

TUNA YILDIRIM, PhD

tuna.yildirim@asu.edu

Arizona State University, Department of Physics,
P.O.Box 871504, Tempe, AZ 85287-1504

Experience

- **Associate Teaching Professor**, July 2025 - Present
Arizona State University, Tempe, AZ, USA
Teaching Quantum Physics I, Math. Methods in Physics I & II,
General Physics, University Physics I & II, Hist. and Phil. of Science, Econophysics
- **Assistant Teaching Professor**, July 2022 - June 2025
Arizona State University, Tempe, AZ, USA
- **Instructor**, December 2020 - June 2022
Arizona State University, Tempe, AZ, USA
- **Faculty Associate**, January 2015 - December 2020
Arizona State University, Tempe, AZ, USA
- **Visiting Scholar**, August 2014 - May 2015
Beyond Center for Fundamental Concepts in Science,
Arizona State University, Tempe, AZ, USA
- **Teaching Assistant**, August 2007 - June 2014
University of Iowa, Iowa City, IA, USA

Education

- **The University of Iowa**, Iowa City, IA, USA
 - **PhD in Theoretical/Mathematical Physics** — December 2014
 - **MS in Physics** — December 2009
- **Hacettepe University**, Ankara, Turkey
 - **BS in Engineering Physics** — June 2006

Service

- **Faculty Advisor - The Philosopher's Guild** (2024 -)
- **Faculty Advisor - Scholars of Physical Mathematics at ASU** (2023 -)
- **Department of Physics – The Sundial Project – Early Start Program Faculty** (2022 - Present)
- **Department of Physics – Teaching Assistant Training** (2022 - Present)
- **Department of Physics – General Studies Course Committee** (2022 - Present)
- **Department of Physics – Assistant Teaching Professor Search Committee** (2026)
- **Department of Physics – Co-Design Council Committee** (2025)
- **Department of Physics – Instructional Professional Search Committee** (2024-2025)
- **Department of Physics – APS Climate Visit Committee** (2023-2024)
- **Department of Physics – Faculty Open Search Committee** (2022-2023)
- **Department of Physics – Teaching Faculty Search Committee** (2023)
- **Department of Physics – Lab Instructor Search Committee** (2022)
- **Department of Physics – Lab Manual Author – PHY114, PHY132, PHY252** - (2020)

Teaching Experience

Semester	Course Title	Course Number
Spring 2026	Quantum Physics I	PHY 314
Spring 2026	Mathematical Methods in Physics II	PHY 201
Spring 2026	University Physics II	PHY 131
Fall 2025	Quantum Physics I (Online)	PHY 314
Fall 2025	Econophysics	PHY 494 / 598
Fall 2025	University Physics II (Online)	PHY 131
Spring 2025	Quantum Physics I	PHY 314
Spring 2025	Mathematical Methods in Physics II	PHY 302
Spring 2025	History and Philosophy of Science	PHY 494 / 598
Fall 2024	Mathematical Methods in Physics I	PHY 201
Fall 2024	University Physics III (Online)	PHY 241
Fall 2024	University Physics II	PHY 131
Summer 2024	General Physics (Online)	PHY111
Spring 2024	Quantum Physics I	PHY 314
Spring 2024	Mathematical Methods in Physics II	PHY 302
Spring 2024	History and Philosophy of Science	PHY 494 / 598
Fall 2023	Mathematical Methods in Physics I	PHY 201
Fall 2023	Econophysics	PHY 494 / 598
Fall 2023	University Physics II	PHY 131
Summer 2023	General Physics (Online)	PHY111
Spring 2023	Quantum Physics I	PHY 314
Spring 2023	University Physics II	PHY 131
Spring 2023	University Physics I	PHY 121
Fall 2022	Econophysics	PHY 494 / 598
Fall 2022	University Physics II	PHY 131
Fall 2022	University Physics I	PHY 121
Spring 2022	Quantum Physics I	PHY 314
Spring 2022	University Physics II	PHY 131
Spring 2022	University Physics I	PHY 121

Semester	Course Title	Course Number
Fall 2021	Physics I	PHY 150
Fall 2021	University Physics II	PHY 131
Fall 2021	University Physics I	PHY 121
Spring 2021	General Physics	PHY 112
Spring 2021	University Physics I	PHY 121
Spring 2021	History and Philosophy of Science	PHY 494 / 598
Fall 2020	University Physics II	PHY 131
Fall 2020	University Physics I	PHY 121
Spring 2020	History and Philosophy of Science	PHY 494 / 598
Spring 2020	General Physics	PHY 112
Fall 2019	University Physics I (Active Learning)	PHY 121
Summer 2019	General Physics Lab	PHY 114
Spring 2019	University Physics I	PHY 121
Spring 2019	University Physics I (Active Learning)	PHY 121
Fall 2018	University Physics I (Active Learning) x 2	PHY 121
Spring 2018	University Physics I	PHY 121
Spring 2018	University Physics I (Active Learning)	PHY 121
Fall 2017	University Physics I (Active Learning) x 2	PHY 121
Summer 2017	General Physics	PHY 112
Summer 2017	General Physics Lab	PHY 114
Spring 2017	University Physics I (Active Learning) x 2	PHY 121
Fall 2016	University Physics I (Active Learning) x 2	PHY 121
Summer 2016	General Physics	PHY 112
Summer 2016	General Physics Lab	PHY 114
Spring 2016	University Physics I (Active Learning)	PHY 121
Fall 2015	University Physics I (Active Learning)	PHY 121
Summer 2015	General Physics	PHY 112
Spring 2015	University Physics I (Active Learning)	PHY 121

- PHY121 - University Physics I: 22 times (14 in active learning style)
- PHY131 - University Physics II: 9 times (1 online)
- PHY241 - University Physics III (Online): 1 time
- PHY314 - Quantum Physics: 6 times (3 in active learning style, 1 online)
- PHY201 - Mathematical Methods in Physics I: 3 times (active learning)
- PHY302 - Mathematical Methods in Physics II: 2 times (active learning)
- PHY112 - General Physics: 5 times
- PHY114 - General Physics Lab: 3 times
- PHY111 - General Physics (Online): 2 times
- PHY494/PHY598 - History and Philosophy of Science: 4 times
- PHY494/PHY598 - Econophysics: 3 times

Mentorship at Arizona State University

* The Sundial Project

- Faculty Facilitator - Summer Program (Early Start) (2022 -)

* Student Clubs Faculty Advisor

- The Philosopher's Guild (2024 -)
- Scholars of Physical Mathematics at ASU (2023 -)

* Teaching Assistant Mentorship

- Teaching Assistant Training (2022 -)

* Undergraduate Research Students

- **Eyan Weissbluth**, Arizona State University, 2024-2026
 - Research Project: “Impact of Philosophy of Science Classes on Learning in STEM Fields” (**Funded by NASA Space Grant**)
 - Learning Goals: Research Methods in Education Research
 - Research Project: “An Analysis of Historical Conceptions of Philosophy of Science: How Ideas of What Science Is Developed From the Enlightenment to the 20th Century” (**Honors Thesis**)
 - Learning Goals: 16th to 20th century philosophies of science
- **Lukas Domer**, Arizona State University, 2024-2026
 - Research Project: “Exploring Possible Elasticity Theory Applications in General Relativity” (**Honors Thesis**)
 - Learning Goals: Differential Geometry, General Relativity, Finite Strain Elasticity Theory
- **Joshua Cohon**, Arizona State University, 2024-2026
 - Research Project: Applications of Finite Strain Elasticity Theory in General Relativity
 - Learning Goals: Differential Geometry, General Relativity, Finite Strain Elasticity Theory
- **Matthew Fridman**, Arizona State University, 2024
 - Research Project: Applications of Finite Strain Elasticity Theory in General Relativity
 - Learning Goals: Differential Geometry, General Relativity, Finite Strain Elasticity Theory

* High-school Research Students

- **Dohyun Ku**, Basis Ahwatukee, 2022
 - Research Project: Econophysics, Philosophy of Science
 - Achieved Learning Goals: Stochastic Calculus, Different Schools of Economics, 20th century Philosophy of Science
 - Currently at UCLA double majoring in mathematics and economics

* Honors Enrichment Contracts

- **PHY314 - Quantum Physics I**
 - 2022: Grace Connolly, Katlynn Crowe
 - 2023: Hyung Seo Lee, Nicolas Renaud, David Boone
 - 2024: Madison Heldman, Lukas Domer, Erik Orson, Preston Yazzie
 - 2025: Eyan Weissbluth, Jack Condon, Jacob Stefanovski
 - 2026: Rajab El Make, Juan Martinez
- **PHY302 - Math. Methods in Physics II**
 - 2024: Lukas Domer
- **PHY494 - Special Topics: History and Philosophy of Science**
 - 2024: Jacqueline Lehner
- **PHY494 - Special Topics: Econophysics**
 - 2022: Tyler Forgacs
- **PHY131 - University Physics II**
 - 2022: Tanner Schultz
 - 2024: AJ Pinto, Harry Tomlinson, Rachel Linker, Elizabeth Biek, Arturo Delgado Navarro

Mentorship at The University of Iowa

* Undergraduate Students

- **Suzanne Squires**, The University of Iowa, 2010-2013
 - Research Project: Yang-Mills Theory and Chern-Simons Theory
 - Achieved Learning Goals: Geometric Quantization, Gauge Theory, Knot Theory
 - Currently Director at Rutgers University
- **Wade Bloomquist**, The University of Iowa, 2013
 - Research Project: Yang-Mills Theory and Chern-Simons Theory
 - Achieved Learning Goals: Geometric Quantization, Gauge Theory, Hamiltonian Methods
 - Currently Assistant Professor of Instruction at University of Iowa

* High-school Students

- **Hart Goldman**, The University of Iowa, 2010-2011
 - Research Project: Yang-Mills Theory and Chern-Simons Theory
 - Achieved Learning Goals: Geometric Quantization, Gauge Theory, Knot Theory
 - Currently Assistant Professor at University of Minnesota

Past Service

- **COGS - UE Local 896 (UIOWA Graduate Assistant Union)**
Red Area Stewart (2009-2010)
Member (2009-2014)
- **University of Iowa Hawkeyes on Science Outreach Program**
Participant (2008-2012)

Awards

- **Outstanding Teaching Professor Award in Natural Sciences** (April 2025)
- **2025-2026 Department of Physics Outstanding Faculty Award** (April 2026)

Workshops

- **AzAAPT** – ASU STEM Teacher Workshop, March 2024

Seminar and Colloquium Talks

- **Arizona State University** – “Chern-Simons Decomposition of 3D Gauge Theories at Large Distances”
Tempe, AZ, March 2015
- **Arizona State University** – “Topologically Massive Yang-Mills Theory and Link Invariants”
Tempe, AZ, September 2014
- **Arizona State University** – “A Review of Geometric Quantization”
Tempe, AZ, September 2014
- **Izmir Institute of Technology** – “Topologically Massive Yang-Mills Theory and Link Invariants”
Izmir, Turkey, July 2013
- **Middle East Technical University** – “Topologically Massive Yang-Mills Theory and Link Invariants”
Ankara, Turkey, July 2013
- **Coe College** – “Knot Theory and Physics”
Cedar Rapids, IA, March 2013

Conference Talks

- **String-Math 2014** – “Topologically Massive Yang-Mills Theory and Link Invariants”
Edmonton, AB, 9 - 13 June 2014
- **DPF Meeting 2013** – “Topologically Massive Yang-Mills Theory and Link Invariants”
Santa Cruz, CA, 13 - 17 August 2013
- **APS April Meeting 2013** – “Knot Theory and Topologically Massive Yang-Mills Theory”
Denver, CO, 13 - 16 April 2013
- **Miami 2012** – “Topologically Massive Yang-Mills Theory and Link Invariants”
Ft. Lauderdale, FL, 13 - 20 December 2012
- **XXV Midwest Theory Get-Together** – “Topologically Massive Yang-Mills Theory and Wilson Loops”
Argonne National Laboratory, Argonne, IL, 7-8 September 2012
- **Miami 2011** – “Geometric Quantization of Topologically Massive Yang-Mills Theory”
Ft. Lauderdale, FL, 15-20 December 2011

Publications

- **"Electrostatic forces and higher order curvature terms of Young-Laplace equation on nanobubble stability in water"**
Tuna Yildirim, Sudheera Yaparathne, John Graf, Sergi Garcia-Segura and Onur Apul
NPJ Clean Water (2022) 5:18, <https://www.nature.com/articles/s41545-022-00163-4>
- **"On Quantum Microstates in the Near Extremal, Near Horizon Kerr Geometry"**
Ananda Guneratne, Leo Rodriguez, Sujeev Wickramasekara, Tuna Yildirim
J. Phys.: Conf. Ser. 698 012010, 2016, [arXiv:1606.03341](https://arxiv.org/abs/1606.03341) [hep-th]
- **"Chern-Simons Splitting of 2+1D Gauge Theories"**
Tuna Yildirim
Proceedings of Symposia in Pure Mathematics (PSPUM), 2015, [arXiv:1506.08232](https://arxiv.org/abs/1506.08232) [math-ph]
- **"Topologically Massive Yang-Mills Theory and Link Invariants"**
Tuna Yildirim
Int. J. Mod. Phys. A, 30(7):1550034, 2015, [arXiv:1311.1853](https://arxiv.org/abs/1311.1853) [hep-th]
- **"Topologically Massive Yang-Mills Theory and Link Invariants"**
Tuna Yildirim
2014, Ph.D. Thesis, The University of Iowa, ir.uiowa.edu/etd/1519/, [arXiv:1412.4310](https://arxiv.org/abs/1412.4310) [hep-th]
- **"Chern-Simons Splitting of 2+1D Pure Yang-Mills Theory at Large Distances"**
Tuna Yildirim
2014, [arXiv:1410.8593](https://arxiv.org/abs/1410.8593) [hep-th]
- **"Near-Extremal Kerr AdS₂xS₂ Solution and Black-Hole/Near-Horizon-CFT Duality"**
Ananda Guneratne, Leo Rodriguez, Sujeev Wickramasekara, Tuna Yildirim
2012, [arXiv:1206.2261](https://arxiv.org/abs/1206.2261) [hep-th]
- **"A Near Horizon CFT Dual of Kerr-Newman-AdS"**
Bradly K. Button, Leo Rodriguez, Catherine A. Whiting and Tuna Yildirim
Int. J. Mod. Phys. A 26:3077-3090, 2011. [arXiv:1009.1661](https://arxiv.org/abs/1009.1661) [hep-th]
- **"Entropy and Temperature from Black-Hole/Near-Horizon-CFT Duality"**
Leo Rodriguez and Tuna Yildirim
Class. Quantum Grav. 27 155003, 2010. [arXiv:1003.0026](https://arxiv.org/abs/1003.0026) [hep-th]