

Syracuse University, Department of Physics and BioInspired Institute
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Education

Ph.D. Brown University, Physics (2014)
M.Sc. Brown University, Physics (2009)
B.Sc. University of Zagreb, Faculty of natural sciences, Physics (2008)

Academic positions

Syracuse University, Department of Physics and Biology, Syracuse, NY
Assistant Professor of Physics (2021- present)
Assistant Professor of Biology, by courtesy (2022-present)
Faculty affiliate, Graduate Neuroscience Concentration (2022-present)
Faculty affiliate, BioInspired Institute (2021-present)

New York University, Department of Physics, New York, NY (2014-2021)
Postdoctoral fellow in the group of Prof. Marc Gershow
Project: Cracking neural circuits of Drosophila larva

Brown University, Department of Physics, Providence, RI (2008-2014)
Graduate student in the group of Prof. Derek Stein
Thesis: The Statistics of DNA Capture and Re-capture by a Solid-state Nanopore

University of Zagreb, Department of Physics, Zagreb, Croatia (2007)
Undergraduate researcher in the group of Prof. Ivica Picek
Thesis: Flavor Mixing in the Neutral Kaon System

CERN Summer Student Program, Geneva, Switzerland (Summer 2006)
Undergraduate researcher in the group of Dr. Michael Doser
Project: Antiproton Cell Experiment for Cancer Treatment

Awards and Honors

2024 **Physics Department Community Building and Social Justice Award**
2023 **NIH Maximizing Investigators' Research (MIRA) Award**
2023 **Physics Department Faculty Teaching Award**, Physics 102
2022 **McKnight Technological Innovations in Neuroscience Award** ([SU News](#))
2016 The New York Academy of Sciences Magazine, [cover story](#) (Spring issue)
2016 Helmsley Fellowship for CSHL Drosophila Neurobiology: Genes, Circuits and Behavior course
2014 Sigma Xi Award for Excellence in Research in Physics, Brown University
2007 University of Oxford Fellowship for summer internship (declined)
2006 CERN Summer Student Scholarship
2003 Croatian National Scholarship for Talented Students (2023- 2007)
2003 Provost's Scholarship, University of Zagreb (declined)

Professional societies

American Physical Society
The New York Academy of Sciences
Sigma Xi, Scientific Research Honor Society, Associate Membership

Maternity Leave

2016/2017 (12 weeks starting on Nov 5)
2021 (12 weeks starting on Jan 18)

Peer-Reviewed Publications

[Google Scholar](#), h-index = 7, NCBI [Mirna Mihovilovic Skanata](#)

1. *Multi-neuronal recording in unrestrained animals with all acousto-optic random-access line-scanning two-photon microscopy*, Akihiro Yamaguchi, Rui Wu, Paul McNulty, Doycho Karagyozov, [Mirna M. Skanata](#), Marc Gershow, ***Frontiers in Neuroscience***. 2023; 17:1135457, [doi: 10.3389/fnins.2023.1135457](#)
2. *Direction Selectivity in Drosophila Proprioceptors Requires the Mechanosensory Channel Tmc*, Liping He, Sarun Gulyanon, [Mirna M. Skanata](#), Doycho Karagyozov, Ellie Heckscher, Michael Krieg, Gavriil Tsechpenakis, Marc Gershow, W. Daniel Tracey Jr., ***Current Biology***, 2019; 29 (6):945-956. PubMed PMID: [30853433](#)
Editor's highlight: [Coordinated movements: watching proprioception unfold](#)
3. *Recording neural activity in unrestrained animals with 3D tracking two photon microscopy*, Doycho Karagyozov*, [Mirna M. Skanata*](#), Amanda Lesar and Marc Gershow, ***Cell Reports***, 2018; 25, 1-13 (*=co-first authors). PubMed PMID: [30380425](#)
Press: [Labrigger](#)
4. *The nanopore mass spectrometer*, Joseph Bush, William Maulbetsch, M Lepoitevin, Benjamin Wiener, [Mirna Mihovilovic Skanata](#), Wooyoung Moon, Cole Pruitt, and Derek Stein, ***Review of Scientific Instruments***, 2017; 88(11), 113307. PubMed PMID: [29195372](#)
Press: [AIP SciLight](#) (*Nanocapillary feeds ions directly into vacuum for mass spectrometry*)
5. *Computations underlying Drosophila photo-taxis, odor-taxis, and multi-sensory integration*, Ruben Gepner*, [Mirna M. Skanata*](#), Natalie M Bernat, Margarita Kaplow and Marc Gershow, ***eLife***, 2015; 4, 06229. (*=co-first authors). PubMed PMID: [25945916](#)
Editor's highlight: [In search of lost scent](#)
6. *Entropic Cages for Trapping DNA Near a Nanopore*, Xu Liu, [Mirna M. Skanata](#) and Derek Stein, ***Nature Communications***, 2015; 6, 6222. PubMed PMID: [25648853](#)
Press: [BrownDailyHerald](#), [Science Daily](#), [NanoWerk](#)
7. *Statistics of DNA Capture by a Solid-State Nanopore*, [Mirna Mihovilovic](#), N. Hagerty and Derek Stein, ***Phys. Rev. Lett.*** 2013; 110(2): 028102. PubMed PMID: [23383940](#)
Editor's highlight: [Through the eye of the needle](#),

Press: [BrownNews](#), [NSF News](#), [Science Daily](#), [GenNews](#), [IEEE Spectrum](#), [MaterialsToday](#).

8. *Fabrication of nanopores with embedded annular electrodes and transverse carbon nanotube electrodes*, Zhijun Jiang, [Mirna Mihovilovic](#), Jason Chan and Derek Stein, *Journal of Physics: Condensed Matter*, 2010; 22(45):454114. PubMed PMID: [21339601](#)

Press: IOP Science Lab Talk: *Electrified nanopores pick up where nature leaves off*

Preprint Publications

CRASH2p: Closed-loop Two Photon Imaging in Freely Moving Animal, Paul McNulty⁺, Rui Wu⁺, Akihiro Yamaguchi, Ellie Heckscher, Andrew Haas, Amajindi Nwankpa, [Mirna M. Skanata](#)^{*}, Marc Gershow^{*} (*=corresponding authors), Bioarxiv, 2024, PMID: 38826435, PMCID: [PMC11142166](#), DOI: [10.1101/2024.05.22.595209](#)

Movie: *Dual-color recordings of neural activity in a moving animal*

Patent

Devices and methods for containing molecules, Derek Stein, Xu Liu, [Mirna Mihovilovic Skanata](#), *US Patent 9810663*; 2017

Book Chapter

Passive and Electrically Actuated Solid-State Nanopores for Sensing and Manipulating DNA, Zhijun Jiang, [Mirna Mihovilovic](#), Erin Teich and Derek Stein, in: *Nanopore-based technology: Single molecule characterization and DNA sequencing*, M.E. Gracheva, Ed., Humana Press, Springer, New York; 2012. PubMed PMID: [22528268](#)

Research Grants

Current Support

- **McKnight Technological Innovations in Neuroscience Award**
Two-photon tracking technology to read and manipulate neural patterns in freely moving animals, Aug 2022- Aug 2024, PI, \$200,000.
- **NIH Maximizing Investigators' Research Award (NIH MIRA, R35)**
Neural mechanisms underlying behavioral variability in uni- and multi-sensory contexts, Aug 2023- Aug 2028, PI, \$1,682,000.

Previous Support

- **The SOURCE**, Syracuse University Undergraduate Research Fellowship award funded Emma Snook and Sonia Julius, (Spring/Summer 2023), \$7,200
- **The SOURCE**, Syracuse University Undergraduate Research Fellowship award funded Chloe Britton Naime and Katherine Monroe (Summer/Fall 2022), \$7,200
- **Engaged Communities Network**, Syracuse University, "Syracuse University Research in Physics Summer High School Program", co-PI, \$5,000

Awards to Lab Members

- **McKnight/Matthew Pecot Fellowship**, undergraduate research award to Liliana Germain
2024/2025 AY, \$16,500
- **Biology Department Summer Research Fellowship**, awarded to Emma Snook
Summer 2024, 5200\$
- **The SOURCE**, Syracuse University Undergraduate Research Fellowship, awarded to Jada Garofalo
Summer/Fall 2023, \$4,200
- **The SOURCE**, Syracuse University Undergraduate Research Fellowship, awarded to Katherine
Monroe and Emma Snook, Spring 2024, \$3,000
- **Summer Pre-Dissertation Scholarship**, awarded to Yiming Xu
Summer 2022, \$4,000

Invited Lectures

1. **Cornell University**, Department of Molecular Medicine
Ithaca, NY, scheduled for May 2025
2. **2nd Upstate NY Soft and Biological Matter Workshop**, Syracuse University
Syracuse, NY, March 2024
3. **BioInspired Institute**, Mechanics of Development and Disease, Syracuse University
Syracuse, NY, March 2024
4. **Bioinspired Institute**, Mechanics of Development and Disease, Syracuse University
Syracuse, NY, September 2022
5. **8th Neuroscience Research Day**, Syracuse University
Syracuse, NY, April 2022
6. **Project Advance (SUPA) Seminar** Syracuse University,
New York City, April 2022 & Syracuse, May 2022
7. **Syracuse University**, Department of Biology Colloquium
Syracuse, NY, April 2022
8. **UCLA**, Physics Department Seminar
Virtually in Los Angeles, CA, March 2021
9. **EPFL** (École polytechnique fédérale de Lausanne), Physics Department Seminar,
Virtually in Lausanne, Switzerland, February 2021
10. **Brown University**, Condensed Matter and Biological Physics Seminar,
Providence, RI, November 2020
11. **University of Illinois Urbana-Champaign**, Biological Physics Seminar,
Champaign, IL, February 2020
12. **University of Florida**, Condensed Matter and Biophysics Seminar,
Gainesville, FL, February 2020
13. **Syracuse University**, Physics Department Colloquium,
Syracuse, NY, February 2020
14. **Purdue University**, Biological Physics Seminar,
West Lafayette, IN, March 2020

15. **Auburn University**, Physics Department Colloquium, Auburn, AL, February 2020
16. **Fordham University**, Neuroscience Seminar, New York, NY, February 2020
17. **University of New Mexico**, Physics Department Seminar, Albuquerque, NM, March 2020 (*cancelled due to Covid-19*)
18. **University of Central Florida**, Physics Department Seminar, Orlando, FL, March 2020 (*cancelled due to Covid-19*)
19. **Neurobiology of Drosophila Conference**, Cold Spring Harbor Laboratory, NY, Oct 2019.
20. **Neurobiology of Drosophila Conference**, Cold Spring Harbor Laboratory, NY, Oct 2017.
21. **Brown University Degree Day, panelist** Providence, RI, April 2016
22. **NYU Neuroscience Retreat** Mohonk, NY, April 2015
23. **Sense2Synapse Conference** New York, NY, April 2015

Talks and Poster Presentations

1. **The McKnight Conference**, technology demonstration, Aspen, CO (June 2024)
2. **Neurobiology of Drosophila Meeting**, Poster, Cold Spring Harbor Laboratory, NY (Oct 2023).
3. **The McKnight Conference**, technology demonstration, Aspen, CO (June 2023)
4. **Bioinspired Institute Annual Symposium**, Poster, Syracuse University (Oct 2023)
5. **COSYNE**, Poster, Denver, CO (March 2018).
6. **Neurobiology of Drosophila Meeting**, Poster, Cold Spring Harbor Laboratory, NY, 2015.
7. **American Physical Society (APS) March Meeting**, Talks, 2010, 2011, 2012, 2016.
8. **National Human Genome Research Institute grantee meeting**, Posters, (San Diego, CA), 2011, 2012, 2013.

Talks and Poster Presentations By Lab members

1. **Undergraduate Research Festival**, Syracuse University, NY (April 2024)
Katherine Monroe, Emma Snook, Liliana Germain, poster presentation
2. **10th Neuroscience research day**, Syracuse University, NY, poster presentations (April 2024)
 - a) Yiming Xu, *Behavioral variability of Drosophila larva under uni-and multi-sensory stimulation*
 - b) Derick Ramos, *Navigation of Drosophila larvae in taste gradients*
3. **APS March meeting**, Minneapolis, MN (March 2024), Yiming Xu
Behavioral variability of Drosophila larva under uni-and multi-sensory stimulation
4. **9th Neuroscience Research Day**, Poster presentation, Syracuse University, NY (April 2023).
5. **Undergraduate Research Festival**, Poster presentation, Syracuse University, NY (April 2023).

Service to the University

- 2025 (Jan) **CU*iP**: APS Conference for Undergraduate Women in Physics, Organizing Committee, Syracuse University, Syracuse, NY
- 2024- present **New Career Development Seminar Series: “All You Can Be with Your Degree”**, Organizer, conversation with guests from Academia, Industry and National Institutes provided students an opportunity to learn about various careers they can pursue.
- 2023 – 2024 Biology Department **Faculty Search Committee**, “Neuroscience and Aging”
- 2023 – 2024 Physics Department **Graduate Admissions** Committee
- 2023 – 2024 Physics Department **Community Building** Committee
- 2023 (Dec) Physics Department **Outreach Showcase** Colloquium (Organizer)
- 2022 – 2023 Physics Department **Colloquium Organization** Committee
- 2022 – 2023 Physics Department **Undergraduate Advising** Committee
- 2021 – 2022 Physics Department **Graduate Admissions** Committee
- 2021 – 2022 Physics Department **Strategic Planning** Committee

Served on Ph.D. thesis committees and the research oral examination committee:

- 2023 (Mar) Abrar Aljiboury, Ph.D. degree in Biology (Exam Chair)
- 2023 (Jun) Renita Benjamin Saldanha
- 2023 (May) Kevin Ching
- 2024 (May) Nuzhat Faiza Nufa
- 2024 (Sep) Oshani Fernando, University of Miami (External Committee Member)

Service to the Profession

- 2025 (Jan) **APS Conference for Undergraduate Women in Physics (CU*iP)**, Syracuse University, NY Organizing Committee
- 2024 (Apr) **10th Neuroscience Research Day**, Syracuse University, NY Organizing Committee (Co-Chair)
- 2024 (Mar) **NIH Study Section**, BRAIN Initiative program with focus on “Neural Circuits” Reviewer
- 2024 (Mar) **2nd Upstate NY Soft and Biological Matter Workshop**. Syracuse University, NY Organizing Committee, Syracuse University, NY
- 2024 (Mar) **APS March Meeting**, Biological Physics at the Organismal and Population Scale focus Session Chair
- 2024 (Mar) **APS March Meeting**, Physics of Neural Systems focus sessions, Minneapolis, MN Co-lead Organizer
- 2023 (Oct) **Bioinspired Institute Annual Symposium**, Syracuse University, NY Poster Judge
- 2023 (Mar) **Undergraduate RA SOURCE program**, Syracuse University, NY Grant Reviewer, Syracuse, NY
- 2023 (Apr) **9th Neuroscience Research Day**, Syracuse University, NY Organizing Committee

Service to the Community / Outreach

Syracuse University

- 2024 (Jul) **Syracuse University Physics High School Program (SURPh)** (6-week summer program)
Selection Committee and Mentor for two high-school summer student researchers
- 2024 (May) **Physics Department Syracuse City School District visit day**
Lab Tour Leader for ~200 high-school visitor (mostly URM)
- 2023 (Jan) **Panelist on “Lives that Speak: Stories of Women in Physics”**,
CUWiP: APS Conference for Undergraduate Women in Physics, Brown University, RI
- 2022 (May) **Research Seminar to Physics High School Teachers**,
Syracuse University Project Advance, Syracuse University, NY and New York, NY
- 2022 (Jun) **Physics Department outreach program**, Research Soundbite to high school students at
PSLA (Public Service Leadership Academy) @ Fowler High School

New York University, Department of Physics Outreach Program, New York, NY (2013)
NYU STEP volunteer, introduced high-school students to research projects in the Physics Department

Brown University, Department of Physics Outreach Program, Providence, RI (2009/2010)
Leader of Science Club at a Community school

Teaching

Syracuse University, Department of Physics, Syracuse, NY

- 2024 Spring PHY102 Major Concepts of Physics II
- 2024 Spring PHY690 Independent study
- 2023 Dec CSD754 Interdisciplinary Methods of Neuroscience (one-week guest lecturer)
- 2023 Fall PHY 451 Problems of Contemporary Physics
- 2023 Fall BIO460 Research in Biology
- 2023 Fall PHY690 Independent study
- 2023 Spring PHY102 Major Concepts of Physics II
- 2022 Fall PHY360 Vibrations, Waves and Optics
- 2022 Spring PHY102 Major Concepts of Physics II (*co-instructor*)
- 2022 Spring PHY690 Independent Study Course
- 2021 Fall PHY690 Independent Study Course:
“What can maggots teach us about neural computations?”

Brown University, School of Professional Studies, Pre-College Curriculum Summer Program:

- Designed and taught “The Tiniest Bits of Reality” (Summers 2009, 2011)
a 2-week 30-hour course on particle physics for high school students.
- Designed and taught “The Magical Inventions of Nikola Tesla” (Summers 2010, 2013)
a 1-week 15-hour course on basic concepts of electromagnetism for high school students.

Brown University, Department of Physics, Providence, RI (2007/2008)

Teaching Assistant for PHYS 50/70 and PHYS 60 Introductory Physics Labs

Mentoring

Syracuse University

Ph.D. students

- **Yiming Xu,** 2021-present
- **Derick Ramos,** APS bridge program, 2023-present

Undergraduate and Master students

- **Gil Raitzes,** MS Applied Data Science Summer 2024 – present
- **Daniella Yaa Sarfo,** Biology Major Summer 2024 – present
- **Riley Marie Parikh,** Psychology and Neuroscience double major Summer 2024 – present
- **Katherine Monroe,** Bioengineering and Neuroscience double major
SOURCE awardee for Fall 2022/Summer 2023 Fall 2022 – present
- **Emma Snook,** Biology major Fall 2023 – present
- **Emily Olech,** Biology and Neuroscience double major Spring 2023 – present
- **Kurt Schaeffer,** Biology major Spring 2023 – present
- **Olivia van Dyke,** Biology and Health Humanities double major Fall 2023 – present
- **Liliana Germain,** Neuroscience and Psychology double major Fall 2023 – present
- **Jadon Garofalo,** Physics and Neuroscience
SOURCE awardee for Summer/Fall 2023 Spring 2023 - Fall 2024
- **Sonia Julius,** Chemical Engineering and Psychology double major
SOURCE awardee for Spring/Summer 2023 Spring 2023 - Fall 2024
- **Dorian Lee Baker-Santoro,** Biology major Spring 2023
- **J Hrdy,** Biomedical Engineering major Fall 2023
- **Chloe Britton Naime,** Mech. Engineering and Neuroscience double major
SOURCE awardee for Summer/Fall 2022 Summer/Fall 2022

New York University, Co-mentored undergraduate and graduate students

- **Nathasha Egodage,** undergraduate, 2014-2016
- **Ruben Contreras,** undergraduate, 2014-2016
- **Ruben Gepner,** PhD. 2018
- **Doycho Karagyozov,** PhD. 2019
- **Amanda Lesar,** PhD. 2021
- **Akihiro Yamaguchi,** PhD. 2023
- **Paul McNulty,** PhD. 2024

Brown University, Co-directed senior thesis research

- **Nick Hagerty,** Senior Thesis, 2010
- **Erin Teich,** Senior Thesis, 2011
- **Karri Di Petrillo,** Senior Thesis, 2013
- **William Poole,** Senior Thesis, 2013

In the News

- [Leaders Redefining the Future of STEM](#)
(Jan 30, 2024)
- [Peek Into the Hidden World Inside of Cells](#)
(March 28, 2023)
Featuring bioimaging research technologies & Blatt Bioimaging Center at Syracuse University
- [Mihovilovic Skanata Awarded McKnight Neuroscience Grant](#)
(Oct 1 2022 and [McKnight Foundation feature](#) Aug 1, 2022)
This award will fund development of novel technology to image and manipulate neural activity.
- [New Faculty Spotlight](#)
(Dec 14, 2021)
- [The New York Academy of Sciences Magazine cover story](#)
(Spring 2016)