Curriculum Vitae Mirna Mihovilovic Skanata

Assistant Professor of Physics, Syracuse University
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140 Sims Drive, Syracuse, NY, United States

Education

Ph.D. Physics, **Brown University** (2014)
M.Sc. Physics, **Brown University** (2009)
B.Sc. Physics, **University of Zagreb**, Croatia, Faculty of Natural Sciences (2008)

Academic Positions

Syracuse University, NY
Assistant Professor of Physics (2021 – present)
Assistant Professor of Biology, by courtesy (2022 – present)
Faculty member, BioInspired Institute (2021 – present)
Faculty member, Graduate Neuroscience Concentration (2022 – present)

New York University, NY
Postdoctoral Researcher, Department of Physics, Center for Soft Matter Research (2014 – 2021)
Project: Cracking neural circuits of Drosophila larva, Advisor: Marc Gershow

Brown University, RI
Graduate Researcher, Department of Physics (2008 – 2014)
Thesis: The Statistics of DNA Capture and Re-capture by a Solid-state Nanopore, Advisor: Derek Stein

University of Zagreb, Croatia
Undergraduate Researcher, Department of Physics (2007)
Thesis: Flavor Mixing in the Neutral Kaon System, Advisor: Ivica Picek

CERN Summer Student Program, Switzerland
Undergraduate Researcher, CERN (Summer, 2006)
Project: Antiproton Cell Experiment for Cancer Treatment, Advisor: Dr. Michael Doser

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

2016 The New York Academy of Sciences Magazine, *cover story* (Spring issue)
2016 Helmsley Fellowship, CSHL Drosophila Neurobiology: Genes, Circuits and Behavior
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)

In the News

- Leaders Redefining the Future of STEM (Jan 30, 2024)
- Peek Into the Hidden World Inside of Cells (March 28, 2023)
  Features 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)

Professional Societies

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

Maternity Leave

- 2016/2017
- 2021

Peer-Reviewed Publications

Google Scholar, h-index = 7, NCBI Mirna Mihovilovic Skanata

1. CRASH2p: Closed-loop Two Photon Imaging in Freely Moving Drosophila, Paul McNulty, Rui Wu, Akihiro Yamaguchi, Ellie Heckscher, Andrew Haas, Amajindi Nwankpa, **Mirna M. Skanata***, Marc Gershow* **Bioarxiv**, 2024. & **Nature Communications 2025 (*co-corresponding author)**
   PMID: 38826435, PMCID: PMC11142166, DOI: 10.1101/2024.05.22.595209

2. 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.
   PMID: 37389365, PMCID: PMC10303936, DOI: 10.3389/fnins.2023.1135457

3. 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.
   PMID: 30853433, PMCID: PMC6884367, DOI: 10.1016/j.cub.2019.02.025

   Editor's highlight: *Coordinated movements: watching proprioception unfold*

4. 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. PMID: 30380425, PMCID: PMC6287944, DOI: 10.1016/j.celrep.2018.10.013 **(*=co-first author)**
Press: *Labrigger*

5. The nanopore mass spectrometer, Joseph Bush, William Maulbetsch, M Lepoitevin, Benjamin Wiener, **Mirna M. Skanata**, Wooyoung Moon, Cole Pruitt, and Derek Stein, **Review of Scientific Instruments**, 2017; 88(11), 113307. PMID: 29195372, PMCID: PMC5707180, DOI: 10.1063/1.4986043.

   Press: *Nanocapillary feeds ions directly into vacuum for mass spectrometry*

6. 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 author),** PMID: 25945916, PMCID: PMC4466338, DOI: 10.7554/eLife.06229.

   Editor's highlight*: In search of lost scent*

7. Entropic Cages for Trapping DNA Near a Nanopore, Xu Liu, **Mirna M. Skanata** and Derek Stein, **Nature Communications**, 2015; 6, 6222. PMID: 25648853, DOI: 10.1038/ncomms7222

   Press: *BrownDailyHerald, Science Daily, NanoWerk*

8. Statistics of DNA Capture by a Solid-State Nanopore, **M. Mihovilovic**, N. Hagerty and Derek Stein, **Phys. Rev. Lett.** 2013; 110(2): 028102. PMID: 23383940, DOI: 10.1103/PhysRevLett.110.028102

   Editor's highlight: *Through the eye of the needle*

   Press*: BrownNews, NSF News, Science Daily, GenNews, IEEE Spectrum, MaterialsToday*.

9. 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. PMID: 21339601, DOI: 10.1088/0953-8984/22/45/454114

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

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, Humana Press, Springer, New York; 2012. PMID: 22528268, DOI: 10.1007/978-1-61779-773-6_14

Research Grants

Current Support

2023 – 2028 **NIH Maximizing Investigators' Research Award (NIH MIRA, R35)**
Neural mechanisms underlying behavioral variability in uni- and multi-sensory contexts
PI, $1,682,000

2022 – 2025 **McKnight Technological Innovations in Neuroscience Award**
Two-photon tracking technology to read and manipulate neural patterns in freely moving animals, PI, $200,000

Undergraduate Research Support

2024 – 2025 **Matthew Pecot Undergraduate Research Fellowship**, The McKnight Foundation
to support Lil*iana Germain (Neuroscience and Psychology),* $16,500

2023 **The SOURCE, Syracuse University Undergraduate Research Fellowship**
to support undergraduate researchers Emma Snook (Biology) and Sonia Julius (Chemical Engineering and Psychology), $7,200 Spring & Summer

2022 **The SOURCE, Syracuse University Undergraduate Research Fellowship**
to support researchers Chloe B. Naime (Mechanical Engineering and Neuroscience) and Katherine Monroe (Biochemical Engineering), $7,200 for Summer & Fall

Pending Grant Applications

2024 **NIH/DHHS Subaward:** *Regulation of neural stem cells that restore feeding behavior in planarians*
PI: Carrie Adler, Cornell University, PD/PI: Mihovilovic Skanata, M.
Pending Request: $273,606, Date Submitted: September 20, 2024

2025 **NSF Collaborative Grant:** *BII: Beyond the Brain: Institute for Biological Memory and Learning Across Systems*
PI/co-PI: Jennifer Schwarz and Jennifer Ross with Team Leaders
Senior Personnel: Mirna Mihovilovic Skanata and others
Pending Request: $15 million, Date Submitted: 2/17/2025

Awards to Lab Members

2024 – 2025 **McKnight/Matthew Pecot Undergraduate Research Fellowship**
Liliana Germain (Psychology and Neuroscience), $16,500

2024 ***Korczynki-Lundgren Undergraduate Research Award****, Department of Biology*
Emma Snook (Biology), $5200, Summer & Fall 2024

2024 **The SOURCE, Syracuse University Undergraduate Research Fellowship**
Katherine Monroe (Bioengineering) and Emma Snook (Biology), $3,000, Spring

2023 **The SOURCE, Syracuse University Undergraduate Research Fellowship**
Jada Garofalo (Physics and Neuroscience), $4,200 for Summer & Fall

2022 **Summer Pre-Dissertation Scholarship**
Yiming Xu (Physics), $4,000, Summer

Invited Lectures

1. **2025 Soft Matter Gordon Research Conference: Squishy, Living, and Adaptive Matter**
   Colby-Sawyer College, New London, NH, scheduled for August **2025**.
2. **Cornell University**, Department of Molecular Medicine Seminar
   Ithaca, NY, scheduled for May **2025**.
3. **Princeton University,** Center for the Physics of Biological Function (CPBF) Seminar
   Princeton, NJ, December **2024**.
4. **130th Topical Symposium of the NY State Section of the APS**
   "Advances in Computational Physics and the Physics of Computation"
   SUNY Polytechnic Institute, Utica, NY, October **2024**.
5. **University of Miami,** Physics Department Colloquium,
   Miami, FL, October **2024**.
6. **2nd Upstate NY Soft and Biological Matter Workshop,**
   Syracuse University, NY, March **2024**.
7. **BioInspired Institute**, Mechanics of Development and Disease,
   Syracuse University, NY, March **2024**.
8. **Bioinspired Institute**, Mechanics of Development and Disease,
   Syracuse University, NY, September **2022**.
9. **8th Neuroscience Research Day,**
   Syracuse University, NY, April **2022**.
10. **Project Advance (SUPA) Seminar** Syracuse University,
    New York City, April 2022 & Syracuse, May **2022**.
11. **Syracuse University**, Department of Biology Colloquium,
    Syracuse, NY, April **2022**.
12. **UCLA**, Physics Department Seminar,
    Virtually in Los Angeles, CA, March 2021.
13. **EPFL** (École polytechnique fédérale de Lausanne), Physics Department Seminar,
    Virtually in Lausanne, Switzerland, February 2021.
14. **Brown University**, Condensed Matter and Biological Physics Seminar,
    Providence, RI, November 2020.
15. **University of Illinois Urbana-Champaign**, Biological Physics Seminar,
    Champaign, IL, February 2020.
16. **University of Florida**, Condensed Matter and Biophysics Seminar,
    Gainesville, FL, February 2020.
17. **Syracuse University**, Physics Department Colloquium,
    Syracuse, NY, February 2020.
18. **Purdue University**, Biological Physics Seminar,
    West Lafayette, IN, March 2020.
19. **Auburn University**, Physics Department Colloquium,
    Auburn, AL, February 2020.
20. **Fordham University**, Neuroscience Seminar,
    New York, NY, February 2020.

21. **University of New Mexico**, Physics Department Seminar, Albuquerque, NM, March 2020 (*cancelled due to Covid-19*)
22. **University of Central Florida**, Physics Department Seminar, Orlando, FL, March 2020 (*cancelled due to Covid-19*)
23. **Neurobiology of Drosophila Conference**, Cold Spring Harbor Laboratory, NY, October 2019.
24. **Neurobiology of Drosophila Conference,** Cold Spring Harbor Laboratory, NY, October 2017.
25. **Brown University Degree Day, panelist** Providence, RI, April 2016.
26. **NYU Neuroscience Retreat** Mohonk, NY, April 2015.
27. **Sense2Synapse Conference** New York, NY, April 2015.

Conferences and Meetings

1. **COSYNE Computational Neuroscience Conference**, *attendee*, Montreal, CA, March 2025
2. **The McKnight Grantee Conference** *Technology demonstration*, Aspen, CO, June 2024.
3. **Neurobiology of Drosophila Meeting** *Poster*, Cold Spring Harbor Laboratory, NY, October 2023.
4. **The McKnight Grantee Conference** *Technology demonstration*, Aspen, CO, June 2023.
5. **COSYNE, Computational and Systems Neuroscience** *Poster*, Denver, CO, March 2018.
6. **Neurobiology of Drosophila Meeting**, *Poster*, Cold Spring Harbor Laboratory, NY, October 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.

Lab Members' Conferences and Meetings Presentations

1. **APS Global Physics Summit,** *Talks by Yiming Xu and Derick Ramos* Anaheim, CA, March 2025
2. **130th Topical Symposium of the New York State Section of the American Physical Society:** "Advances in Computational Physics and the Physics of Computation"**,** *Poster presentations by Dr. Seongjin Park, Yiming Xu, Derick Ramos*, SUNY Polytechnic Institute, Utica, NY, October 2024.
3. **BioInspired Institute Annual Symposium**, *Flash talk by Dr. Seongjin Park and Poster presentations by: Yiming Xu (with Riley Parikh and Daniella Sarfo), Derick Ramos (with Emma Snook and Katherine Monroe), Dr. Seongjin Park*, Syracuse University, October 2024.

4. **Undergraduate Research Festival**, *Poster presentation: Katherine Monroe, Emma Snook, Liliana Germain*, Syracuse University, NY, April 2024.
5. **10th Neuroscience Research Day**, *Poster presentations: Yiming Xu and Derick Ramos (with Katherine Monroe, Emma Snook, Liliana Germain),* Syracuse University, NY, April 2024.
6. **APS March meeting**, *Talk, Yiming Xu*
   Minneapolis, MN, March 2024.
7. **Bioinspired Institute Annual Symposium**, *Poster presentation, Yiming Xu*
   Syracuse University, October 2023.
8. **9th Neuroscience Research Day**, *Poster presentation, Yiming Xu*
   Syracuse University, NY, April 2023.
9. **Undergraduate Research Festival,** *Poster presentation*,
   Syracuse University, NY, April 2023.

Service to the Profession

Conference Organizer

2025/03	**APS Global Physics Summit (April & March Meetings),** Anaheim, CA *Physics of Neural Systems Focus sessions* (Co-Organizer and Session Chair)
2025/01	**APS Conference for Undergraduate Women in Physics** (CU*iP), Syracuse University, NY (Organizing Committee)
2024/04	**10th Neuroscience Research Day** Syracuse University, NY (Co-Chair of Organizing Committee)
2024/03	**2nd Upstate NY Soft and Biological Matter Workshop,** Syracuse University, NY (Organizing Committee)
2024/03	**APS March Meeting,** Minneapolis, MN *Physics of Neural Systems Focus sessions* (Co-Organizer)
2023/03	**9th Neuroscience Research Day** Syracuse University, NY (Organizing Committee)

New Seminar Series Organizer

2025 *Spring* **BioSoft Bunch Lunch Seminar Series**, Syracuse University, NY (Organizer)
I organized a weekly lunch seminars where students and postdocs from biophysics and soft matter research groups in the Physics Department present their work. This provides an opportunity for the 60 members to learn about ongoing projects within our research community, exchange feedback and ideas on their projects, foster cross-lab collaborations and offer students valuable practice in presenting their work. This initiative aims to promote STEM education and community engagement.

2024 *Spring* **Career Development Seminar Series for Physics and Biology Students: "All You Can Be with Your Degree",** Syracuse University, NY (Organizer)
I organized a bi-weekly Career Development Seminar Series for students and postdocs, featuring guests from academia, industry, and national research institutes. The Biology and Physics students who attended the events were offered valuable

opportunities to connect with our guests, learn about diverse career paths in science, and gain insight into career options beyond academia.

Grant Reviewer

2024/03	**NIH Study Section** BRAIN Initiative program with focus on "Neural Circuits" (Reviewer)
202/03	**Undergraduate RA SOURCE program**, Syracuse University, NY (Reviewer)

Service to the University

2024-	**Neuroscience Executive Committee Member**
2024 – 2025	Physics Department **Graduate Admissions** Committee
2023 – 2024	Biology Department **Faculty Search Committee**, "Neuroscience and Aging"
2023 – 2024	Physics Department **Graduate Admissions** Committee
2023 – 2024	Physics Department **Community Building** Committee
2023/12	Physics Department **Outreach Showcase** Colloquium (Organizer)
2023/10	Bioinspired Institute **Annual Symposium**, Poster Judge
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

Thesis and Research Oral Exam Committee Member

2024/12	Emma Snook, B.S. Biology with distinction (Senior Thesis)
2024/10	Oshani Fernando, University of Miami (External Committee Member)
2024/05	Nuzhat Faiza Nufa (Research Exam)
2023/06	Renita Benjamin Saldanha (Research Exam)
2023/05	Kevin Ching (Research Exam)
2023/03	Abrar Aljiboury, Ph.D. degree in Biology (Thesis Exam Chair)

Community Outreach

2025/01	**Panelist on CU*iP,** APS Conference for Undergraduate Women and Gender Minorities in Physics Syracuse University, NY
2024/07	**Syracuse University Physics High School Program (SURPh)** Hosted high-school summer student researchers for the 6-week-long summer program: Jamie Triana, Lucy R Lombard, Abdirahman Ali
2024/05	**Department of Physics Syracuse City School District visit day** Lab Tour Leader for ~200 high-school visitor (mostly URM)

2023/01	**Panelist on "Lives that Speak: Stories of Women in Physics"** CUWiP: APS Conference for Undergraduate Women in Physics, Brown, RI
2022/05	**Research Seminar to Physics High School Teachers** Syracuse University Project Advance, Syracuse University, NY and New York, NY
2022/06	**Department of Physics Outreach Program, Syracuse University**, NY Research Soundbite to high school students at PSLA @ Fowler High School
2013/07	**Department of Physics Outreach Program, New York University**, New York, NY NYU STEP volunteer, introduced high-school students to research projects
2009 & 2010	**Department of Physics Outreach Program, Brown University**, Providence, RI Leader of Science Club at a Community school

Teaching

Syracuse University, Department of Physics

2025 *Spring*	PHY102 Major Concepts of Physics II
2024 *Spring*	PHY102 Major Concepts of Physics II
2023 *Fall*	PHY 451 Problems of Contemporary Physics
2023 *Spring*	PHY102 Major Concepts of Physics II
2022 *Fall*	PHY360 Vibrations, Waves and Optics
2022 *Spring*	Co-instructor PHY102 Major Concepts of Physics II

Syracuse University, Guest Lecturer and Independent Study Courses

2024 *Fall*	PHY 490 Independent study in Physics
2024 *Fall*	PHY 690 Independent study in Physics
2024 *Spring*	PHY 690 Independent study in Physics
2023 *Fall*	CSD 754 Interdisciplinary Methods of Neuroscience (one -week Guest Lecturer)
2023 Fall	BCM 460 Independent study in Biochemistry
2023 *Fall*	BIO 460 Research in Biology
2023 *Fall*	PHY 690 Independent study in Physics
2022 *Spring*	PHY 690 Independent Study in Physics
2021 *Fall*	PHY 690 Independent Study in Physics

Brown University, Providence, RI

2009 & 2011	Designed and taught summer school course "The Tiniest Bits of Reality" *a 2-week 30-hour course on particle physics for high school students,* School of Professional Studies, Pre-College Curriculum Summer Program.
2010 & 2013	Designed and taught summer school course "The Magical Inventions of Nikola Tesla" *a 1-week 15-hour course on basic concepts of electromagnetism for high school students,* School of Professional Studies, Pre-College Summer Program.
2007 & 2008	Teaching Assistant for PHYS 50/70 and PHYS 60 Introductory Physics Labs Department of Physics, Providence, RI.

Mentoring

Ph.D. and Post-graduate Students

1. **Yiming Xu (Physics)**, *Graduate Student* 2021 –
2. **Derick Ramos (Physics)**, *Graduate Student* 2023 –
3. **Gil Raitses (Applied Data Science)**, *M.Sc. Student* 2024 *Summer* –
4. **Emma Snook (B.Sc. Biology)**, *Research Technician* 2025 –

Undergraduate Students

1. **Emma Snook (Biology)**, Senior Thesis 2023 – 2024
   Korczynki-Lundgren Undergraduate Research Award (2024)
   SOURCE awardee (Spring 2023)
   Independent study in Biology BIO460 (Fall 2023)
2. **Katherine Monroe (Bioengineering)** 2022 *Fall* –
   SOURCE awardee (Fall 2022 & Summer 2023)
3. **Liliana Germain (Psychology and Neuroscience)** 2023 *Fall* –
   McNair Scholar (2023/2024)
   Matthew Pecot/McKnight research fellowship (2024/2025)
4. **Olivia van Dyke (Biology and Health Humanities)** 2023 *Fall* –
5. **Emily Olech (Biology and Neuroscience**) 2023 *Spring* –
   Independent study in Biochemistry BCM460 (Fall 2023)
6. **Kurt Schaeffer (Biology)** 2023 *Spring* –
7. **Daniella Yaa Sarfo (Economics)** 2024 *Summer* –
   SOURCE awardee (Summer 2024)
8. **Riley Marie Parik (Psychology and Neuroscience**) 2024 *Summer* –
   SOURCE awardee (Summer 2024)
9. **Zixuan Miao (Physics)** 2024 *Fall* –
   Independent study in Physics PHY490 (Fall 2024)
10. **Ren Monegro (Biology)** 2024 *Fall* –

Alumni

1. Jadon Garofalo (Physics and Neuroscience) 2023 – 2024
   SOURCE awardee (Summer & Fall 2023)
2. Sonia Julius (Chemical Engineering and Psychology) 2023 - 2024
   SOURCE awardee (Spring & Summer 2023)
3. Dorian Lee Baker-Santoro (Biology) 2023 *Spring*
4. J Hrdy (Biomedical Engineering) 2023 *Fall*
5. Chloe Britton Naime (Mech. Engineering and Neuroscience) 2022
   SOURCE awardee (Summer & Fall 2022)

High-school students

1. Jamie Triana 2024 *Summer*
2. Lucy R Lombard 2024 *Summer*
3. Abdirahman Ali 2024 *Summer*

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