Vladislav Belyy

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EDUCATION

Ph.D. **University of California, Berkeley** May 2016
Biophysics. Thesis advisor: Ahmet Yildiz
"Force Generation by Cytoplasmic Dynein and Development of PhotoGate Microscopy"

B.S. **University of Maryland, College Park** May 2010
Cell Biology and Molecular Genetics
Minors in Physics and French, High Honors in Biology

RESEARCH EXPERIENCE

Assistant Professor at The Ohio State University 2022 - present
Department of Chemistry and Biochemistry

Postdoctoral Fellow at University of California, San Francisco 2016 - 2022
Advisor: Peter Walter
Topic: *Oligomerization and activation mechanism of human IRE1α*

Graduate Student Researcher at University of California, Berkeley 2010 - 2016
Advisor: Ahmet Yildiz
Topic 1: *Mechanism of force production by cytoplasmic dynein*
Topic 2: *Development of new microscopy techniques for studying oligomerization*

Undergraduate Researcher at University of Maryland, College Park 2006 - 2010
Advisor: Sergei Sukharev
Topic: *Inactivation and attenuation pathways of mechanosensitive ion channels*

Intern at the National Institute on Aging 2005
Advisor: Kenneth Boheler
Topic: *Transcriptional control of stem cell differentiation*

INDEPENDENT FUNDING

R35 NIGMS Maximizing Investigators' Research (MIRA) Award (GM154813) 2024-2029
"*Molecular mechanisms of Eph receptor signaling*". **$1,221,000** (direct) over 5 yrs.

Seed Grant from the Center for RNA Biology at OSU 2024-2025
Collaborative pilot project with Damien Wilburn's lab, **$50,000** (direct) over 1 year.

Innovation Faculty Startup Award 2022-2026
Enterprise for Research, Innovation and Knowledge grant, **$200,000** (direct, 4 yrs)

K99/R00 NIGMS Pathway to Independence Award (GM138896) 2020-2024
"Investigating the mechanobiology of ER stress in the context of cell proliferation"

Damon Runyon Fellowship Award 2017-2020
Four years of full financial support for postdoctoral research

Hellman Graduate Award 2015
One year of full graduate research support for a continuing doctoral student

NSF Graduate Research Fellowship 2010-2014
Full financial support for 3 years of graduate research

PUBLICATIONS

Smith JW, Wilburn DB, **Belyy V.** Optogenetic Clustering of Human IRE1 Reveals Differential Regulation of Transcription and mRNA Splice Isoform Abundance by the UPR. bioRxiv 2025.07.16.665212; doi: https://doi.org/10.1101/2025.07.16.665212 (under review at JBC).

Belyy V, Zuazo-Gaztelu I, Alamban A, Ashkenazi A, Walter P. Endoplasmic reticulum stress activates human IRE1α through reversible assembly of inactive dimers into small oligomers. *eLife 11:e74342.* 2022.

Wang L, Toutkoushian H, **Belyy V**, Kokontis C, Walter P. Conserved structural elements specialize ATAD1 as a membrane protein extraction machine. *eLife* **11**:e73941. 2022.

Belyy V, Tran N, Walter P. Quantitative microscopy reveals dynamics and fate of clustered IRE1α. *Proc Natl Acad Sci*. 2020;117(3):1533-1542.

Ezber Y, **Belyy V**, Can S, Yildiz A. Dynein harnesses active fluctuations of microtubules for faster movement. *Nat Phys*. 2020;16(3):312-316.

Schoof M, Faust B, Saunders RA, Sangwan S, Rezelj V, et al. [53 other authors]. An ultrapotent synthetic nanobody neutralizes SARS-CoV-2 by stabilizing inactive Spike. *Science*. 2020;370(6523):1473-1479.

Göke A, Schrott S, Mizrak A, **Belyy V**, Osman C, Walter P. Mrx6 regulates mitochondrial DNA copy number in Saccharomyces cerevisiae by engaging the evolutionarily conserved Lon protease Pim1. *Mol Biol Cell*. 2020;31(7):527-545.

Belyy V, Shih S-M, Bandaria J, Huang Y, Lawrence RE, Zoncu R, and Yildiz A. PhotoGate microscopy to track single molecules in crowded environments. *Nat Commun*. 2017;8:13978.

Belyy V, Schlager MA, Foster H, Reimer AE, Carter AP, Yildiz A. The mammalian dynein–dynactin complex is a strong opponent to kinesin in a tug-of-war competition. *Nat Cell Biol*. 2016;18(9):1018-1024.

DeWitt MA, Cypranowska CA, Cleary FB, **Belyy V**, Yildiz A. The AAA3 domain of cytoplasmic dynein acts as a switch to facilitate microtubule release. *Nat Struct Mol Biol*. 2015;22(1):73-80.

Belyy V, Hendel NL, Chien A, Yildiz A. Cytoplasmic dynein transports cargos via load-sharing between the heads. *Nat Commun*. 2014;5:5544.

Cleary FB, Dewitt MA, Bilyard T, Htet ZM, **Belyy V**, Chan DD, Chang AY, and Yildiz A. Tension on the linker gates the ATP-dependent release of dynein from microtubules. *Nat Commun*. 2014;5:4587.

Kamaraju K, **Belyy V**, Rowe I, Anishkin A, Sukharev S. The pathway and spatial scale for MscS inactivation. *J Gen Physiol*. 2011;138(1):49-57.

Belyy V, Kamaraju K, Akitake B, Anishkin A, Sukharev S. Adaptive behavior of bacterial mechanosensitive channels is coupled to membrane mechanics. *J Gen Physiol*. 2010;135(6):641-652.

Belyy V, Anishkin A, Kamaraju K, Liu N, Sukharev S. The tension-transmitting "clutch" in the mechanosensitive channel MscS. *Nat Struct Mol Biol*. 2010;17(4):451-458.

Reviews and Book Chapters

Belyy V, Yildiz A. Studying the Mechanochemistry of Processive Cytoskeletal Motors With an Optical Trap. In: *Methods in Enzymology*. Vol 582. 1st ed. Elsevier Inc.; 2017:31-54.

Belyy V, Yildiz A. Processive cytoskeletal motors studied with single-molecule fluorescence techniques. *FEBS Lett*. 2014;588(19):3520-3525.

AWARDS AND FELLOWSHIPS

***(Finalist)* Damon Runyon-Rachleff Innovation Award** 2024
$800,000 early career award for supporting exceptionally creative cancer research

Dr. Elizabeth L. Gross Award for Faculty Excellence 2024
Student-selected award for mentorship (chosen by Biophysics graduate students)

FASEB SRC Poster Contest Winner 2021
Poster presentation award at the Endoplasmic Reticulum Conference (*online*)

Paul F. Cranefield Student Award 2011
One-time award of $2,000 and an invited talk at the annual SGP meeting

HHMI Undergraduate Research Fellowship 2007-2010
Financial support for research conducted in the Suhkarev Lab

University of Maryland President's Scholarship 2006-2010
Financial support for talented in-state undergraduates

Maryland Higher Education Commission Scholarship 2006-2010
Merit-based scholarship for in-state undergraduates

Capstone Research Presentation Award 2009
Maryland-HHMI award for travel to the Biophysical Society Meeting

Research poster competition winner, Maryland Bioscience Day 2007
Category: Biochemistry/Biophysics

National Institute on Aging Intramural Research Summer Internship 2005
Research conducted at the Laboratory of Cardiovascular Science

PRESENTATIONS

Talks

"A Biophysicist's Journey into Cell Signaling: Dissecting Receptor Oligomerization in the Endoplasmic Reticulum" *(invited talk).* Physics Colloquium at Cedarville University. March 27th, 2025.

"Deciphering the molecular mechanism and downstream effects of an endoplasmic reticulum stress sensor" *(invited talk).* Department of Biochemistry & Molecular Biology at Michigan State University. February 13th, 2025

"Zooming in on receptor oligomerization at the heart of ER stress signaling" *(invited talk).* Department of Chemistry seminar at Cleveland State University. September 13th, 2024.

"Dissecting ER stress signaling with single-molecule imaging and optogenetics" *(invited talk).* Joseph F. Foster Memorial Chemical Biology and Biochemistry Seminar at Purdue University. November 6th, 2023.

"A single-molecule look at stress receptor oligomerization" *(invited talk, selected by students). Life Sciences Interdisciplinary Graduate Programs Symposium.* Ohio State University. May 23, 2023.

*"*ER sentinels: receptor oligomerization at the core of the unfolded protein response" *(invited talk) Molecular Genetics Department Seminar.* Ohio State University. March 22, 2023.

"ER sentinels: receptor oligomerization at the core of the unfolded protein response" *(invited talk)*. Hong Kong University of Science and Technology LIFS seminar *(virtual)*. September 30th, 2022.

"ER sentinels: receptor oligomerization at the core of the unfolded protein response" *(invited talk)*. Biophysics Seminar at the University of Maryland, College Park *(virtual)*. April 12th, 2021.

"Human IRE1 is reversibly trapped in the cores of stress-induced clusters". Gordon Research Conference: Stress Proteins in Growth, Development and Disease, Lucca (Barga), Italy. June 23rd – 28th, 2019.

"PhotoGate Microscopy for Tracking Single Molecules in Crowded Environments". ASCB Annual Meeting, San Francisco, CA. Dec. 3rd-7th, 2016.

"Single-molecule insight into the activation of human dynein by adapter proteins" *(invited talk).* Biophysical Society 60th Annual Meeting, Los Angeles, CA. Feb. 27th – Mar. 2nd, 2016.

"Cytoplasmic dynein transports cargos via load-sharing between the heads". Single Molecule Biophysics Conference, Aspen, CO. Jan. 7th, 2015.

"Mind the membrane: lipid modulation of mechanosensitive channel gating" *(invited talk).* Society of General Physiologists 65th Annual Meeting, Woods Hole, MA. Sept. 10, 2011.

"The role of hydrophobic interhelical association in the adaptive gating mechanism of the mechanosensitive channel MscS". Biophysical Society 52rd Annual Meeting, Long Beach, CA. Mar. 2, 2008.

Posters

"Deciphering the molecular mechanism and downstream effects of the endoplasmic reticulum stress sensor IRE1". Cell Bio 24, ASCB|EMBO annual meeting, San Diego, CA. Dec. 14th-18th.

"Dissecting ER stress signaling with live-cell imaging and optogenetics". Biophysical Society 68th Annual Meeting, Philadelphia, PA. Feb 10-14, 2024.

"Single-molecule insight into ER stress sensor oligomerization" *(poster contest winner).* FASEB SRC: The Endoplasmic Reticulum Conference, online, June 22nd-24th, 2021.

"Probing the attenuation of IRE1 with optogenetics" *(poster)*. International Science and Friendship Symposium, Puerto Varas, Chile. Oct. 21st - 26th, 2018.

"Load-sharing mechanism of cytoplasmic dynein" *(poster)*. Biophysical Society 58th Annual Meeting, San Francisco, CA. Feb. 15-19, 2014.

"Adaptive behavior of bacterial mechanosensitive channels in excised patches is coupled to membrane mechanics" *(poster).* Biophysical Society 53rd Annual Meeting, Boston, MA. Mar. 2, 2009.

TEACHING EXPERIENCE

Department of Chemistry and Biochemistry, The Ohio State University, Spring 2023-present

- Instructor of record for the graduate-level course *Advanced Biochemistry: Macromolecular Structure and Function* (Approx. enrollment: 75 students. Semesters taught: AU2023, AU2024).
- Instructor of record for the undergraduate-level course *Biochemistry and Molecular Biology I* (Approx. enrollment: 70 students. Semesters taught: SP2023, SP2025).
- Breakout group moderator for ethics discussion, OSBP first-year orientation (OSBP7600. Semesters participated: AU2023)

Biophysics Graduate Group, University of California, Berkeley, Fall 2012

Creator and instructor of a student-led module course, *Introduction to LabVIEW*. Developed the curriculum and taught all 8 lectures of a hands-on workshop-style course on LabVIEW programming for graduate students and postdocs.

Department of Physics, University of California, Berkeley, Spring 2012

Graduate instructor for the upper division course, *Introduction to Molecular Biophysics*. Led discussion sections to clarify concepts in statistical mechanics, cellular energetics, and protein function.

SERVICE AND MENTORSHIP

LAB TRAINEES

Graduate students

2025-present	Katie Letsinger (Ohio State Biochemistry Ph.D. Program)
2024-present	James Alltop (Ohio State Biochemistry Ph.D. Program) Recipient of the Molecular Biophysics Training Program fellowship, 2024 Invited panelist at the international Katharine E. Welsh Symposium, 2024

2024-present Adalyn Brown (Molecular, Cell, and Developmental Biology Ph.D. Program)

2023-present Daisy Alvarado (Biophysics Ph.D. Program)
Recipient of the Biophysics Graduate Student Travel Award, 2025
Transferred to my lab from the Sotomayor lab due to their departure from OSU

2023-present Jacob Smith (Ohio State Biochemistry Ph.D. Program)
Recipient of the OSBP Graduate Student Travel Award, 2025
Oral presentation at Rustbelt RNA meeting in Huron, OH, 2025
Oral presentation at ASCB annual meeting in San Diego, CA, 2024
Oral presentation at Rustbelt RNA meeting in Newark, OH, 2024

2022-present Swapnil Mukherjee (Chemistry Ph.D. Program)
Poster presentation at Rustbelt RNA meeting in Huron, OH, 2025
Oral presentation at Dow Graduate Symposium in Columbus, OH, 2025
Recipient of the CBC Graduate Student Research Award, 2024
Recipient of the ASCB Travel Grant to attend the ASCB conference, 2024
Poster presentation at Biophysical Society Meeting in Philadelphia, PA, 2024
Poster presentation at ASCB annual meeting in San Diego, CA, 2024
Poster presentation at Rustbelt RNA meeting in Newark, OH, 2024

Undergraduate students

2025-present Asmita Barua (biochemistry major)
2024-present Pia Delouri (molecular genetics major)
2023-2024 Gwen Woodbury (biology major)
2022-2023 Nick Bittel (biochemistry major)

Visiting students and summer interns

2024 Nichole D. Rodriguez-Cornier (REU student from University of Puerto Rico)

Rotation students

2025 Katie Letsinger (Ohio State Biochemistry Ph.D. program)
2024 Yujia Xie (Ohio State Biochemistry Ph.D. program)
2024 Virginia Lopez (Ohio State Biochemistry Ph.D. program)
2024 Korey Kihm (Chemistry Ph.D. program)
2024 Shubham Mulay (Biophysics Ph.D. program)
2024 Kath Olson (Ohio State Biochemistry Ph.D. program)
2024 Michael Brandt (Ohio State Biochemistry Ph.D. program)
2023 Thaanya Amarasekara (Ohio State Biochemistry Ph.D. program)
2023 Stella Lai (Ohio State Biochemistry Ph.D. program)
2023 Sonali Pal (Ohio State Biochemistry Ph.D. program)
2023 Uxue Miranda Beitia (Molecular, Cell, and Developmental Biology Ph.D. program)
2023 Arshadul Hak (Biophysics Ph.D. program)
2023 Paul Nicolosi (Molecular, Cell, and Developmental Biology Ph.D. program)

GRADUATE STUDENT COMMITTEES

2024-present Paul Nicolosi (Wilburn lab, Molecular, Cell, and Dev. Biology Ph.D. program)

2024-present	Dylan Munson (Hadad lab, Chemistry Ph.D. program)
2023-present	Barbara Fornaciari (Kohler lab, Chemistry Ph.D. program)
2023-present	Madalyn Fields (Seveau lab, Biomedical Sciences Ph.D. program)
2023-2024	Mohamed Kourdassi* (Pei lab, Chemistry Ph.D. program)
2023-present	Nathen Zavada (Cole lab, Molecular Genetics Ph.D. program)
2023-present	Tasnin Nila (Musier-Forsyth lab, Chemistry Ph.D. program)
2023-present	Thaanya Amarasekara (Jackman lab, Ohio State Biochemistry Ph.D. program)
2022-present	Elizabeth Fosuah (Fu lab, Ohio State Biochemistry Ph.D. program)
2022-2023	Abigail Smith* (Schultz lab, Chemistry Ph.D. program)
2022-present	Brendan Harty (Pei lab, Chemistry Ph.D. program)

* Served on the candidacy committee only for these students, not the advisory committee.

DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY SERVICE

2024-present	**Strategic Planning Committee.** The committee is tasked with developing a strategic vision for hiring new faculty and advancing the research mission of the department.
2024-present	**First-year Biochemistry Oral Exam Committee.** Each first-year Ph.D. student in the biochemistry / chemical biology track is required to pass an oral exam in which they present and defend a research paper of their choice. Committee members evaluate the presentations over ~2 full days each year.
2023-2024	**Biochemistry Junior Faculty Search Committee**. Duties included reading and ranking all incoming applications, narrowing them down to a short list of candidates to interview, organizing and hosting interview visits, and eventually agreeing on a final ranking of interviewees.
2022-present	**Graduate Admissions Committee.** Duties include screening applications, selecting students for admission, and recruiting admitted students during visitation weekends on the OSU campus.
2022-present	**Division Seminar Coordinator.** Duties include inviting external and internal speakers at the weekly Biochemistry seminar series, managing the seminar schedule, handling visit logistics, and managing AV equipment.

UNIVERSITY AND COLLEGE SERVICE

2024-present	**Biotechnology Major Development Committee**. Task force for establishing a new undergraduate biotechnology major at OSU, including the development of the overall structure of the new major and new major-specific courses.

PROFESSIONAL SERVICE OUTSIDE OF OSU

2024-present	**Early-Career Reviewer for the Journal of Biological Chemistry**. Duties include routinely reviewing manuscripts in my area of expertise.

PROFESSIONAL DEVELOPMENT

2023	**Mentorship training: "**Mentoring Better" workshop organized by the CCTS (Center for Clinical & Translational Science) predoctoral T32 program, held in-person on September 7th, 2023.

2022-2023 **New Faculty FIT** (Foundation, Impact, Transformation) program, offered by the Drake Institute for Teaching and Learning. A small cohort-oritented peer-mentoring program for developing teaching skills.

SERVICE PRIOR TO JOINING OSU

2013 **Lead organizer of biophysics module courses,** Biophysics Graduate Group, University of California, Berkeley. Recruited volunteer teachers, advertised the offered courses to the broader campus community, and managed the administrative aspects of the student-led courses.

2011-2012 **Mentor for a group of high school students** from BayTech Bay Area Technology School, Oakland, CA, working on a 3-month research project on molecular motors. The student team went on to receive awards for their project at the following competitions: Alameda County Science and Engineering Fair (2^{nd} place), I-SWEEP International Sustainable World Energy Engineering Environment Project Olympiad in Houston, Texas (Bronze Medal, 2012), and International Environmental Project Olympiad in Istabul, Turkey (Bronze Medal, 2012).