Wesley Chiang

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Research Interests

Development of novel hybrid nanomaterial systems to expand the toolset of chemical probes available to study complex biophysical phenomena, with a special focus in neuro-immune interactions relevant to disease pathogenesis. Such systems include peptide and lipid modified inorganic nanocrystals designed to mimic naturally occurring protein aggregates or pathogens to identify key cellular interactions with such mimetic materials that drive inflammatory activation and dysregulation of cellular physiology.

Employment

Postdoctoral Associate, Department of Chemistry, University of Rochester **Jan. 2025 – Present**

Education

University of Rochester - School of Medicine & Dentistry **Aug. 2019 – Mar. 2024**

- Ph.D. Biophysics, Structural, and Computational Biology
  Thesis Adviser: Dr. Todd Krauss
  "*Nano for Neuro: Developing Hybrid Quantum Dot Nanobio Assemblies to Probe Neuroinflammatory Activation"*

University of Rochester **Aug. 2017 – May 2019**

- M.S. Optics
  Thesis Adviser: Dr. Todd Krauss
  "Enhanced Structural Stability of Micelle Encapsulated Quantum Dots and Their Function as Structural Mimics of Protein Oligomers in Super-Resolution Imaging"

University of California, Irvine **Sept. 2013 – June 2017**

- B.S. Biomedical Engineering
- B.S. Materials Science & Engineering

Honors

George V. Metzger Award **May 2024**
Department of Biochemistry and Biophysics Student Seminar Award **2023, 2024**
SPIE Optics and Photonics Education Scholarship **June 2022**
Neuman Travel Award **May 2022**
SPIE Student Conference Support **Dec 2021**
Sayeeda Zain Travel Award **Dec 2021**
T32 Training Program in Cellular, Biochemical, and Molecular Biology **July 2021 - June 2022**
5-T32-GM-135134-02 (PI: Lynne Maquat, PhD; Co-PI: Jeffrey Hayes, PhD)
AAAS/Science Program for Excellence in Science **Jan 2020**
Student Speaker Award **2018, 2019**
University of Rochester SPIE Student Chapter
NSF I-Corps @ UCI Applied Innovation **Summer 2017**
For yCrutch
BioEngine Fellowship **2017**
Startup seed investment for yCrutch
Undergraduate Research Opportunities Research Grant **2016**
1. Micro-/Nanobubble Delivery System for Wound Healing
2. Low-cost Ergonomic Redesign of Crutches

Presentations

Single Molecule Biophysics Conference 2025 **Jan 2025**
Aspen Center for Physics, Aspen, CO
"Resolving Changes in Synaptic Architecture of Neurons in Response to Amyloid-like Quantum Dot Nanoassemblies"

2024 NY RNA Symposium in the Finger Lakes **Sept 2024**
Hotel Canandaigua, Canandaigua, NY
"Less Precise Medicine – An Argument for Broad-Kinase Inhibition in a Microglial Model for Parkinson's Disease"

T32 Chemical Biology Interface Retreat 2024 (Oral) **May 2024**
University of Rochester, NIH T32 CBI Training Program
"Hybrid Amyloid Quantum Dot Nano-Bio Assemblies to Probe Neuroinflammatory Damage"

T32 Cellular, Biochemical & Molecular Sciences Retreat 2023 (Oral) **March 2023**
University of Rochester Medical Center, Rochester, NY
"Probing Potential Origins for COVID-19 Associated Neuroimmune Using a Quantum Dot Biomimetic of SARS-CoV-2"

Neuroimmune Communication in Health and Disease (Poster) **Jan 2023**
Gordon Research Conference, Ventura, CA
"Probing Potential Origins for COVID-19 Associated Neuroimmune Using a Quantum Dot Biomimetic of SARS-CoV-2"

MRS Fall Meeting 2022 (Oral) **Dec 2022**
Boston, MA
"Quantum Dot Biomimetics of SARS-CoV-2 to Uncover Potential Origins of Neurologic Disease Relevant to COVID-19"

T32 Chemical Biology Interface Retreat 2022 (Oral) **June 2022**
University of Rochester, NIH T32 CBI Training Program
"Constructing a Quantum Dot Biomimetic of SARS-CoV-2 to Probe Possible Origins of COVID-19 Associated Neurologic Disease"

SPIE Photonics West – BIOS 2022 (Oral) **Jan 2022**
Colloidal Nanoparticles for Biomedical Applications XVII
"Elucidating the neuropathophysiology of COVID-19 using quantum dot biomimetics of SARS-CoV-2"

5th Annual Immune Imaging Symposium (Poster) **Nov 2019**
Program for Advanced Immune Bioimaging
"Micelle-Encapsulated Quantum Dots as Structural Mimics of Spherical β-Amyloid Oligomers to Investigate the Cellular Mechanisms of Alzheimer's Associated Neurodegeneration"

Summer Student Colloquium (Oral) **Aug 2019**
University of Rochester SPIE Student Chapter
"Micelle-Encapsulated Quantum Dots as Structural Mimics of Spherical Macromolecules to Investigate Cellular Dynamics"

T32 Chemical Biology Interface Annual Retreat (Poster) **May 2019**
University of Rochester, Chemistry Department NIH T32 CBI Training Program
"Micelle Encapsulated Quantum Dots as Structural Mimics of Spherical Macromolecules to Investigate Cellular Dynamics"

Research Day (Poster) **Oct 2018**
University of Rochester, School of Medicine
"Observation of Cellular-Specific Protein-Cell Dynamics Through Super-resolution Imaging of Quantum Dots Structurally Mimicking Amyloid-beta Oligomers"

Siegman International School on Lasers (Poster) **Aug. 2018**
Optical Society, Denmark Technical University
"Improved Micelle Stability of Water-Soluble Quantum Dots for Super Resolution Imaging of Neurons"

Summer Student Colloquium (Oral) **July 2018**
University of Rochester SPIE Student Chapter
"Functionalizing Quantum Dots for Super-Resolution Imaging in Cells"

Research Publications

1. **Chiang W**, Urban HM, Yanchik-Slade F, Stout A, Hammond JM, Nilsson BL, Gelbard HA, and Krauss TD. *ACS Chemical Neuroscience* 2024, 15 (17), 3124-3135. DOI: 10.1021/acschemneuro.4c00183. PMID: 39146244 **Aug 2024**
2. Lin M, Jensen MK, Elrod ND, Haseley M, Beam AC, Huang K, Chu H, **Chiang W**, Russell WK, Proschel C, Wagner EJ*, Tong L*. Cytoplasmic binding partners of the Integrator endonuclease INTS11 and its paralog CPSF73 are required for their nuclear function. *Molecular Cell* 2024, 84(15), p2900-2917.e10. DOI: 10.1016/j.molcel.2024.06.017. PMID: 39032490 **Aug 2024**
3. Gelbard HA*, **Chiang W**. SARS and Synapses. *Nature Microbiology*. 2024; 9:1163-1164. doi: 10.1038/s41564-024-01685-y. 38653780 **Apr 2024**
4. **Chiang W**, Morshed O, Krauss TD. *Quantum Confinement in Semiconductor Nanocrystals*. American Chemical Society. 2023. DOI: 10.1021/acsinfocus.7e7022 **Sep 2023**
5. **Chiang W,** Stout A, Yanchik-Slade F, Li H, Terrando N, Nilsson BL, Gelbard HA*, Krauss TD*. Quantum Dot Biomimetic for SARS-CoV-2 to Interrogate Blood–Brain Barrier Damage Relevant to NeuroCOVID Brain Inflammation. *ACS Applied Nano Materials* 2023, 6 (16), 15094-15107. DOI: 10.1021/acsanm.3c02719. PMID: 37649833 **Aug 2023**
6. Edwards EH, Jelušić J, Kosko RM, McClelland KP, Ngarnim SS, **Chiang W,** Lampa-Pastirk S, Krauss TD*, Bren KL*. Shewanella oneidensis MR-1 Respire CdSe Quantum Dots for Photocatalytic Hydrogen Evolution. *Proc. Natl. Acad. Sci*. 2023; 120(17). doi: 10.1073/pnas.2206975120. PMID: 37068259 **Apr 2023**
7. Miller-Rhodes P, Li H, Velagapudi R, **Chiang W**, Terrando N*, Gelbard HA*. URMC-099 Prophylaxis Prevents Hippocampal Vascular Vulnerability and Synaptic Damage in an Orthopedic Model of Delirium Superimposed on Dementia. *FASEB J*. 2022; 36:e22343. doi:10.1096/fj.202200184RR. PMID: 35535564 **Jun 2022**
8. Urban JM, **Chiang W,** Hammond JW, Cogan NMB, Stout A, Burke R, Stern HA, Gelbard HA, Nilsson BL*, Krauss TD*. Quantum Dots for Enhanced Single Molecule Localization Microscopy. *Journal of Physical Chemistry B.* 2021; 125(10):2566-76. doi: 10.1021/acs.jpcb.0c11545; PMID: 33683893 **Mar 2021**

Other Publications

1. Tam LM*, **Chiang W**, Huynh KT. Establishing global climate resilience to persistent organic pollutants through the private sector: a call to reform institutional standards of the International Finance Corporation. *Journal of Science Policy and Governance.* 2021; 18(2). doi: 10.38126/JSPG180210 **Jun 2021**

Manuscripts in Preparation or Review

1. Song CC, Wu PY, Huffman WJ, David-Berchholz J, Bedolla A, Velagapudi R, Baht GS, Rodriguez RM, Wetsel WC, Rendina D, Bilbo SD, **Chiang W**, Ogu JC, Gelbard HA, Yang T, Grill WM, Terrando N*. Electrical stimulation of the vagus nerve improves amyloid pathology in delirium superimposed on dementia. *Molecular Neurodegeneration.* (submitted). **Under Review**
2. **Chiang W[1],** Li H[1], Linh L, David-Bercholz J, Caceres AI, Pereira A, Marrero M, C Lim, Majewska AK, Terrando N*, Gelbard HA*. Neutrophilia With Damage to the Blood-Brain Barrier and Neurovascular Unit Following Chronic Acute Lung Injury. bioRxiv doi: 10.1101/2023.10.16.562508. *J Clin Invest.* (submitted) **Under Review**
3. **Chiang W,** Ogu J, Stallone J, Schwartz J, Frederick D, Stout A, Gelbard HA*, Krauss TD*. SARS-CoV-2 Mimicking Quantum Dots to Explore Spike Mediated Activation and Recruitment of Neutrophils. **In preparation**

4. Li H[1], Sandoval IM[1], **Chiang W**, Schwartz J, Squire R, Morrero M, Jensen MK, Wagner EJ, Tansey MG, Manfredsson F*, Gelbard HA*. Inhibition of LRRK2 and MLK3 with URMC-099 attenuates neurodegeneration in an AAV-hSYN model of Parkinson's Disease. *Molecular Neurodegeneration* — **In preparation**
5. **Chiang W**, Squire E, Schwartz J, Jensen MK, Wagner EJ, Gelbard HA*. Dual kinase inhibition: An argument with less-precise medicine for Parkinson's Disease therapeutics. — **In preparation**
6. **Chiang W***, Gelbard HA, Krauss TD. Neuron-wide and synapse-specific changes in synaptic architecture from amyloid targeting. — **In preparation**
7. **Chiang W**, Ogu J, Stallone J, Schwartz J, Frederick D, Krauss TD, Gelbard HA*. Spike-mediated biomolecular interactions that influence brain vulnerability to NeuroCOVID. — **In preparation**

*[1]Co-first authorship *Corresponding author(s)*

Research Projects & Internships

Doctoral Thesis – Constructing a Quantum Dot Biomimetic of SARS-CoV-2 to Interrogate COVID-19 Associated Neuropathophysiology — **May 2020 – Dec. 2023**
Advised by Dr. Todd Krauss & Dr. Harris Gelbard

Rotation Project – Developing Calibration and Comparison of Common Fluorophores for STED Microscopy Using Nuclear Pore Complexes — **Jan. 2020 – Mar. 2020**
BPH 595, Dr. David MacLean & Dr. Kaye Thomas

Rotation Project – Investigating Acid-Sensitive Ion Channels Using Fluorescently Tagged Hi1a Toxin & STED Microscopy — **Jan. 2020 – Mar. 2020**
BPH 595, Dr. David MacLean

Rotation Project – Developing Microfluidic Ring Resonator Nanophotonic Biosensor — **Oct. 2019 – Dec. 2019**
BPH 595, Dr. Ben Miller

"Enhanced Structural Stability of Micelle Encapsulated Quantum Dots and Their Function as Structural Mimics of Protein Oligomers in Super-Resolution Imaging" — **Oct. 2017 – Aug. 2019**
MS Thesis, Dr. Todd Krauss – University of Rochester

"yCrutch - Low-cost Ergonomic Redesign of Crutches" — **Sept. 2016 – June 2017**
MSE180 Senior Design – University of California, Irvine

"BubMed - Micro-/Nanobubble Delivery System for Wound Healing" — **Sept. 2016 – June 2017**
BME180 Senior Design – University of California, Irvine

"Software Integration of Optoelectronics in Surgical Microscope Attachment and Development of Image Search, Localization, and Fitting Algorithms" — **June 2016 – April 2017**
Systems Engineering Internship (Software Lead) – Alpha Vision, LLC

"3D Image Reconstruction of Stained Brain Vasculature in Optically Cleared Tissue" — **May 2015 – Sept. 2015**
Beckman Laser Institute, Dr. Bernard Choi – University of California, Irvine

"Development of microcantilever to assess cardiomyocyte health" — **June 2013 – Nov 2013**
Microbiomechanics Lab, Dr. William Tang – University of California, Irvine

Teaching Positions

Workshop Facilitator – Dept. of Biochemistry and Biophysics, University of Rochester — **Aug. 2022 – Dec. 2022**
IND 431 – Foundations in Modern Biology

Teaching Assistant – Dept. of Biochemistry and Biophysics, University of Rochester — **Mar. 2022 – May 2022**
BPH 411 – Methods in Structural Biology

Teaching Assistant – Dept. of Biochemistry and Biophysics, University of Rochester — **Jan. 2021 – Apr. 2021**
BPH 509 – Molecular Biophysics

Adjunct Faculty, Gosnell School of Life Science, Rochester Institute of Technology — **Jan. 2020 – May 2020**
BIOG 340 – Biocompatibility and Immune System

Program Assistant, Chemistry Study Group Leader – Kearns Center — **Sept. 2019 - Present**
CHM 131 – General Chemistry, CHM 132 – General Chemistry

Teaching Assistant – Dept. of Optics, University of Rochester — **Aug. 2017 – May 2019**

OPT 456 – Graduate Teaching Laboratory

- Solid State Laser Design, Fiber Laser Design, Optical System Quality Testing

Trainees Mentored During Postdoc

Jessica Ogu*	Neuroscience PREP Scholar	June 2024 – Present
Alice Giulia Alessandroni	Biophysics PhD Student (Rotation)	Jan. 2025 – Mar. 2025

Students Mentored During PhD

Rene Squire	Neuroscience Undergraduate	May 2023 – Dec. 2024
Jonathan Chi	Biology Undergraduate Student	Dec. 2023 – May 2024
Jack Schwartz	Biochemistry PhD Student (Rotation)	Fall 2023 & Spring 2024
Dylan Frederick	Biophysics PhD Student (Rotation)	Sep. 2023 – Dec 2023
Jessica Ogu	UCI Neurobiology Undergraduate (REU)	June 2023 – Sep. 2023
Thomas Bewaale	Materials Science PhD Student	Feb. 2023 – Oct. 2023
Adriana Miranda	Materials Science PhD Student	June 2022 – Oct. 2023
Zeyuan Zhu*	Chemistry Undergraduate	May 202 – May 2023
Jonathan (Jack) Stallone	Biochemistry PhD Student (Rotation)	Oct. 2022 – Dec. 2022
Lia Calcines Rodriguez	Neuroscience PhD Student (Rotation)	Oct. 2021 – Dec. 2021

* *Individual has been accepted to or is now currently matriculated into a PhD program*

Service and Professional Activities

AFFILIATIONS

Member | Optica; International Society for Optics and Photonics (SPIE); American Chemical Society (ACS); Materials Research Society (MRS); out in Science Technology Engineering and Mathematics (oSTEM); National Science Policy Network (NSPN)

INSTITUTIONAL SERVICE

Postdoctoral Rep – Department of Chemistry Faculty Search Committee	Nov. 2024 – Feb. 2025
Member – University of Rochester LGBTQ Advocacy Committee	June 2022 – Dec 2023
Student Liaison – T32 Training Grant in Cellular, Biochemical, and Molecular Sciences	Aug 2022 – June 2023
President – outGRADS, University of Rochester *Helped found and establish a cross-campus affinity group to support the interpersonal and professional development of gender and/or sexual minority trainees at the University of Rochester.*	Oct. 2020 – June 2023
Member – University Graduate Student Postdoc Advisory Committee *Advised Dean of Graduate Students (Dr. Sturge-Apple) regarding trainee issues and concerns on topics ranging from housing, transportation, insurance, financial security, and access/use of university provided resources – IT, CARE office, etc. Met with other senior admin, President Mangelsdorf, and Board of Trustees as part of this process.*	June 2021 – June 2023
President – UR Science Policy, University of Rochester	Aug. 2022 – May 2023
Vice President – UR Science Policy, University of Rochester	June 2021 – Aug. 2022
Member – University Diversity and Inclusion Student Advisory Committee	Jan 2022 – May 2022
Secretary – UR Science Policy, University of Rochester	Mar. 2020 – June 2021
Member – Department of Biochemistry and Biophysics Social Media Committee	Sept 2020 – May 2022