

## Curriculum Vitae

Mirna Mihovilovic Skanata

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### Education

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

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### Academic positions

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

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### Awards and Honors

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**NIH Maximizing Investigators' Research (MIRA) Award** (2023)  
**Physics Department Faculty Teaching Award**, Physics 102, Syracuse University (2023)  
**McKnight Technological Innovations in Neuroscience Award** (2022) ([SU News](#))

The New York Academy of Sciences Magazine, [cover story](#) (Spring 2016 issue)  
Helmsley Fellowship for CSHL Drosophila Neurobiology: Genes, Circuits and Behavior course (2016)  
Sigma Xi Award for Excellence in Research in Physics, Brown University (2014)

University of Oxford Fellowship for summer internship (2007, declined)  
CERN Summer Student Scholarship (2007)  
Croatian National Scholarship for Talented Students (2003-2007)  
Dean's Scholarship, University of Zagreb (2003, declined)

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## Professional societies

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American Physical Society  
The New York Academy of Sciences

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## Maternity Leave

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

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## Peer-Reviewed Publications

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[Google Scholar](#), h-index = 7

1. "Multi-neuronal recording in unrestrained animals with all acousto-optic random-access line-scanning two-photon microscopy",  
Yamaguchi A, Wu R, McNulty P, Karagyzov D, **Mihovilovic Skanata M** and Gershow M  
*Front. Neurosci.* **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 Karagyzov, Ellie Heckscher, Michael Krieg,  
Gavriil Tsechpenakis, Marc Gershow, W. Daniel Tracey Jr.,  
*Current Biology*, **2019**; 29 (6):945-956. PubMed PMID: [30853433](#) (**68 citations**)  
**Editor's highlight:** *Coordinated movements: watching proprioception unfold*
3. "Recording neural activity in unrestrained animals with 3D tracking two photon microscopy",  
Doycho Karagyzov\*, **Mirna M. Skanata\***, Amanda Lesar and Marc Gershow,  
*Cell Reports*, **2018**; 25, 1-13 (\*=co-first authors). PubMed PMID: [30380425](#) (**44 citations**)  
**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](#) (**23 citations**)  
**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](#) (**85 citations**)  
**Editor's highlight:** *In search of lost scent*
6. "Entropic Cages for Trapping DNA Near a Nanopore",  
Xu Liu, **Mirna Mihovilovic Skanata** and Derek Stein,  
*Nature Communications*, **2015**; 6, 6222. PubMed PMID: [25648853](#) (**71 citations**)  
**Press:** [BrownDailyHerald](#), [Science Daily](#), [NanoWerk](#)
7. "Statistics of DNA Capture by a Solid-State Nanopore",  
**Mirna Mihovilovic**, Nicholas Hagerty and Derek Stein,  
*Phys. Rev. Lett.* **2013**; 110(2): 028102. PubMed PMID: [23383940](#) (**115 citations**)  
**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](#) (**51 citations**)  
**Press:** IOP Science Lab Talk: *Electrified nanopores pick up where nature leaves off*)
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## In preparation

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"Dual-color volumetric two-photon imaging of neural activity throughout the brain of a freely crawling invertebrate", Paul McNulty, Rui Wu, Doycho Karagyozov, **Mirna M. Skanata\***, Marc Gershow \*  
**Movie:** [Dual-color recordings of neural activity in a moving animal](#)

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## Patent

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"Devices and methods for containing molecules",  
Derek Stein, Xu Liu, **Mirna Mihovilovic Skanata**, *US Patent 9810663*; 2017

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## Book Chapter

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"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](#)

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## Invited Lectures

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1. **Syracuse University, Bioinspired Institute**, MDD  
Syracuse, NY, September 2022
2. **Syracuse University, Neuroscience Research Day**  
Syracuse, NY, April 2022
3. **Project Advance (SUPA) Seminar** Syracuse University,  
New York City, April 2022 & Syracuse, May 2022
4. **Syracuse University**, Department of Biology Colloquium  
Syracuse, NY, April 2022
5. **UCLA**, Physics Department Seminar  
Virtually in Los Angeles, CA, March 2021
6. **EPFL** (École polytechnique fédérale de Lausanne), Physics Department Seminar,  
Virtually in Lausanne, Switzerland, February 2021
7. **Brown University**, Condensed Matter and Biological Physics Seminar,  
Providence, RI, November 2020
8. **University of Illinois Urbana-Champaign**, Biological Physics Seminar,  
Champaign, IL, February 2020
9. **University of Florida**, Condensed Matter and Biophysics Seminar,  
Gainesville, FL, February 2020
10. **Syracuse University**, Physics Department Colloquium,  
Syracuse, NY, February 2020
11. **Purdue University**, Biological Physics Seminar,  
West Lafayette, IN, March 2020
12. **Auburn University**, Physics Department Colloquium,  
Auburn, AL, February 2020

13. **Fordham University**, Neuroscience Seminar, New York, NY, February 2020
14. **University of New Mexico**, Physics Department Seminar, Albuquerque, NM, March 2020 (*cancelled due to Covid-19*)
15. **University of Central Florida**, Physics Department Seminar, Orlando, FL, March 2020 (*cancelled due to Covid-19*)
16. **Neurobiology of Drosophila Conference**, Cold Spring Harbor Laboratory, NY, Oct 2019.
17. **Behavioral Neurogenetics of Drosophila Larva** (Maggot Meeting) Edinburgh, Scotland, Oct 2018.
18. **Neurobiology of Drosophila Conference**, Cold Spring Harbor Laboratory, NY, Oct 2017.
19. **Brown University Degree Day, panelist** Providence, RI, April 2016
20. **NYU Neuroscience Retreat** Mohonk, NY, April 2015
21. **Sense2Synapse Conference** New York, NY, April 2015

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## Talks and Poster Presentations

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1. Neurobiology of Drosophila Meeting, Poster presentation, Cold Spring Harbor Laboratory, NY, 2023.
2. Undergraduate Research Festival, Poster presentation, Syracuse University, NY, 2023.
3. Neuroscience Research Day, Poster presentation, Syracuse University, NY, 2023.
4. COSYNE, Poster presentation, Denver, CO, 2018.
5. Neurobiology of Drosophila Meeting, Poster presentation (Cold Spring Harbor Laboratory, NY), 2015.
6. American Physical Society (APS) March Meeting, Talks, 2010, 2011, 2012, 2016.
7. National Human Genome Research Institute grantee meeting, Poster presentations, (San Diego, CA), 2011, 2012, 2013.

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## Research Grants

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### Current Grants

- McKnight Technological Innovations in Neuroscience Award, *“Two-photon tracking technology to read and manipulate neural patterns in freely moving animals”*, 08/2022-08/2024, PI, \$200,000.
- NIH Maximizing Investigators' Research Award (NIH MIRA, R35), *“Neural mechanisms underlying behavioral variability in uni- and multi-sensory contexts”*, 08/2023-08/2028, PI, \$1,682,000.

### Completed Grants

- The SOURCE, RA Undergraduate Fellowship, Syracuse University (Summer/Fall 2022), \$7,200 for two undergraduate students
- The SOURCE, RA Undergraduate Fellowships, Syracuse University (Spring/Summer 2023), \$7,200 for two undergraduate students
- Engaged Communities Network, Syracuse University, *“Syracuse University Research in Physics Summer High School Program”*, co-PI, \$5,000

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## Service to the Department

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1. Physics Department Graduate Admissions Committee, member, SU (2023/24 & 2021/22)
2. Community Committee, member (2023/24)
3. Physics Department Colloquium Committee, member, SU (2022/23)
4. Undergraduate Advising Committee, member, SU (2022/23)
5. Physics Department Planning Committee, member, SU (2021/22)
6. Served on the Ph.D. thesis committees of:
  - Abrar Aljiboury, Ph.D. degree in Biology, the exam Chair (March 2023)
7. Served on the oral examination committees of:
  - Renita Benjamin Saldanha (June 2023)
  - Kevin Ching (May 2023)

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## Service to the University and Scientific Community

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1. Co-organizer of Physics of Neural Systems focus sessions at APS March Meeting 2024
2. Member of a Faculty Search Committee in Biology with focus in neuroscience and aging (2023/2024)
3. Reviewer for the undergraduate SOURCE grants (Spring 2023)
4. Co-organizer of Neuroscience Research Day conference, Syracuse University (April 2023)

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## Teaching

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### **Syracuse University**, Department of Physics, Syracuse, NY

- PHY451 Problems of Contemporary Physics (Fall 2023)
- BCM460 Research in Biochemistry (Fall 2023)
- BIO460 Research in Biology (Fall 2023)
- PHY690 Independent study (Fall 2023)
- PHY102 Major Concepts of Physics II (Spring 2023)
- PHY360 Vibrations, Waves and Optics (Fall 2022)
- *Co-instructor* for PHY102 Major Concepts of Physics II (Spring 2022)
- PHY690 Independent Study Course: *“What can maggots teach us about neural computations?”* (Fall 2021/Spring 2022)

### **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

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## Outreach

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### **Syracuse University**

- CUWiP: APS Conference for Undergraduate Women in Physics: *“Lives that Speak – Stories of Women in Physics”*, panelist, Brown University, Providence, RI (January 2023)
- Research seminar to physics high school teachers for the Syracuse University’s Project Advance (NYC, April & Syracuse, May, 2022)

- Talk at PSLA (Public Service Leadership Academy) @ Fowler High School, as part of the Physics Department outreach program (June 2022)

**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*

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## Mentoring

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### **Syracuse University**

#### Ph.D. students

- Yiming Xu, 2022-present
- Derick Ramos, APS bridge program, 2023-present

#### Undergraduate students

- Katherine Monroe, Bioengineering and Neuroscience double major Fall 2022-present, *SOURCE awardee* for Fall 2022/Summer 2023
- Sonia Julius, Chemical Engineering and Psychology double major, Spring 2023-present, *SOURCE awardee* for Spring/Summer 2023
- Jadon Garofalo, Physics and Neuroscience, Spring 2023 - present, *SOURCE awardee* for Summer/Fall 2023
- Emily Olech, Biology and Neuroscience double major, Spring 2023 – present
- Kurt Schaeffer, Biology major, Spring 2023 - present
- J Hrdy, Biomedical Engineering major, Fall 2023 – present
- Emma Snook, Biology major, Fall 2023 – present
- Olivia van Dyke, Biology and Health Humanities double major, Fall 2023 - present
- Dorian Lee Baker-Santoro, Spring 2023
- Chloe Britton Naime, Mechanical Engineering and Neuroscience double major *SOURCE awardee* for Summer/Fall 2022