TUNA YILDIRIM, PhD

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Arizona State University, Department of Physics,
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Experience

- **Arizona State University**, Tempe, AZ, USA
  Assistant Teaching Professor, July 2022 - Present
  Teaching Quantum Physics I, Math. Methods in Physics I & II, General Physics, University Physics I, II & III, Hist. and Phil. of Science, Econophysics
- **Arizona State University**, Tempe, AZ, USA
  Instructor, December 2020 - June 2022
  Taught Quantum Physics, General Physics, University Physics I & II, Hist. and Phil. of Science
- **Arizona State University**, Tempe, AZ, USA
  Faculty Associate, January 2015 - December 2020
  Taught General Physics, General Physics Lab, University Physics I & II, Hist. and Phil. of Science
- **Beyond Center for Fundamental Concepts in Science**,
  Arizona State University, Tempe, AZ, USA
  Visiting Scholar, August 2014 - May 2015
  Did research on theoretical high energy physics
- **The University of Iowa**, Iowa City, IA, USA
  Teaching Assistant, August 2007 - June 2014
  Taught Physics I Lab, Physics III Lab, Introductory Physics I Lab, College Physics I Lab, College Physics II Lab, Basic Physics Lab, Computational Physics, Quantum Gauge Theories, General Relativity and Cosmology

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 Physics Engineering** — June 2006

Service

- **Faculty Advisor - The Philosopher's Guild** (2024 -)
- **Faculty Advisor - Scholars of Physical Mathematics at ASU** (2023 -)
- **Department of Physics – General Studies Course Committee Member** (2022 -)
- **Department of Physics – The Sundial Project – Early Start Program Faculty** (2022 -)
- **Department of Physics – Teaching Assistant Training** (2022 -)
- **Department of Physics – Lab Instructor Search Committee Member** (2022)
- **Department of Physics – Faculty Open Search Committee Member** (2022-2023)
- **Department of Physics – Teaching Faculty Search Committee Member** (2023)
- **Department of Physics – Lab Manual Author – PHY114, PHY132, PHY252** - (2020)

Teaching Interests

Introductory Physics,
Electrodynamics,
Classical Mechanics,
Quantum Mechanics,
Special & General Relativity,
Quantum Field Theory,
Geometry and Topology in Physics,
Mathematical Methods in Physics,
Statistical Mechanics,
History and Philosophy of Science,
Econophysics

Research Skills

Physics

Quantum Field Theory,
General Relativity,
Geometric Quantization,
Gauge Theories, Black Holes,
Quantum Gravity,
Theory of Elasticity

Mathematics

Differential Geometry,
Symplectic Geometry,
Topology, Knot Theory,
Mathematical Physics

Computer/Programming

Mathematica, Latex

Languages

English (Bilingual), Turkish (Native),
Norwegian (Intermediate)

Interests

Drums (Rock and heavy metal),
Surfing, Skateboarding, Hiking

Other 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)
- **American Physical Society**
  Member (2013-2020)
- **Science Fiction and Fantasy Society of Hacettepe University**
  Vice President (2001-2003)

Publications

- **"Electrostatic forces and higher order curvature terms of Young–Laplace equation on nanobubble stability in water"**
  Tuna Yildirim, Sudheera Yaparatne, 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 [hep-th]
- **"Chern-Simons Splitting of 2+1D Gauge Theories"**
  Tuna Yildirim
  Proceedings of Symposia in Pure Mathematics (PSPUM), 2015, arXiv: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 [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 [hep-th]
- **"Chern-Simons Splitting of 2+1D Pure Yang-Mills Theory at Large Distances"**
  Tuna Yildirim
  2014, arXiv:1410.8593 [hep-th]
- **"Near-Extremal Kerr AdS2xS2 Solution and Black-Hole/Near-Horizion-CFT Duality"**
  Ananda Guneratne, Leo Rodriguez, Sujeev Wickramasekara, **Tuna Yildirim**
  2012, arXiv: 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 [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 [hep-th]

Teaching Experience

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

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

Students Mentored

✺ Undergraduate Students

- **Suzanne Carter,** The University of Iowa, 2010-2013
  — Research Project: Yang-Mills Theory and Chern-Simons Theory
  — Achieved Learning Goals: Geometric Quantization, Gauge Theory, Knot Theory
- **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

✺ Highschool 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
- **Dohyun Ku**, Arizona State University, 2022
  — Research Project: Econophysics, Philosophy of Science
  — Achieved Learning Goals: Stochastic Calculus, Different Schools of Economics, 20th century Philosophy of Science

Teaching Experience

Arizona State University		
Semester	**Course Title**	**Course Number**
Fall 2024	Mathematical Methods in Physics I	PHY 201
Fall 2024	University Physics III (Online)	PHY 241
Fall 2024	University Physics II	PHY 131
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
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

Arizona State University		
Semester	**Course Title**	**Course Number**
Spring 2019	University Physics I	PHY 121
Spring 2019	University Physics I (Active Learning)	PHY 121
Fall 2018	University Physics I (Active Learning)	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)	PHY 121
Summer 2017	General Physics	PHY 112
Summer 2017	General Physics Lab	PHY 114
Spring 2017	University Physics I (Active Learning)	PHY 121
Fall 2016	University Physics I (Active Learning)	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