Kevin L. Scrudders

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905 North St. Apt. 1/2, Lafayette, IN 47904

Education

Purdue University (West Lafayette, IN)

- Ph.D., Biochemistry — Expected May 2025

Heidelberg University (Tiffin, OH) [abbr. HU]

- B.S., Biochemistry and Philosophy — May 2019

Current Research Experience

Purdue University — West Lafayette, IN

Graduate Research with Dr. Shalini T. Low-Nam — Oct 2019 – Present

CAR T-cell Activation Thresholds

- Single molecule, single cell, in-vitro reconstitution of T cell activation thresholds
- T-Cell activation thresholds in 3D cell-cell junctions

Fellowships/Awards/Honors

NIH T32 Fellowship – Molecular Biophysics — Aug 2021 – July 2023

The Pancoast Family Research Scholarship [HU] — 2019, 2020, & 2024

Outstanding Research Safety Representative — 2025

The Robert E. Oleson Outstanding Student Leader Award [HU] — May 2019

Leadership Experience

Student-Led "Frontiers in Biophysics Seminar Series" Selection Committee (Member 2022-2021) — Aug 2021 - Present

"The Hitchhiker's Guide to The Biomolecular Galaxy" Symposium Committee (Chair 2023, Planning Member 2022) — Spring 2022 & 2023

Purdue Biochem. Div. Seminar, Student-led Speaker Selection Committee — Fall 2020 & 2022

Heidelberg Univ. ACS Student Chapter (President 2018, President 2017, VP 2016, Treasurer 2015) — Aug 2014 – May 2019

Skills and Techniques

- Advanced Microscopy Techniques:
  - Total Internal Reflection Fluorescence (TIRF)
  - Single Molecule Localization and Tracking
  - Interference Reflection Microscopy (IRM)
  - Förster Resonance Energy Transfer (FRET)
- Computational Analysis:
  - MATLAB programming for multi-dimensional image processing and analysis
  - IRM image segmentation utilizing adaptive thresholding
- Biochemical and Cell Biological Techniques:
  - Supported lipid bilayer (SLB) reconstitution
  - Mammalian cell culture (primary cells and cell lines; adherent and suspension cultures)
  - Small peptide synthesis (<15 amino acids)
- Design and Visualization Tools:
  - Adobe Creative Suite for graphic design
  - PyMol for molecular visualization

Research Interests

My research interests focus on T cell activation across spatial and temporal scales, particularly examining how T cells integrate varied durations and intensities of signaling into distinct cellular responses. More broadly, I am interested in dissecting biological systems at the molecular level, facilitating rational design approaches to harness and enhance these systems for therapeutic and health-promoting applications.

Teaching Experience

CHM 129 – Recitation Supervising TA — Fall 2023, Fall 2024
Generated recitation material and conducted 2 recitation sections

CHM 339 – Biochemistry Laboratory, TA — Spring 2021
Oversaw two sections of weekly laboratory

CHM 129 – Lecture Supervising TA — Fall 2020
Coordinated lecture material and online homework assignments

CHM 339 – Biochemistry Laboratory, TA — Spring 2020
Oversaw two sections of weekly laboratory

CHM 129 – Gen. Chem. with a Biological Focus, TA — Fall 2019
Oversaw two sections of weekly laboratory and recitation

Publications

Curtis, Ryan W.; Scrudders, Kevin L.; Ulcickas, James R. W.; Simpson, Garth J.; Low-Nam, Shalini T.; Chmielewski, Jean, *Supramolecular Assembly of His-Tagged Fluorescent Protein Guests within Coiled-Coil Peptide Crystal Hosts: Three-Dimensional Ordering and Protein Thermal Stability*, ACS Biomaterials Science & Engineering, **April 4th, 2022**, doi: 10.1021/acsbiomaterials.2c00155

Pre-prints

Mohamadreza Fazel, Reza Hoseini, Maryam Mahmoodi, Lance W. Q. Xu, Ayush Saurabh, Zeliha Kilic, Julian Antolin, Kevin L. Scrudders, Douglas Shepherd, Shalini T. Low-Nam, Fang Huang, Steve Pressé, *Simultaneous particle tracking, phase retrieval and point spread function reconstruction*, BioRxiv, **May 6th, 2025**, doi: 10.1101/2025.05.02.651986

Cheng Bi, Kevin L. Scrudders, Yue Zheng, Maryam Mahmoodi, Shalini T. Low-Nam, Fang Huang, *SPTnet: a deep learning framework for end-to-end single-particle tracking and motion dynamics analysis*, bioRxiv, **Feb 8th, 2025**, doi: 10.1101/2025.02.04.636521

Vinay K. Menon, Joy Wu, Alex J. Alonzo, Kaitlyn A. Rogers, Kevin L. Scrudders, Suriya Selvarajan, Andrew Walke, Rajasree Kundu, Ankona Datta, Shalini T. Low-Nam, *Direct measurement of PIP2 densities in biological membranes using a peptide-based sensor*, BioRxiv, **Sept 13th, 2024**, doi: 10.1101/2024.09.11.612554

Abstracts/Posters

Scrudders, Kevin L.; Wu, Joy; Luo, Weichuan; Zheng, Suilan; Breinig, Tanvi; Rodriguez-Lopez, Kenneth ; Low, Philip S.; Low-Nam, Shalini T.; *Measuring Signaling Thresholds for Lytic Granule Polarization in CAR T cells at the Single Cell Level*, Immunoreceptors and Immunotherapy FASEB, **Jun 16-20th, 2024**

Scrudders, Kevin L.; Luo, Weichuan; Zheng, Suilan; Menon, Vinay; Breinig, Tanvi; Rodriquez-Lopez, Kenneth; Philip, Low; Low-Nam, Shalini, *Bridging the Gap: reconstitution of engineered T cell activation with single-cell, single-molecule resolution*, P14D Annual Symposium, **Sept 23rd, 2022**

Scrudders, Kevin L.; Luo, Weichuan; Zheng, Suilan; Menon, Vinay; Breinig, Tanvi; Rodriquez-Lopez, Kenneth; Philip, Low; Low-Nam, Shalini, *Bridging the Gap: reconstitution of engineered T cell*

activation with single-cell, single-molecule resolution, Gordan Research Conference: Biointerface Science, **Jun 12-17th, 2022**

Scrudders, Kevin; Luo, Weichuan; Zheng, Suilan; Philip, Low; Low-Nam, Shalini, *Single-molecule, single-cell reconstitution of engineered T cell activation*, 17th Annual Garnet E. Peck Symposium, **April 7th, 2022**

Scrudders, Kevin; Luo, Weichuan; Zheng, Suilan; Philip, Low; Low-Nam, Shalini, *Single-molecule, single-cell reconstitution of engineered T cell activation*, Abstracts of Papers, 263rd ACS National Meeting, San Diego, CA, United States, **Mar 20-24th, 2022**, BIOL 3656534

Scrudders, Kevin L.; Muralidharan, Kaushik; Lyon, Angeline; Low-Nam, Shalini T.; *Reconstituting PLCβ Domain Function using Supported Lipid Bilayers*, 733 Wilhelm Und Else Heraeus-Stiftung Seminar, Online Seminar, **Mar 17-18th, 2021**, Poster 37

Scrudders, Kevin; Cohn, Melanie; Ihrig, Colin; Malone, Kiera; Iwanek, Kathryn; Morrison, Chase; Beres, Nathaniel, *Green Chemistry at Heidelberg Universit*y, Green Chemistry Student Chapters: Stories of Success (Invited), 257th ACS National Meeting, Orlando, FL, United States, **March 31 – April 4th, 2019,** CHED-234

Scrudders, Kevin; Beres, Nathaniel, *Antimicrobial Properties of Menthol and its Derivatives*, Abstracts of Papers, 257th ACS National Meeting, Orlando, FL, United States, **March 31 – April 4th, 2019**, CHED-117

Scrudders, Kevin; Bauer, Alexandra; Blum, Dani; Webb, Rebecca; Raimondo, Rachel; Beres, Nathaniel, *Chemistry outreach with Heidelberg University's ACS Chapter*, Abstracts of Papers, 255th ACS National Meeting, New Orleans, LA, United States, **March 18-22nd, 2018**, CHED-1893

Bauer, Alexandra; Scrudders, Kevin; Blum, Dani; Hogle, Markilynn; Riffle, Erica; Beres, Nathaniel, *Chemistry in the Heidelberg University community*, Abstracts of Papers, 253rd ACS National Meeting, San Francisco, CA, United States, **April 2-6th, 2017**, CHED-1785

Scrudders, Kevin; Chandler, Claire; Beres, Nathaniel, *Antimicrobial properties of lavender and cinnamon derivatives*, Abstracts of Papers, CHED 251st ACS National Meeting, San Diego, CA, United States, **March 13-17th, 2016**, CHED-1293