

RIINA TEHVER, Ph.D.

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Denison University, Department of Physics and Astronomy
Granville, OH 43023

EDUCATION

THE PENNSYLVANIA STATE UNIVERSITY

University Park, PA

Ph.D. in Physics, 1999. Dissertation: Effective Interactions in Colloidal Suspensions

TARTU UNIVERSITY

Tartu, Estonia

B.S. in Physics *cum laude*, 1993

WESLEYAN UNIVERSITY

Middletown, CT

non-degree student, 1990-1991

ACADEMIC EMPLOYMENT, RESEARCH AND TEACHING EXPERIENCE

2010-present **DENISON UNIVERSITY**

Granville, OH

Associate Professor of Physics and Astronomy (2016-present),

Chair of Physics and Astronomy (2018-2021).

Assistant Professor of Physics and Astronomy (2010-2016).

Teaching across the physics curriculum

Mentoring undergraduate students in physics research

Conducting research in molecular machines and protein dynamics

2006-2010 **UNIVERSITY OF MARYLAND**

College Park, MD

Postdoctoral Research Fellow at the Institute for Physical Science and Technology.

Researching protein folding and dynamics

Generated research proposal to win a \$150k NIH fellowship as a Principal Investigator

Guest lectured introductory chemistry and graduate biophysics courses

Mentoring 2 junior team members

1993-1999 **THE PENNSYLVANIA STATE UNIVERSITY**

University Park, PA

Graduate Research Assistant/Graduate Teaching Assistant/Graduate Lecturer.

Researched complex fluids

Teaching assistant for undergraduate and graduate physics courses. Co-developed and taught a hands-on interactive course in undergraduate mechanics. Selected to teach a conceptual class of special relativity and quantum mechanics to humanities majors

Awarded the opportunity to lecture Physics 204 - calculus based thermodynamics, optics and modern physics for undergraduates; supervised 4 teaching assistants; class enrollment: 60 students.

NON-ACADEMIC EMPLOYMENT

2000-2006 **ELSTER ELECTRICITY, LLC**

Raleigh, NC

Elster Electricity, formerly ABB Electricity Metering, is a provider of advanced metering infrastructure.

Principal Software Engineer, Team Leader.

1999-2000 **ABB, INC - ELECTRIC SYSTEMS TECHNOLOGY INSTITUTE**
ABB is a Fortune 250 producer of industrial and utility electrical products.
Consulting R&D Engineer, Program Manager.

Raleigh, NC

FELLOWSHIPS AND AWARDS

J Reid Anderson Distinguished Professorship in Physics, Denison University, 2020-2025
Bartlett Family Pre-Tenure Fellow, Denison University, 2013-2014
Best Presenter award, Gordon Conference, "Protein Folding and Dynamics", 2008
Braddock Graduate Fellowship, Pennsylvania State University, 1998-1999
NASA Space Grant Fellowship, 1996-1997
Outstanding Teaching Award, Pennsylvania State University, 1995

AWARDED GRANTS

Robert C. Good Faculty Fellowship, "Modeling Myosin VI Stepping Dynamics and Load Induced Anchoring" 2021 (a semester leave from teaching)
DURF (Denison University Research Foundation), "How does myosin VI step? Connecting its structure and kinetics" 2015 (\$4886)
Cottrell College Science Award, Research Corporation, "The Structural Foundation of the Force Response of Molecular Motors" 2011-2014 (\$35,000)
Ruth L. Kirschstein National Research Service Award, the National Institutes of Health, "Molecular Basis for Protein Interactions with a Biological Nanomachine" 2007-2010 (approx. \$150,000)

PEER REVIEWED PUBLICATIONS

H. Vu, Z. Zhang, R. Tehver and D. Thirumalai. Plus and minus ends of microtubule respond asymmetrically to kinesin binding by a long range directionally driven allosteric mechanism. *Sci. Adv.* **8**, 15 (2022)

M. P. Grindle, B. Carter*, J.-P. Alao, K. Connors, R. Tehver and A. Kravats. Structural communication between the *E. coli* chaperones DnaK and Hsp90. *Int J Mol Sci.* **22**, 2200 (2021)

D. Hathcock, R. Tehver, M. Hinczewski and D. Thirumalai. Myosin V executes steps of variable length via structurally constrained diffusion. *eLife* 9:e51569 (2020)

M. Hinczewski, R. Tehver, and D. Thirumalai, Design principles governing the motility of myosin V, *PNAS* 110, E4059 (2013)
Research Highlight: A. Klopffer, "Walk the line", *Nature Physics* **9**, 692 (2013)

M. Jayasinghe, P. Shrestha, X. Wu, R. Tehver, G. Stan, Weak Intra-Ring Allosteric Communications of the Archaeal Chaperonin Thermosome Revealed by Normal Mode Analysis, *Biophys. J.* **103**, 1285 (2012)

R. Tehver, D. Thirumalai, Rigor to Post-Rigor Transition in Myosin V: Link between the Dynamics and the Supporting Architecture, *Structure* **18**, 471 (2010)
Research Highlight: R. Elber, "Watching Biomolecular Machines in Action", *Structure* **18**, 415 (2010)

R. Tehver, J. Chen, D. Thirumalai. Allostery Wiring Diagrams in the Transitions that Drive the GroEL Reaction Cycle, *J. Mol. Biol.* **387**, 390 (2009)

- R. Tehver, D. Thirumalai. Kinetic model for the coupling between allosteric transitions in GroEL and Substrate protein folding and aggregation. *J. Mol. Biol.* **384**, 1279 (2008)
- R. Tehver, A. Maritan, J. Koplik, J.R. Banavar. Depletion Forces in Hard-Sphere Colloids. *Physical Review E* **59**, R1339 (1999)
- R. Tehver, F. Ancilotto, F. Toigo, J. Koplik, J. R. Banavar. Absence of Many-Body Effects in Interactions Between Charged Colloidal Particles. *Physical Review E* **59**, R1335 (1999)
- R. Tehver, F. Toigo, J. Koplik, J. R. Banavar. Thermal Walls in Computer Simulations. *Physical Review E* **57**, R17 (1998)
- R. Tehver, M. W. Cole, A. Maritan, J. Koplik, J.R. Banavar. Impurity Solvation in Liquid. *Journal of Chemical Physics* **108**, 2104 (1998)
- M. G. Rozman, P. Reineker, R. Tehver. Scattering by Locally Periodic One-Dimensional Potentials. *Physics Letters A* **187**, 127 (1994)
- M. G. Rozman, P. Reineker, R. Tehver. One-Dimensional Scattering: Recurrence Relations and Differential Equations for Transmission and Reflection Amplitudes. *Physical Review A* **49**, 3310 (1994)
- * denotes a Denison University student

SCIENTIFIC PRESENTATIONS

- R. Tehver. Modelling the step size distribution of myosin VI. Invited talk presented at the American Physical Society March Meeting, Chicago, IL (March 2022)
- R. Tehver. Stepping along molecular motors. Physics seminar, Denison University (May 7, 2021)
- R. Tehver. What can minimal models teach us about molecular motors? Physics Seminar, Kenyon College (Nov. 8, 2019)
- R. Tehver. What can minimal models teach us about molecular motors? Biophysics seminar, Ohio State University (April 18, 2019)
- D. Hathcock, R. Tehver, M. Hinczewski and D. Thirumalai. Myosin V executes steps of variable length via structurally constrained diffusion. Poster presented at the American Physical Society March Meeting, Boston, MA (March 2019)
- R. Tehver. The effect of variable step size on myosin VI dynamics. Presented at the Stochastic Physics in Biology Gordon Conference, Los Angeles, CA (Jan. 2019)
- R. Tehver. Investigating Myosin VI Stepping Mechanism. Invited talk presented at the Ralph & Helen Oesper Symposium, University of Cincinnati, Cincinnati, OH (Nov. 9, 2018)
- R. Tehver. Walk the line: stepping along molecular motors. Denison Scientific Association (DSA) seminar, Denison University (November 1, 2017)
- R. Tehver. Modeling myosin VI stepping dynamics. Talk presented at the American Physical Society March Meeting, New Orleans, LA (March 2017)
- R. Tehver. Modeling Nature's Nano-Machines. Biology and Physics Seminar, Colgate University (March 7, 2017)
- R. Tehver, A. Jack*, I. Lowe*. A mechanochemical model for Myosin VI. Talk presented at the American Physical Society March Meeting, Baltimore, MD (March, 2016)
- A. Jack*, I. Lowe*, R. Tehver*. Modeling Hand-Over-Hand and Inchworm Steps in Myosin VI. Poster American Physical Society March Meeting, Baltimore, MD (March, 2016)

R. Tehver. A kinetic model for the stepping dynamics of myosin VI. Invited talk presented at ACS CERM 2016, Cincinnati, OH (May 2016)

Y. Yang*, I. Lowe*, R. Tehver. Minimal Mechanochemical Model for the Processivity of Myosin VI. Talk presented at the American Physical Society March Meeting, Denver, CO (March 2014)

I. Lowe*, Y. Yang*, R. Tehver. Computational Study of Force-Gating in Myosin VI. Poster, American Physical Society March Meeting, Denver, CO (March 2014)

R. Tehver. Modeling Nature's Nano-Machines. Colloquium, The College of Wooster (Nov. 5, 2013)

Y. Yang*, R. Tehver. Directional Mechanosensing in Myosin VI. Poster presented at the American Physical Society March Meeting, Baltimore, MD (March 2013)

R. Tehver. Predicting Allosteric Wiring Diagrams within Motor Proteins. Talk, American Physical Society March Meeting, Baltimore, MD (March 2013)

R. Tehver. Modeling Nature's Nano-Machines. Colloquium, Oberlin College (March 6, 2013)

R. Tehver, A. McCallister*. Testing the force response of the allosteric cycle of myosin VI. Poster presented at the Biophysical Society 56rd Annual Meeting, San Diego, CA (Feb 2012)

R. Tehver, D. Thirumalai, Allosteric Wiring Diagrams of Myosin V and VI. Poster presented at the Protein Folding Dynamics Gordon Conference, Ventura, CA (January 8-13, 2012)

R. Tehver, Modeling nature's nano-machines. Colloquium, Kenyon College (Feb. 17, 2012)

R. Tehver, Monkeying with molecular motors. Faculty Seminar, Denison University (Sept. 13, 2011)

R. Tehver, Modeling motor proteins: linking the dynamics and the supporting architecture. Colloquium, Wake Forest University (Apr. 13, 2011)

R. Tehver. Modeling nature's nano-machines. Seminar, Denison Scientific Association. (Feb. 23 2011)

R. Tehver. Mechanochemical models for motor proteins. Seminar, University of Maryland (Apr. 26, 2010)

R. Tehver. Myosin V Allosteric Link between the Dynamics and its Supporting Architecture. Talk presented at the Protein Folding Dynamics Gordon Conference, Ventura, CA (January 10-15, 2010)

R. Tehver, J. Chen, D. Thirumalai. Networks of Functional Residues in GroEL and GroES. Poster presented at the Biophysical Society 53rd Annual Meeting, Boston, MA (March 2009)

R. Tehver, J. Chen, D. Thirumalai. Structural and functional allostery wiring diagrams in GroEL/GroES. Presentation at the 2009 March Meeting of the American Physical Society, Pittsburgh, PA (March 2009)

R. Tehver, D. Thirumalai. Kinetic model for GroEL-assisted protein folding. Poster presented at the Gordon Research Conference "Protein Folding Dynamics" Ventura, CA (Jan. 2007)

R. Tehver. Effective Intercations and Collective Behavior of Colloidal Particles Presented at the 1998 March Meeting of the American Physical Society, Los Angeles, CA (March 1998)

R. Tehver, J.R. Banavar, A. Maritan, M. W. Cole. Computational Studies of Solvation Poster presented at the 2nd Annual PSU Materials Day, PSU, University Park, PA (Oct. 1995)

* denotes a Denison University student

STUDENT PROJECTS

Honors theses:

Ian Lowe, "Investigations into the effects of force on the dynamics of and phosphate release of myosin VI" (2015)
 Yubo Yang, "Minimal mechanochemical model for myosin VI processivity" (2014)

Projects:

- “Myosin VI actin binding domain causes controlled converter swing, increasing the rate of ADP to APO state transition”, Rae Furge’24 (2022)
- “Investigating the Robustness of Elastic Network Models”, James Rau’22 (2021)
- “How the Mechanical Properties of a System affect Myosin VI Stepping”, Charlotte Jaffe’24 (2021)
- “Myosin VI Point Mutation Responsible for Genetic Deafness Causes Critical Failure in Motors Dynamics”, Rae Furge’24 (2021)
- “How to build an efficient molecular motor: comparison of competing myosin VI models”, Joy Zhou’22 (2019)
- “Structural constraints on myosin V stepping dynamics”, Aditi Singh’22 (2019)
- “Elastic Network study to determine Functional Dynamics in Hsp90/Hsp70 Chaperone Complex”, Ben Carter’20 (2019)
- “Mechanochemical modeling of Myosin VI”, Amanda Jack’17 (2016)
- “Modeling Hand-Over-Hand and Inchworm Steps in Myosin VI”, Amanda Jack’17 (2015)
- “Investigating the stepping mechanism of myosin VI”, Ian Lowe’15 (2015)
- “Mechanochemical modelling of myosin VI” Ian Lowe ’15 (2014)
- “Optimizing computational analysis through massively parallel GPU computing” William Cornell’16 (2014)
- “Analyzing the robustness of structure-based dynamics in molecular motors” Amanda Jack’17 (2014)
- “Minimal requirements for directional processivity of myosin VI”, Yubo Yang’14 (2013)
- “Analysis of the force-dependent kinetics and biochemical makeup of myosin VI”, Ian Lowe ’15 (2013)
- “Determining the allosteric communication networks in the myosin family using statistical coupling analysis”, Abigail Chua ’15 (2013)
- “Constructing and simulating molecular motors”, Nikolaus Bachsoliani ’13 (2012)
- “Directional mechanosensing of myosin VI”, Yubo Yang’14 (2012)
- “A comparison of the force sensitivity of the Different allosteric states of myosin VI”, Ian Lowe ’15 (2012)
- “Effect of structural strain on myosin VI processivity”, Andrew McCallister ’12 (2011)
- “Protein dynamics with parallel processing”, Nikolaus Bachsoliani ’13 (2011)
- “Linking architecture and dynamics: a comparative study of myosin V & myosin VI by normal mode analysis”, Yubo Yang’14 (2011)

COURSES TAUGHT

PHYS 121 “General Physics I”, Fall 2010, Fall 2011, Fall 2012, Fall 2014, Fall 2015, Fall 2017 (double section), Fall 2021 (2 sections)

First course in a year-long calculus-based introductory physics sequence with a focus on mechanics, fluid dynamics, and thermodynamics. The course includes a laboratory.

PHYS 122 “General Physics II”, Spring 2011, Spring 2012, Spring 2015, Spring 2018, Spring 2019

Second course in a year-long calculus-based introductory physics sequence with a focus on electricity and magnetism, waves, and optics. The course includes a laboratory.

PHYS 126 “Principles of Physics II”, Spring 2013, Spring 2014, Spring 2021

In-depth introductory mechanics and thermodynamics course for physics and engineering majors. The course includes a laboratory component.

PHYS 127 “Principles of Physics III”, Fall 2020

In-depth introductory electricity and magnetism and optics course for physics and engineering majors. The course includes a laboratory component.

PHYS 201/ MATH 247 “Applied Mathematics of Physical Systems”, Spring 2014, 2015, Spring 2016, Spring 2019, Spring 2020, Spring 2021

Unified mathematical foundation for physics and engineering students. This course covers linear algebra, multivariable calculus, vector calculus, differential equations, and selected advanced topics. The course includes a computational component.

PHYS 306 “Electricity and Magnetism”, Spring 2011, Spring 2012

Junior/senior level course in electricity and magnetism. It includes boundary value problems, and radiation and waves.

PHYS 320 “Statistical and Thermal Physics”, Fall 2015, Fall 2017, Spring 2020

A junior/senior level course in classical and quantum statistical physics. Topics covered range from overview of thermodynamics of ideal gases to magnetic systems, Bose-Einstein condensates, and degenerate Fermi gases.

PHYS 330 “Introduction to Quantum Mechanics”, Fall 2010, Fall 2012, Fall 2014, Fall 2018, Fall 2019

A senior level course in quantum mechanics that covers wave function, mathematical formalism, solutions to the Schrödinger equation in 1 and 3 dimensions, perturbation theory, and interpretations of quantum mechanics.

PHYS 345/BIO356 “Physical Models for Molecular Systems”, Spring 2016

A new junior/senior level molecular biophysics course. Associated labs included molecular simulations of protein folding, calibrating optical tweezers, imaging structures using AFM, and learning the basics of NMR.

PHYS 361, “Directed Study”, PHYS 363, 364 “Independent Study” most semesters Fall 2015-present

Various projects and studies with individual students or small groups of students. The topics have varied from statistical physics to mathematical methods to individual research projects.

PHYS470 “Teaching Methods in Physics”, Fall 2011, Fall 2012

Discussion-based course that explores teaching tools and techniques.

AS-101 “Advising Seminar”, Fall 2015, Fall 2018, Fall 2020

Weekly seminar with first year students that explores personal goals within the context of liberal arts education.

PROFESSIONAL MEMBERSHIPS

Biophysical Society

American Physical Society

American Association of Physics Teachers

SERVICE

Organizer, “Molecular Machines” focus session, American Physical Society March Meeting, Las Vegas, NV (2023)

Chair, Department of Physics and Astronomy, Denison University (2018-2021)

June Orientation (June-O) advisor, Denison University (2012-2015, 2018-2022)

International June-O advisor, Denison University (2021, 2022)

Student Research Grants Committee, member (2019-2021)

Physics Department Comprehensive Exam Committee, chair (2018-2021)
Anderson Scholarship Committee, Denison University, member (2010-2013, 2017, 2019, 2020)
COVID Scholarship Working Group, member (2020)
Physics Department Search Committee, chair (2019)
GALI Institute (Fall 2018)
Physics Department Chairs Conference, American Center for Physics, College Park, MD (June 2018)
Student Enrollment and Retention Committee (SERC), Denison University, member (2012-2015), vice-chair (2012-2013), chair (2014-2015)
Physics Department Search Committee, member (2010-2012, 2015)
National Research Council (NRC) Committee for Anton Molecular Dynamics grant proposals (2013)
Denison Scientific Association (DSA) Co-Organizer (2011-2012)
Physics Department Comprehensive Exam Committee, member (2011, 2012)
Faculty Development Committee, Denison University, member (2011)
Chair, *Protein Folding Dynamics* Gordon Research Seminar, Ventura, CA Jan. 9-10, 2010
Reviewer, *Bioinformatics*, *Physical Review Letters*