MOCHI LIU

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EDUCATION:

PRINCETON UNIVERSITY

Ph.D. in Quantitative and Computational Biology, Sep 2020

Princeton University Centennial Fellowship in the Natural Sciences and Engineering

GRE Scores: 170 Quantitative, 164 Verbal, 4.5 Writing

UNIVERSITY OF CALIFORNIA, BERKELEY **GPA: 3.93/4.0**

B.S. with High Honors in Bioengineering, Electrical Engineering and Computer Science Minor, Aug 2013

EXPERIENCES:

PRINCETON UNIVERSITY, LEWIS-SIGLER INSTITUTE | Princeton, NJ Jul 2015 – Present

Graduate Student / Postdoctoral Researcher, Leifer and Shaevitz Labs

- Designed and built high-throughput optogenetic behavioral assays to study mechanosenation in *C. elegans*
- Utilized image processing and machine learning methods to measure and map the worm's locomotory behavior
- Characterized and modeled the neural computation of time-varying stimuli that drive behavior
- Discovered how behavior context affect the animal's response to touch

MOTE MARINE LABORATORY | Sarasota, FL Jun 2013 – Jun 2014

Software Contractor, Sturgeon Commercial Demonstration Program

- Constructed database to track data associated with every fish, caviar container, customer, pricing, and invoice
- Programmed front-end application for intuitive operation, automated product barcoding and reduced human-errors
- Supported day-to-day operation of farming Siberian Sturgeon (*A. Baerii*) for caviar and meat production

UC BERKELEY, HELEN WILLS NEUROSCIENCE INSTITUTE | Berkeley, CA Jan 2014 – May 2014

Research Volunteer, Feldman Lab

- Explored how to reduce mechanical hysteresis of piezoelectric actuators used to stimulate whiskers
- Engineered an rotating experimental apparatus that presents up to 5 textures in random order
- Studied rodent sensory response to various tactile stimuli presented to whiskers

UC BERKELEY, COLLEGE OF NATURAL RESOURCES | Berkeley, CA Feb 2010 – May 2013

Student Research Assistant II, Forest Pathology and Mycology Laboratory

- Investigated the behavior, epidemiology and evolution of pathogen *Phytophthora ramorum* (Sudden Oak Death)
- Constructed software platform to accurately automate microsatellite grading, saving hundreds of staff man-hours
- Employed RT-PCR, ELISA and microsatellite analysis to diagnose pathogens in plant samples

UC BERKELEY, COLLEGE OF NATURAL RESOURCES | Berkeley, CA Sep 2012 – May 2013

Field Studies Volunteer, Carlson Lab

- Determined the utility of freshwater and estuarine habitats by threatened juvenile Steelhead salmon (*O. mykiss*)
- Utilized electrofishing and beach seining techniques to sample streams and estuaries
- Handled fish in preparation for PIT Tagging and fin clipping, which is used for stable isotope analysis

MERCK & CO., INC. | Kenilworth, NJ Jun 2012 - Aug 2012

Virology Summer Intern, Merck Research Laboratories Infectious Diseases Department

- Identified enzymes that may be crucial for the metabolism of prodrugs active against Hepatitis C viral polymerase
- Perturbed the expression of candidate enzymes by siRNA silencing or over-expression in mammalian cell culture
- Quantified active drug concentration and viral RNA in timecourse studies

UC SAN FRANCISCO | San Francisco, CA Sep 2011 – May 2012

Research Volunteer, Slavotinek Lab

- Uncovered the genetic causes for congenital malformations starting with whole exome sequencing of patients
- Determined functions of human genes by silencing orthologous genes in zebrafish model using Morpholinos
- Found novel mutations that cause Fraser and Manitoba-oculo-tricho-anal (MOTA) syndromes in patients

THE SCRIPPS RESEARCH INSTITUTE | La Jolla, CA Jun 2011 - Aug 2011

Immunology and Virology Summer Intern, Gallay Lab

- Developed an immunostaining based assay to quantify Hepatitis C Virus infectivity
- Created ZsGreen fluorescent protein transduced stable cell lines for fluorescent assay indicating drug toxicity
- Combined infectivity and toxicity assays to screen for effective viral inhibitors

PUBLICATIONS:

- Liu, M., Sharma, A.K., Shaevitz, J.W. and Leifer, A.M., 2018. Temporal processing and context dependency in Caenorhabditis elegans response to mechanosensation. *eLife*, 7, p.e36419.
- Nguyen, J.P., Shipley, F.B., Linder, A.N., Plummer, G.S., Liu, M., Setru, S.U., Shaevitz, J.W. and Leifer, A.M., 2016. Whole-brain calcium imaging with cellular resolution in freely behaving Caenorhabditis elegans. *Proceedings of the National Academy of Sciences*, *113*(8), pp.E1074-E1081.
- Nathanson J, Swarr DT, Singer A, Liu M, Chinn A, Jones W, Hurst J, Khalek N, Zackai E, Slavotinek A. 2013. Novel *FREM1* mutations expand the phenotypic spectrum associated with manitoba-oculo-tricho-anal (MOTA) syndrome and bifid nose renal agenesis anorectal malformations (BNAR) syndrome. *Am. J. Med. Genet. Part A* 161A: 473-478.

PRESENTATIONS AND POSTERS:

- The Scripps Research Institute 2011 Presentation: "Development of Simple Assays for HCV Infection and Cellular Toxicity Due to Inhibitors"
- Merck & Co., Inc. 2012 Presentation: "Metabolic Activation of Anti-Hepatitis C Virus Nucleotide Prodrugs"
- Poster: Swarr DT, Nathanson J, Liu M, Singer A, Khalek N, Zackai E, Slavotinek A. Novel *FREM1* mutations expand the phenotypic spectrum associated with manitoba-oculo-tricho-anal (MOTA) and bifid nose renal agenesis (BNAR) syndromes. Poster session presented at: 33rd Annual David W. Smith Workshop on Malformations and Morphogenesis; 2012 Aug 8-12; Buford, Georgia.
- International Physics of Living Systems 2015 Presentation: "Behavior Triggered Analysis in C. Elegans"
- American Physical Society March Meeting 2016 Presentation: "High Throughput Interrogation of Behavioral Transitions in C. Elegans"
- CeNeuro 2016 Poster: "High Throughput Interrogation of Behavioral Transitions in C. Elegans"
- New York Area Worm Meeting 2017 Presentation: "High Throughput Interrogation of Mechanosensory-motor Transformations in Caenorhabditis Elegans"
- International C. elegans Conference 2017 Presentation: "Temporal Structure of Mechanosensory Signal and Current Behavioral State Determine Locomotory Rresponse"
- CeNeuro 2018 Poster: "Temporal Processing and Context Dependency in C. Elegans Response to Mechanosensation"
- International Physics of Living Systems 2018 Poster: "Temporal Processing and Context Dependency in C. Elegans Response to Mechanosensation"
- NHGRI Annual Meeting 2018 Poster: "Temporal Processing and Context Dependency in C. Elegans Response to Mechanosensation"

TEACHING AND MENTORSHIP:

PRINCETON UNIVERSITY | Princeton, NJ — Jul 2015 – Present

Undergraduate Mentor, Leifer Lab

- Supervised 6 undergraduate researchers over the course of graduate school
- Conceptualized independent projects for students and coached presenting scientific findings

PRISON TEACHING INITIATIVE | Fort Dix, NJ — Nov 2018 – Dec 2018

Instructor, Federal Correctional Institution Fort Dix

- Taught incarcerated students cell biology and genetics sections of a first year college biology course

PRINCETON UNIVERSITY | Princeton, NJ — Fall 2016, Spring 2017

Assistant in Instruction, Integrated Science Curriculum Laboratory Section

- Guided an interdisciplinary lab course for freshmen undergraduates interested in pursuing a career in science

PRINCETON NAND SUMMER COURSE | Princeton, NJ — Jun 2015 – Aug 2015

Rotation Instructor, Neurotechnologies for Analysis of Neural Dynamics (NAND)

- Advised two postdoctoral fellows for an independent project exploring themotaxis and halotaxis behavior in worms

SKILLS:

- Programming Tools: MATLAB, LabVIEW, VB.NET, Python, Tensorflow, Keras
- Analytic Tools: ImageJ, Sequencher, Geneious, Ensembl, Primer3, Mutation Taster
- Familiar Hardware: programmable microcontrollers, DAQ boards, industrial cameras, DLP projection
- Laboratory Techniques: optogenetics, gel electrophoresis, western blot, PCR, real time qPCR, mammalian cell culture, DNA/RNA extraction, ELISA, cloning, sequencing, transfection, transduction, gene silencing
- Equipment Operated: Front-End Loader/Tractor, Forklift, Pressure Washer, Ultrasound
- Fluent in Mandarin Chinese

HONORS AND AWARDS:

- Dean’s List (every semester)
- Tau Beta Pi Engineering Honor Society
- UC Berkeley Bioengineering Honor Society
- Majorie G. Gilbert and Louis S. Gilbert Scholarship