Colin J. Comerci

San Diego, CA • (610) 762-3718 • cjcomerci@gmail.com • www.cjcomerci.com

INDEPENDENT RESEARCH

My lab will investigate how bacteria respond to natural antibiotics – many of which we use therapeutically – during multispecies competition, developing insight into clinical antimicrobial resistance (AMR). Leveraging my expertise in molecular biophysics, cellular imaging, and systems biology to study AMR across spatial scales, I will discover how antibiotics activate gene regulatory networks and how molecular and cellular heterogeneity impact population dynamics during multispecies competition. Ultimately, my research will suggest novel treatment strategies, such as combination therapies to eliminate AMR activation.

EDUCATION

Ph.D. in Biophysics 2012–2019

Stanford University, Stanford, CA

B.A. in Physics; Biophysics; Biochemistry 2008–2012

University of Pennsylvania, Philadelphia, PA

RESEARCH EXPERIENCE

Postdoctoral Researcher: 2020–2026

Exploring electrical and chemical signalling in bacterial communities

University of California San Diego, Division of Biological Sciences (Adviser: Gürol M. Süel, PhD)

- Conceptualized and executed microscopy and competition experiments to study enantiomer signalling in interspecies interactions of bacterial spores
- Led a team integrating microscopy, microfluidics, and electrical devices to study electrochemical control of cell type composition of biofilms
- Orchestrated collaborations implementing novel electrochemical devices to control bacterial growth

Graduate Researcher: 2012–2019

Superresolution Microscopy as a Tool for Studying Cellular Structure Beyond the Diffraction Limit

Stanford University, Biophysics Program (Adviser: W. E. Moerner, PhD)

- Designed, built, and maintained a STED superresolution fluorescence microscope, including optical setup, control software, and electronics
- Established and spearheaded collaborations applying STED microscopy, single-particle tracking, and quantitative image analysis to:
  - Formation and function of the primary cilia
  - Self-assembly of a bacterial surface layer
  - Chromatin organising proteins in the eukaryotic nucleus
  - Clustering of immune receptors in human melanoma tissue sections

Undergraduate Researcher: 2009–2012

CD2 Promotes Human Natural Killer Cell Membrane Nanotube Formation

Children's Hospital of Philadelphia, Division of Immunology and *Baylor College of Medicine, Center for Human Immunobiology* (Adviser: Jordan S. Orange, MD, PhD)

- Developed a live-cell protocol to visualise NK cell membrane nanotubes in cell lines and ex vivo NK cells
- Investigated factors contributing to nanotube formation

AWARDS & HONORS

- NSF Graduate Research Fellowship 2013–2016

- ASCB Travel Award 2014
- Roy and Diana Vagelos Scholars Program in the Molecular Life Sciences 2008–2012
- Benjamin Franklin Scholars 2008–2012
- Dean's List, University of Pennsylvania 2011, 2012
- Eagle Scout 2008
- Pennsylvania Governor's School for the Sciences 2007

TEACHING EXPERIENCE

Guest Lecturer — Introduction to Quantitative Biology (BGGN214) 2022

University of California San Diego

- Designed and delivered a primary literature-based lecture on single-cell heterogeneity, guiding graduate students through data interpretation, mechanistic reasoning, and evidence-based explanation

Pathways to Scientific Teaching — Pedagogy Course 2021

University of California San Diego

- Semester-long course integrating active learning with evidence-based, inclusive teaching practices
- Designed a sample lesson on cell differentiation emphasizing quantitative data analysis and experimental design

Teaching Assistant — Biophysical Chemistry Capstone (CHEM 185) 2016

Stanford University

- Facilitated co-led student discussions of primary biophysics literature for 6 undergraduates, supporting development of critical thinking and scientific practices
- Provided small-group office hours to help students master key biophysical methods and analyses

Teaching Assistant — Physical Chemistry (CHEM 171) 2015

Stanford University

- Led weekly office hours (20+ students) covering thermodynamic concepts and computer programming for scientific data analysis and modeling
- Assisted in developing and grading assessments to evaluate mastery of course content

MENTORING EXPERIENCE

- Mentored 3 rotation students, UCSD 2024–2025
- Mentored a master's student, UCSD 2022–2024
  Biology Undergraduate and Master's Mentorship Programme (BUMMP)
- Mentored 2 PhD students, UCSD 2021–2025
- Supervised an undergraduate research assistant, UCSD 2020–2021
- Supervised 1 and mentored 3 PhD students, Stanford University 2017–2019

PUBLICATIONS (PEER REVIEWED)

** denotes co-first authorship*

15. **Comerci CJ,** Chou TK-T, Amino R, Bialecka M, Garcia-Ojalvo J, Süel GM. 2026. Enantiomer sensing enables social avoidance by bacterial spores. iScience 29: 114967.
14. Dechiraju H, Li Y, **Comerci CJ**, Luo L, Figuerres S, et al. 2025. Bioelectronic delivery of potassium ions controls membrane voltage and growth dynamics of bacteria biofilms. Biomedical Materials & Devices 3: 646.
13. Shukla S, **Comerci CJ**, Süel GM, Jahed Z. 2025. Bioelectronic tools for understanding the universal language of electrical signalling across species and kingdoms. Biosensors and Bioelectronics 267: 116843.
12. Kim S, Eig E, Yue J, Yang A, **Comerci CJ**, et al. 2024. Bioelectronic drug-free control of opportunistic pathogens through selective excitability. Device 2: 100596.

11. **Comerci CJ**, McCarthy DG, Nosrati M, Kim KB, Kashani-Sabet M, Moerner WE, Leong SP. 2023. Nanometer-scale distribution of PD-1 in the melanoma tumour microenvironment. Journal of Radiology and Oncology 7: 20–25.

10. Weiss LE, Love JF, Yoon J, **Comerci CJ**, Milenkovic L, Kanie T, Jackson PK, Stearns T, Gustavsson A-K. 2023. Single-molecule imaging in the primary cilium. Methods in Cell Biology 176: 59–83.

9. **Comerci CJ*,** Gillman AL*, Galera-Laporta L, Gutierrez E, Groisman A, Larkin JW, Garcia-Ojalvo J, Süel GM. 2022. Localized electrical stimulation triggers cell-type-specific proliferation in biofilms. Cell Systems 13(6): 488–498.

8. Galera-Laporta L*, **Comerci CJ***, Garcia-Ojalvo J, Süel GM. 2021. IonoBiology: The functional dynamics of the intracellular metallome, with lessons from bacteria. Cell Systems 12(6): 497–508.

7. Gu B*, **Comerci CJ***, McCarthy DG*, Saurabh S, Moerner WE, Wysocka J. 2020. Opposing effects of cohesion and transcription on CTCF organization revealed by super-resolution imaging. Molecular Cell 80(4): 699–711.

6. **Comerci CJ*,** Herrmann J*, Yoon J, Jabbarpour F, Zhou X, Nomellini JF, Smit J, Shapiro L, Wakatsuki S, Moerner WE. 2019. Topologically-guided continuous protein crystallization controls bacterial surface layer self-assembly. Nature Communications 10: 2731.

5. Yoon J, **Comerci CJ**, Weiss LE, Milenkovic L, Stearns T, Moerner WE. 2019. Revealing nanoscale morphology of the primary cilium using super-resolution fluorescence microscopy. Biophysical Journal 116(2): 319–329.

4. Saurabh S, Perez AM, **Comerci CJ**, Shapiro L, Moerner WE. 2017. Super-resolution microscopy and single-protein tracking in live bacteria using a genetically encoded, photostable fluoromodule. Current Protocols in Cell Biology 4.32.1–4.32.22.

3. Saurabh S, Perez AM, **Comerci CJ,** Shapiro L, Moerner WE. 2016. Super-resolution imaging of live bacteria cells using a genetically directed, highly photostable fluoromodule. Journal of the American Chemical Society 138(33): 10398–401.

2. Lee YL, Sante J, **Comerci CJ**, Cyge B, Menezes LF, Li FQ, Germino GG, Moerner WE, Takemaru K, Stearns T. 2014. Cby1 promotes Ahi1 recruitment to a ring-shaped domain at the centriole-cilium interface and facilitates proper cilium formation and function. Molecular Biology of the Cell 25(19): 2919–33.

1. **Comerci CJ**, Mace EM, Banerjee PP, Orange JS. 2012. CD2 Promotes Human Natural Killer Cell Membrane Nanotube Formation. PLoS ONE 7(10): e47664.

PRESENTATIONS

American Society of Cell Biology Annual Meeting, Poster, Philadelphia PA.	2025
American Society of Microbiology Meeting, Poster, Los Angeles CA.	2025
American Physical Society March Meeting, Talk and Poster, Las Vegas NV.	2023
Biophysical Society Meeting, Poster, San Diego CA.	2023
Biophysical Society Meeting, Poster, San Diego CA.	2020
Keystone Symposia: Imaging Across Scales, Short Talk and Poster, Snowbird UT.	2019
Biophysical Society Meeting, Poster, San Francisco CA.	2018
Cancer Metastasis Symposium, Poster, San Francisco CA.	2017
American Society of Cell Biology Annual Meeting, Poster, San Francisco CA.	2016
American Society of Cell Biology Annual Meeting, Poster, Philadelphia PA.	2014

GRANTS

- Watching Antimicrobial Resistance Activation: Developing Single-molecule Tracking Tools 2026
  NIH R21 Grant Proposal, PI: Colin J. Comerci, *In preparation*
- Sleeper Spores, Defense Advanced Research Projects Agency HR0011-21-C-0192 2021–2022
  PI: Gürol M. Süel, *Led the experimental design section and wrote progress reports*
- Charge matters: Pursuing the most common, and least understood 2020–2025
  molecular interactions in cells, NIH NIGMS R35 GM139645,
  PI: Gürol M. Süel, *Edited initial submission and wrote sections of renewal*

- Single-Molecule Imaging for Cell Biology and Super-Resolution Microscopy, NIH NIGMS R35 GM118067, PI: W.E. Moerner, *Assisted in writing* 2016–2021

PROFESSIONAL EXPERIENCE & OUTREACH

- Co-chair, ASCB/EMBO Meeting Minisymposium 2026
  Extracellular Signals and Matrices in Multicellular Organization
- Student Research Showcase Poster Judge, UCSD Biology Department 2025
- Hands-on Science Lessons, San Diego French American School 2022-2023
- *Designed and led hands-on science lesson for 25+ fifth graders*
- President, Optical Society & Co-chair, Stanford University Photonics Retreat 2017–2018
  Led team of 10, raised $50,000, organized 3-day off-site programme for 100 student, faculty, and industry participants
- Co-president, Stanford University Biophysics Leadership Committee 2014
  Led team of 8 students to organize student recruitment, educational and social events
- Stanford Science Circle Middle and High School Program 2013-2014

REVIEWER ACTIVITIES

Biophysical Reports; Data; Nature; Physical Review E; Proceedings of the National Academy of Sciences USA (PNAS)

ACADEMIC REFERENCES

W. E. Moerner, PhD (Graduate Adviser)
Harry S. Mosher Professor, Stanford University
wmoerner@stanford.edu

Gürol Süel, PhD (Postdoctoral Adviser)
Professor, University of California, San Diego
gsuel@ucsd.edu

Jordi Garcia-Ojalvo, PhD (Collaborator)
Professor, Universitat Pompeu Fabra
jordi.g.ojalvo@upf.edu