

- SPUR Summer Research Showcase 2024, Aug. 2024, UCLA. **Oral Presentation.**
- BIG Summer Final Session, Aug. 2024, UCLA. **Poster Presentation.**

Title: Potential effects of  $\alpha 9\alpha 10$  nicotinic receptor antagonists on chronic pain and motor deficits in mice with sciatic nerve injury.

- Create @ State 2024 Symposium, Arkansas State University, Apr 2024, **Poster Presentation**

Title: Inhibition of cephalic pain by RgIA4, a novel, selective  $\alpha 9\alpha 10$  nicotinic acetylcholine receptor (nAChR) antagonist,

- Create @ State 2023 Symposium, Arkansas State University, Apr 2023, **Poster Presentation**
- ABI Undergraduate Research Scholar Program Final Session, May 2022, **Oral Presentation**

### Activity & Achievement

**Kaggle Competition: [Expert](#)**, Highest Rank: **2,552/205,373**

- [Leash Bio - Predict New Medicines with BELKA](#) (**Silver medal**, 27/1950, 2024 Apr. – Jul.)  
This competition aims to accelerate drug discovery by enabling more precise predictions of drug outcomes based on biological data. Our team achieved robustness on both the Public (8th) and Private (27th).
- [HMS - Harmful Brain Activity Classification](#) (**Bronze medal**, 245/2767, 2024 Jan. – Apr.)  
This competition focuses on developing models to detect dangerous brain wave patterns using EEG data. Our team ensembled 1D-ResNet and 2 spectrogram-based vision models with proper post-processing.

#### Conference Challenges:

- **MICCAI 2024, Endoscopic Vision Challenge Cluster** (October 2024)  
[Semantic Segmentation for Tools and Fold Edges in Colonoscopy data](#) (Segmentation: **1st**, Active Learning: **2nd**)  
Competed in the performance of semantic segmentation model and efficiency of active learning algorithm.  
[PhaKIR - Phase, Keypoint and Instrument Recognition](#) (Phase: **2nd**, Instrument: **1st**)  
Competed in the performance of video recognition in Endoscopic video.  
[Open Suturing Skills Challenge](#) (Task1 (GRS): **3rd**, Task2 (OSATS): **3rd**)  
Competed in the accuracy of students' suturing skills evaluation.  
[Surgical Tissue Tracking Using the STIR \(Surgical Tattoos in Infrared\) Dataset](#) (2D: **3rd**, 3D: **2nd**)  
Competed in the accuracy of multi-point tracking in 2D and 3D coordinates using stereovision movie.
- [6<sup>th</sup> National Medical AI Contest in Japan](#) (**4th**, 2024 Mar.)  
Competed in the accuracy of 3D semantic segmentation in CT using the TotalSegmentator benchmark

### Community Service/ Cocurricular Activities

The 1<sup>st</sup> Japan-US Science Forum in Southern California, Organization Team, Southern California Japanese Scholar Forum, 2024 Fall-Current,

Access and Accommodation Services, Volunteer, Arkansas State University, 2022 Spring – 2023 Spring

### Academic Honors & Special Awards

**Research Excellence Awards**, B.I.G. Summer Research Program, UCLA, 2024 Summer

**ABI Undergraduate Research Scholarship** (Arkansas State University, 2021 Fall - 2022 Spring)

**Chancellor's List**, (Arkansas State University, 2021 Fall, 2022 Spring, 2022 Fall, 2023 Spring)

**Shonan Alumni Foundation Scholarship for Overseas Study**, Japan (2021-2022)