Rizal F. Hariadi

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Education

2011 *Ph.D.* in Applied Physics.
California Institute of Technology.
Ph.D. thesis advisors: Erik Winfree, co-advised by Bernard Yurke.

2003 *B.S.* in Physics
B.S. in Biochemistry.
Washington State University.
Undergraduate thesis advisor: J. Thomas Dickinson.

Academic and professional experience

2024– Associate Professor
2016–2024 Assistant Professor

Department of Physics and the Biodesign Institute
Arizona State University
Other ASU affiliations:
(*i*) Biodesign Center for Molecular Design and Biomimetics (*ii*) Center for Biological Physics
Graduate faculty: (*iii*) School of Molecular Sciences (*iv*) School of Biological and Health Systems Engineering. **Affiliate faculty:** (*v*) Biodesign Center for Molecular Evolution, (*vi*) The Biomimicry Center, (*vii*) Global Security Initiative, (*viii*) Grand Challenges Scholars Program

2015– 2016 Postdoctoral Fellow (PI: Peng Yin)
Wyss Institute for Biologically–Inspired Engineering
Harvard University

2011– 2015 Postdoctoral Research Fellow (PI: Sivaraj Sivaramakrishnan)
Department of Cell and Developmental Biology
University of Michigan

Awards

At ASU

3 research awards, 1 teaching award.

2024 NSF CAREER.
2021 Outstanding Teaching Award, Department of Physics, Arizona State University.
2018 NIH Director's New Innovator Award (*with a perfect Impact Score of* 10).
2018 Arizona Biomedical Research Commission New Investigator Award.

Before ASU

2002 *Top 3*, LeRoy Apker Award, American Physics Society.
The highest award offered in the US for an undergraduate thesis in physics.

2002 *Honorable mentions*, 2002 All-American College Academic Team, USA Today.

Publications

At ASU

ASU mentees: undergraduate , postdoc/postbac/graduate student mentored by Hariadi

Under revision — I. F. Tengganu, S. Dey, D. Kishnan, and **R. F. Hariadi**, "A simple surface modification to generate atomically-flat and hydrophobic substrates for evaluating the activity of protein motors". [ChemRxiv]

Under review — G. B. M. Wisna, A. Saurabh, R. Sasmal, D. Karna, P. Chopade, S. Pressé, and **R. F. Hariadi**, "Multi-axial DNA origami force spectroscopy unlocks conformational dynamics hidden under single-axial tension". [bioRχiv]

Submitted — A. Saurabh, G. B. M. Wisna, M. Schwieger, **R. F. Hariadi**, and S. Pressé, "Bayesian nonparametrics for FRET using realistic integrative detectors". [bioRχiv]

In preparation — F. Djutanta, R. Kha, B. Yurke, and **R. F. Hariadi**, "Hydrodynamically–active oily ocean surface as a universal cradle for the emergence of life".

In preparation — N. Acharya, R. Sasmal, G. B. M. Wisna, S. Dey, Y. Liu, H. Yan, **R. F. Hariadi**, "Non-destructive, exogenous stain for membrane-enclosed oligonucleotides composed of cholesterol modified DNA nanostructure".

2025 G. B. M. Wisna, D. Sukhareva, J. Zhao, P. Chopade, D. Satyabola, M. Matthies, S. Roy, P Šulc, C. Wang, H. Yan, and **R. F. Hariadi**, "DNA origami cryptography in 2-D and 3-D space with improved detection and fast readout enabled by high-speed DNA-PAINT and unsupervised clustering". **Nature Communications** (2025) 16:11514, [Paper]

2025 P. Xia, D. Satyabola, Md A. R. Laskar, X. Zhou, G. B. M. Wisna, Y. Zhang, A. Ikbal, A. Kemeklis, A. E. Krylova, and **R. F. Hariadi**, H. Yan, and C. Wang, "DNA helix bundle-encoded multi-bit information readout by sapphire-supported nanopores", **Advanced Functional Material** (2025) e23998 [Paper]

2023 S. Pradhan, C. Swanson, C. Leff, I. Tengganu, Melissa H. Bergeman, Ian B. Hogue, and **R. F. Hariadi**, "Viral attachment blocking chimera composed of DNA origami and nanobody inhibits Pseudorabies virus infection *in vitro*". **ACS Nano** (2023) 17(23):23317-23330. [Paper]

2023 J. Sentosa, F. Djutanta, B. Horne, D. Showkeir, R. Rezvani, and **R. F. Hariadi**, "Gradient-mixing LEGO robots for purifying DNA origami nanostructures of multiple components by rate-zonal centrifugation". **PLOS ONE** (2023) 18(7): e0283134. [Paper]

2023 F. Djutanta°, P. Brown°, B. Nainggolan, Alexis Coullomb, S. Radhakrishnan, J. Sentosa, B. Yurke, and **R. F. Hariadi***, and D. Shepherd*, "Decoding the hydrodynamic properties of microscale helical propellers from Brownian fluctuations", **PNAS** (2023) 120 (22) e2220033120. [Paper]
°*Authors contributed equally.*
**Authors supervised equally.*

2022 X. Zhou, H. Liu, F. Djutanta, S. Jiang, X. Qi, L. Yu, D. Satyabola, S. Lin, **R. F. Hariadi**, Y. Liu, N. Woodbury, and H. Yan, "DNA–templated programmable excitonic wires for micron-scale exciton transport", **Chem**, (2022) 8(9), 2442-59. [Paper]

2022 Perspective D. Gandavadi and **R. F. Hariadi**, "The right shoe for the job", **Science** (2022) 375, 1089–1090. [Paper]

2022 Review S. Pradhan, A. Varsani, C. Leff, C. Swanson, and **R. F. Hariadi**, "Viral aggregation: The knowns and unknowns". **Viruses** 14(2), 438. [Paper]

2021 R. M. Shetty, S. Brady, P. W. K. Rothemund, **R. F. Hariadi***, and A. Gopinath*, "Bench-top fabrication of single-molecule nanoarrays by DNA origami Placement". **ACS Nano** (2021) 15(7) 11441–11450. [Paper]
**authors supervised equally.*

2019 L. Green, H. K. K. Subramanian, V. Mardanlou, J. Kim, **R. F. Hariadi**, and E. Franco, "Autonomous dynamic control of DNA nanostructure self-assembly", **Nature Chemistry** (2019) 11, 510–520. [Paper]

2019 I. Sgouralis, S. Madaan, F. Djutanta, R. Kha, **R. F. Hariadi**, and S. Pressé, "A Bayesian nonparametric approach to single-molecule FRET", **J. Phys Chem B.** (2019) 123(3), 675-688. [Paper]

2016 V. Mardanlou, L.N. Green, Hari K. K. Subramanian, **R. F. Hariadi**, J. Kim, and E. Franco, "A coarse-grained model of DNA nanotube population growth", **International Conference on DNA-Based Computers** (2016) 135–147. [Paper]

2016 **R. F. Hariadi***, A. Appukutty*, and S. Sivaramakrishnan, "Engineering circular gliding of actin filaments along myosin-patterned DNA nanotube rings to study long-term actin-myosin behaviors". **ACS Nano** (2016) 10(9), 8281–8288. [Paper]
**authors contributed equally.*

2016 R. F. Sommese, **R. F. Hariadi**, K. Kim, M. Liu, M. J.Tyska, M. A. Titus, S. Sivaramakrishnan, "Patterning protein complexes on DNA nanostructures using a GFP nanobody" (2016) **Protein Science**, 25(11), 2089–2094. [Paper]

Before ASU

2015 **R. F. Hariadi**, E. Winfree, and B. Yurke, "Determining hydrodynamic forces in bursting bubbles using DNA nanotube mechanics", **PNAS**, 2015, 112, E6086–E6095. [Paper]

2015 V. Verma, L. Mallik, **R. F. Hariadi**, S. Sivaramakrishnan, G. Skiniotis, A. P. Joglekar, "Using Protein Dimers to Maximize the Protein Hybridization Efficiency with Multisite DNA Origami Scaffolds", **PLoS One**, 2015 10(9): e0137125. [Paper]

2015 **R. F. Hariadi***, R. F. Sommesse*, A. Adhikari, R. Taylor, S. Sutton, J. Spudich, and S. Sivaramakrishnan, "Mechanical coordination in motor ensembles revealed using engineered artificial myosin filaments", **Nature Nanotechnology**, 2015, 10, 696–700. [Paper]
**authors contributed equally.*

2015 **R. F. Hariadi**, R. F. Sommesse, and S. Sivaramakrishnan, "Tuning myosin-driven transport on cellular actin networks", **eLIFE**, 2015, 4, e05472. [Paper]

2015 Y. H. Tee, T. Shemesh, V. Thiagarajan, **R. F. Hariadi**, K. L. Anderson, C. Page, N. Volkmann, D. Hanein, S. Sivaramakrishnan, M. Kozlov, and A. Bershadsky, "Cellular chirality arising from the self-organization of the actin cytoskeleton", **Nature Cell Biology**, 2015, 4(17), 445–457. [Paper]

2015 **R. F. Hariadi**, B. Yurke, and E. Winfree, "Thermodynamics and kinetics of DNA nanotube polymerization from single-filament measurements". **Chemical Science**, 2015, 6, 2252–2267. [Paper]

2014 **R. F. Hariadi**, M. Cale, and S. Sivaramakrishnan, "Myosin lever arm directs the emergence of collective movement patterns", **PNAS**, 2014, 1111, 4091–4096. [Paper]

2013 D. Y. Zhang*, **R. F. Hariadi***, H. M. T. Choi, and E. Winfree. "Integrating DNA strand displacement circuitry with DNA tile self-assembly", **Nature Communications**, 2013, 4, 1965. * *authors contributed equally.* [Paper]

2012 C. G. Evans, **R. F. Hariadi**, and E. Winfree, "Direct atomic force microscopy observation of DNA tile crystal growth at the single-molecule level", **JACS**, 2012, 134, 10485–10492. [Paper]

2010 **R. F. Hariadi** and B. Yurke, "Elongational-flow-induced scission of DNA nanotubes in laminar flow", **Physical Review E**, 2010, 82, 046307. [Paper]

2008 P. Yin, **R. F. Hariadi**, S. Sahu, H. M. T. Choi, S. H. Park, T. H. LaBean, and J. H. Reif, "Programming DNA tube circumference", **Science**, 2008, 321, 824–826. [Paper]

2007 K. Fujibayashi, **R. F. Hariadi**, S. H. Park, E. Winfree, and S. Murata, "Toward reliable algorithmic self-assembly of DNA tiles: a fixed-width cellular automaton pattern", **Nano Letters**, 2008, 8, 1791–1797. [Paper]

2002 **R. F. Hariadi**, S. C. Langford, and J.T. Dickinson, "Controlling nanometer-scale crystal growth on a model biomaterial with a scanning force microscope", **Langmuir**, 2002, 18, Issue 21, 7773–7776. [Paper]

2000 J. T. Dickinson, **R. F. Hariadi**, and S. C. Langford, "Mechanical detachment of nanometer particles strongly adhering to a substrate: an application of corrosive tribology", **Journal of Adhesion**, 74, 373–390.

1999 J. T. Dickinson, **R. F. Hariadi**, and S. C. Langford, "Nanometer scale investigations of chemical mechanical polishing mechanisms using scanning force microscopy," **Ceramics Transactions**, 102, 213–232.

1999 J.T. Dickinson, **R. F. Hariadi**, L. Scudiero, and S. C. Langford, "A scanning force microscope study of detachment of nanometer-sized particles from glass surfaces", **Tribology Letters**, 7, 113–119.

1999 **R. F. Hariadi**, S. C. Langford, and J.T. Dickinson, "Scanning force microscope observations of particle detachment from substrates: The role of water vapor in tribological debonding", **Journal of Applied Physics**, 1999, 86, 4885–489. [Paper]

Intellectual property

At ASU

Total: 19 patent applications and provisional applications filed.

2025 "Proximity-based split-initiator system for reducing background in nucleic acid amplification"
Co-inventors: R. Sasmal.
Application No. 63/906,911, *filed on October-28-2025.*

2024 "Methods of fabricating high-throughput arrays with customizable properties using silica microsphere assisted patterning"
Co-inventors: Prathamesh Chopade, Aaron Sakai, Deeksha Satyabola.

2024 "Compositions and methods related to imaging cancer cells"
Co-inventors: R. Sasmal.
Application No. 63/697,328, *filed on September-23-2024*.

2024 "Compositions and methods related to nucleic acid nanopores"
Co-inventors: R. Sasmal.
Application No. 63/663,231, *filed on September-23-2024*.

2024 "Compositions and methods related to removal of cholesterol-modified transmembrane sensors"
Co-inventors: R. Sasmal, Y. Hassan.
Application No. 63/663,231, *filed on 24-June-2024*.

2024 "DNA origami nanoarrays"
Co-inventor: P. Chopade.
Application No. 63/638,158, *filed on 24-Apr-2024*.

2023 "Enhanced transmembrane sensors and molecular amplifiers for lysis-free detection of intracellular targets"
Co-inventors: N. Acharya, C. Swanson.
SkySong invention ID: D23-228

2023 "Compositions and methods related to nucleic acid sensors"
Co-inventor: G. B. M. Wisna and R. Sasmal.
Application PCT/US23/63860, *filed on 03/07/2023*.

2023 "Flip-flop membrane spanning sensors and application thereof"
Co-inventor: N. Acharya.
SkySong Invention ID: D23-191, *filed on 03-06-2023*.

2023 "Applications for transmembrane DNA hairpin and duplex sensors – Localized Immune Response"
Co-inventor: C. Swanson.
SkySong Invention ID: D23-148, *filed on 01-12-2023*.

2023 "Applications for transmembrane DNA hairpin and duplex sensors – Bioimaging Invention"
Co-inventor: C. Swanson.
Application 63/580,879, *filed on 09-07-2023*.

2023 "Applications for transmembrane DNA hairpin and duplex sensors"
Co-inventor: C. Swanson.
SkySong Invention ID: D23-144, *filed on 01-04-2023*.

2023 "Delivery of a chemical entity, termed payload, across lipid membranes into cells or lipid compartments using a cholesterol-modified transmembrane DNA structure"
Co-inventor: C. Swanson.
SkySong Invention ID: D23-143, *filed on 01-02-2023*.

2022 "Compositions and methods related to multivalent binders for antiviral therapeutics"
Co-inventor: C. Swanson, Swechchha Pradhan.
U.S. provisional patent application No. 63/368,313, *filed on 07/13/2022*.

2020 "Transmembrane nanosensors and molecular amplifiers for lysis-free detection of intracellular targets."
Co-inventors: H. Yan, S. Dey, and C. Swanson.
U.S. provisional patent application No. 63/091,113, *filed on 10/13/2020*.

2020 "Transmembrane nanosensor arrays for rapid, ultra-sensitive and specific digital quantification of internal microRNA content of intact exosomes."

Co-inventors: H. Yan, S. Dey.
Application PCT/US2021/018371

2017 "Materials and methods relating to single molecule arrays."
Co-inventors: Rishabh Shetty (ASU), Ashwin Gopinath (MIT), Paul Rothemund (California Institute of Technology).
Application WO-2019108954-A1

Before ASU

2015 "Treatments using aggregation of target particles".
Co-inventor: C. Swanson.
AzTE Invention ID: D17-130, AzTE Technology ID: M17-161L.

2008 "DNA structures self-assembled from single-stranded DNA tiles: Chains, ribbons, and tubes",
Co-inventors: Peng Yin, Rizal F. Hariadi (California Institute of Technology),
Sudheer Sahu, Thomas H. LaBean, and John H. Reif (Duke University).
U.S. Provisional patent, *filed on March 24th, 2008*.

Talks

At ASU

Outside ASU

48 contributed & invited seminars/talks, e.g., MIT, Yale, Notre Dame, Georgia Tech, University of Michigan, Nature Conference, ACS, FNANO, and others.

3/26/2026	Upcoming Northern Arizona University. Invited
02/21–25/2026	Upcoming Biophysical Society meeting.
12/02/2025	26th Annual PI Meeting for the Innovative Molecular Analysis Technologies (IMAT) Program. Invited
10/21/2025	ASU–Mayo Clinic, Phoenix AZ. Invited
10/7/2025	Georgia Institute of Technology. Invited
10/01/2025	UIN Raden Fatah Palembang. Invited
09/26/2025	Biological Physics / Physical Biology (BPPB) virtual seminar series. Invited
08/20/2025	ACS Fall Meeting. Invited
06/10/2025	International Workshop on Molecular Cybernetics 2025. Invited
04/28/2025	22th Annual Conference on the Foundation of Nanoscience.
10/22/2024	Institute for Quantitative and Computational Biosciences, UCLA. Invited
10/04/2024	Biomimicry in Medicine, ASU. Invited
09/29/2024	Nanobiology Institute, Yale. Invited
09/20/2024	DNA30, Johns Hopkins University. Invited
01/17–18/2024	Phase A closeout and Phase B kickoff, IARPA, Washington DC.
08/31/2023	Department of Physics, Colloquium, Arizona State University.
07/10/2023	Universitas Indonesia. Invited
07/07/2023	Institut Teknologi Bandung. Invited
07/06/2023	Universitas Gajah Mada. Invited
06/05/2023	Build a Cell webinar.

3/3/2023 NanoRobotic Systems in Living Environments (RoSyLEn) Workshop, Ohio State University Invited

05/22–24/2023 SynCell 2023: International Conference on Engineering Synthetic Cells and Organelles.

05/2023 Phase A kickoff, IARPA, Washington DC.

04/2023 2023 Foundation of Nanoscience (FNANO), Snowbird, Utah. Invited

03/2/2023 Biophysics Program, Ohio State University. Invited

01/13/2023 Biophysics Program, University of Michigan. Invited

08/08/2022 DNA28: 28th International Conference on DNA Computing and Molecular Programming.

07/16/2022 American Society of Virology (AVS) 42nd Annual meeting

04/11/2022 2022 Foundation of Nanoscience (FNANO), Snowbird, Utah.

03/18/2022 American Physics Society March Meeting 2022

01/08/2022 Universitas Brawidjaya, Department of Physics. Invited

12/10/2021 University of Michigan–Dearborn, Department of Physics. Invited

12/2/2021 Missouri State University, Department of Physics, Astronomy, and Materials Science. Invited

9/20–21/2021 Research Institute of Nanoscience and Nanotechnology, Institut Teknologi Bandung, Indonesia. Invited

8/3/2021 Universitas Pertahanan RI. Invited

09/2020 Astrobiology Australasia Meeting. Virtual conference due to COVID–19 outbreak

09/2020 DNA26: 26th International Conference on DNA Computing and Molecular Programming. Virtual conference due to COVID–19 outbreak

04/2020 Foundation of Nanoscience 2020 (FNANO 2020), Snowbird, Utah. Virtual conference due to COVID–19 outbreak

01/19–24/2020 GRC: Origins of Life, Galveston, Texas.

05/22/2019 North Carolina State University, Department of Physics. Invited

05/19–22/2019 Nature Conference on Engineering Biology for Medicine. Invited

09/11/2018 University of Notre Dame, Department of Aerospace and Mechanical Engineering. Invited

05/05/2018 2018 BioPhest, the University of Arizona

12/05/2017 Massachusetts Institute of Technology, Modern Optics, and Spectroscopy seminar. Invited

04/10/2017 2017 Foundation of Nanoscience (FNANO), Snowbird, Utah. Invited

At ASU

01/26–27/2023 UBonn and ASU Virtual Symposium for Transdisciplinary Research Area Life and Health.

11/15/2022 Chalk talk at the Center for Biological Physics.

01/18/2019 2019 Regional Academic Collaboration Conference (ReACT) on Bio Security

11/06/2018 Chalk talk at the Center for Biological Physics.

02/05/2018 Chalk talk at the Biodesign Institute.

03/31/2017 School of Biological and Health Systems Engineering.

02/02/2017 Department of Physics.

Before ASU

02/25/2016 Department of Mechanical Engineering, Johns Hopkins University.

01/21/2016 Department of Physics, Washington University.

01/14/2016	Department of Physiology and Biophysics, University of Washington.
12/16/2015	Department of Physics, Arizona State University.
12/13/2015	2015 American Society for Cell Biology (ASCB) Annual Meeting, San Diego.
12/03/2015	Department of Physics and Brandeis Materials Research Science and Engineering Center, Brandeis.
08/18/2015	21st International Conference on DNA Computing and Molecular Programming, Cambridge, MA.
12/10/2014	2014 ASCB Annual Meeting, Philadelphia.
04/17/2014	2014 Foundation of Nanoscience (FNANO), Snowbird, Utah.
08/07/2013	Mechanobiology Institute, National University of Singapore.
08/05/2013	Munich DNA Node, München, Germany.
08/05/2013	Department of Physics, Ludwig-Maximilians-Universität, München, Germany.

Active collaborators (*alphabetical order*)

James W Canary	New York University.
Po-Lin Chiu	Arizona State University.
Joshua Hihath	Arizona State University.
Sivaraj Sivaramakrishnan	University of Minnesota.
Ruojie Sha	New York University
Petr Šulc	Arizona State University.
Xu Wang	Arizona State University.
Hao Yan	Arizona State University.
Sui Yang	Arizona State University.
Bernard Yurke	Boise State University.

Mentorship (>1 semester)

At ASU

Postdoctoral researchers: 8 advised; 2 secured faculty positions.

Postdocs	Deepak Karna	09/2024–**present**
	Prathamesh Chopade	01/2023–**present**
	Ranjan Sasmal	02/2022–**present**
	Nirbhik Acharya	04/2021–07/2023
	Amarnath Singam	12/2022–06/2023
	Tarushyam Mukherjee	01/2022–09/2022
	Daisuke Inoue (Next stop: Assistant Professor, Kyushu University)	10/2018–04/2019
	Tunjung Mahatmanto (Next stop: Lecturer at Universitas Brawijaya)	11/2016–6/2018
Visiting postdoc	Adi Wibowo	Summer–Fall 2017

Ph.D. Students: 6 advised; 5 graduated (2 moved to postdocs at Harvard, MIT/Caltech, 1 moved to industry, 1 is running a spin-off startup based on the science developed in the laboratory.)

Graduate students (*chronological order*)

- Rishabh Manoj Shetty (Next stop: postdoc at MIT and Caltech) — Spring 2017–Summer2019
- Swarup Dey (Next stop: postdoc at Harvard) — Summer 2017–Spring 2021
- Franky Djutanta (Next stop: Oxford NanoImaging) — Spring 2017–Summer 2022
- Swechchha Pradhan (Next stop: Exodigm Biosciences) — Spring 2020–Summer 2022
- Gde Bimananda Mahardika Wisna — Fall 2020–Summer 2025
- Shajeda Begum — Fall 2025–**present**

Undergraduate Students: >38 advised, 3 Goldwater scholars,
>16 moved on to graduate/medical/dental/law schools

Undergraduate students (*alphabetical order & ≤ 1 semester*)

- Michelle Anthony (*Next stop: M.D. student at U of Arizona*) — Spring 2018
- Indrajit Badvaram (*Next stop: Ph.D. student at Johns Hopkins*) — Summer 2017–Summer 2018
- Alonzo Beatty — Summer–Fall, 2019
- Sarah Brady — –Summer 2019
- Alexander DaSilva Barrett fellow at CLAS — Summer 2018
- Dustin Foote — Summer 2018–Spring 2019
- Jayant Gupta (*Next stop: M.D. student at Mayo Clinic*) — Summer 2022–Spring 2023
- Chase Hanson (*Next stop: Ph.D. student at UC Davis*) — Spring–Summer 2018
- Youssef Hassan — Summer 2022–Summer 2025
- Gabrielle Hirneise — Summer 2018–Spring 2019
- Jun S. Hong (*Next stop: dental student at the University of New England*) — Spring–Fall 2019
- Jae Woo Jeong — Spring 2024–Summer 2025
- Shineun Kang — Spring 2025–**present**
- Neil Karerakattil — Spring 2021–Summer 2022
- Rachael Kha (*Current position: Ph.D. student at MIT*) — –Summer 2019
- Maeve Kennedy (*Current position: M.D./Ph.D. at Baylor/Rice*) — Summer 2018–Summer 2019
- Joyce Kuang — Summer–Fall 2018
- Malikakhon Kuchkarova — Spring 2024–**Fall 2024**
- Eric Le — Spring 2017–Spring 2020
- Chloe Leff — Summer 2021
- Aidan McGirr (*Next stop: Law student at NYU*) — Fall 2018–Spring 2019
- Kenna McRae (*Next stop: Ph.D. student at UC Davis*) — Spring 2018
- Sritharini Radhakrishnan — Fall 2019–Summer 2022
- Christopher Ramirez (*Next stop: Ph.D. student at UC Davis*) — Summer 2018–Spring 2019
- Sri Ujjwal Reddy — Fall 2022–**present**
- Robert Rezvani (*Next stop: M.D. student at U of Arizona*) — Summer 2018–Spring 2019
- Rayhan Rizqi — Spring 2023–**present**
- Shuchi Sharma (*Next stop: M.D. student at Ohio State*) — Summer 2018
- Tal Sneh — Summer 2018–Spring 2021
- Sabrina Suhartono (*Next stop: programmer at Revature*) — Fall 2017–Spring 2019
- Daria Sukhareva (*Next stop: Ph.D. student at CU Boulder*) — Fall 2020–Spring 2023
- Tohma Taniguchi (*Next stop: Ph.D. student at ASU*) — Spring 2022–Spring 2023
- Bryan Ugaz (*Next stop: Ph.D. student at Stanford*) — May 2018–Spring 2019
- Ritvik Warrier — Fall 2021–Fall 2022
- Justin Wilson — Fall 2019–Spring 2020
- Sarah Xi — Spring 2020–Fall 2020
- Irene Zhang (*Next stop: Ph.D. student at U of Michigan*) — Fall 2018–Spring 2019
- Jonathan Zhao — Spring 2022–**present**

High-school students: 6 advised

High school students	Pranati Chintada (*Next stop: Caltech*)	Summer 2024–Spring 2025
	Anshuman Patel	Summer 2024
	Through ASU SCENE (Science and Engineering Experience) program	
	Adrian Kwiatkowski (Next stop: University of Chicago)	Fall 2018–Spring 2019
	Aliyapadi Biruni Hariadi (Next stop: Yale University)	Fall 2022–Spring 2023
	Leann Landkoff (Next stop: McGill University)	Fall 2022–Spring 2023
	Kavi Ullal (Next stop: Case Western University)	Fall 2022–Fall 2023

Visiting student researchers: 8 advised.

Visiting student researchers (*alphabetical order*)	Gaby Almira (*then at Osaka University*)	Summer 2017
	Isyatul Azizah (*then at Universitas Brawijaya*)	Summer–Fall 2017
	Emilio Bachtiar (*then at Johns Hopkins University*)	Summer 2017
	Anshuman Bakshi (*then at UC Berkeley*)	Summer 2017
	Johannes Hahmann (*then at RWTH Aachen University*)	Spring 2025
	Fania Feby Ramadhani (*then at Institut Teknologi Bandung*)	Summer 2017
	Jason Sentosa (*then at Georgia Institute of Technology*)	Summer 2019 & Summer 2020
	Isadonna Fortune Tengganu (*then at Surya University*)	Summer 2019
	– Next stop: graduate student at ASU SoLS (Advisor: Ke Hu)	
	Gde Bimananda Mahardika Wisna (*then at Institut Teknologi Bandung*)	Summer 2017
	– Next stop: graduate student in Hariadi lab at ASU Physics	

Before ASU

2012–2017	Leopold Green	University of California, Riverside.
2015–2016	Alexander Auer	Wyss Institute at Harvard.
2013–2016	Abhinav Appukutty	University of Michigan.
2014–2016	Neerja Garikipati	Huron High School, Ann Arbor.
2012–2014	Mario Cale	University of Michigan.
Fall 2013	James Song	University of Michigan.
2011–2012	Terrence Tigney	University of Michigan.
Summer 2007	Yudhistira Virgus	Institut Teknologi Bandung, Indonesia.

Mentored Trainee's Honors and Awards

At ASU

3 Goldwater scholars: M. Kennedy (2019), T. Sneh (2020), C. Leff (2023)
Graduate student fellowship: G. Wisna (2023; American Heart Association)
1 Gates Scholar, 1 U.S. Presidential Scholar: A. Kwiatkoswskii (2019)

International- & National-level

Spring 2023	Chloe Leff	Goldwater Scholar.
Spring 2023	Gde Bimananda Mahardika Wisna	American Heart Association predoctoral fellowship.

Spring 2020	Tal Sneh	Goldwater Scholar.
Spring 2020	Tal Sneh	2020 AAAS Best Student e-Poster Competition.
Spring 2019	Aidan McGirr	*National finalist*, Truman Scholar.
Spring 2019	Daisuke Inoue	Kazato Research Encouragement Prize.
Spring 2019	Maeve Kennedy	Goldwater Scholar.
Spring 2019	Adrian Kwiatkowski	U.S. Presidential Scholar in Career and Technical Education Program.
Spring 2019	Adrian Kwiatkowski	Gates Scholar.

State-level

Spring 2023	A. Biruni Hariadi	Flinn Scholar semifinalist. US Presidential Scholar finalist.
Spring 2019	Adrian Kwiatkowski	1st place Arizona Science and Engineering Fair (AzSEF) (Biochemistry category).

University-level

2024–2025	Sri Ujwall	Grand Challenge Scholars Research Stipend.
Spring 2021	Tal Sneh	2021 Chair's Distinguished Senior Awards
Spring 2020	Swarup Dey	ASU SMS Innovation award.
Spring 2020	Tal Sneh	Physics scholarship.
Spring 2019	Swarup Dey	The College Graduate Excellence Award.
Spring 2019	Chase Hanson	Wally Stoelzel scholarship.
Spring 2019	Chase Hanson	Department of Physics scholarship.
Spring 2019	Dustin Foote	Fulton Grand Challenge Scholars Program.
Spring 2019	Tal Sneh	2019 Fusion Best Poster Award.
Spring 2018	Rishabh Shetty	ASU SBHSE Merit Award.

Travel grants

10 travel grants.

Spring 2024	Gde Bimananda Mahardika Wisna	Biophysical Society meeting.
Spring 2024	Gde Bimananda Mahardika Wisna	Biodesign Travel Grant.
Summer 2022	Swechchha Pradhan	American Society of Virology 2022 Travel Award.
Spring 2022	Swechchha Pradhan	Biodesign Travel Grant.
Fall 2021	Franky Djutanta	Light-sheet microscope conference.
Spring 2020	Franky Djutanta	International Conference on Engineering Synthetic Cells and Organelles.
Spring 2020	Franky Djutanta	*Travel award*, Gordon Research Seminar: Origins of Life Registration Grant.
Spring 2020	Tal Sneh	AAAS *Travel Grant*.
Fall 2019	Tal Sneh	*Travel grant*, NSF Center for Engineering MechanoBiology.
Fall 2018	Swarup Dey	*Travel award*, Mechbio Conference 2018.

Before ASU

Summer 2015	Abhinav Appukutty	*Best poster*, 21st International Conference on DNA Computing and Molecular Programming, Harvard University, MA.

Teaching

At ASU

Courses: Undergraduate and graduate courses relating to thermodynamics, electromagnetism, optics, biophysics, soft matter, and laboratory work.
Ratings: as high as a perfect rating of 5/5 (PHY 472, Fall 2022) and evaluations stating "*Professor Hariadi is by far one of the best professors I've had at ASU. He is very organized and responds very quickly*" (PHY 112 student, Spring 2021).
Teaching award: 1 Outstanding Teaching Award, Department of Physics, ASU.

Fall {2017–2022}	PHY 472: "Advanced Biophysics Laboratory" *–New course developed at ASU.*
Spring {2021,2022,2023}	PHY 112: Physics II.
Spring {2018, 2019, 2020}	PHY 252: "Physics III" Wave physics, oscillations, harmonic systems, physical optics, thermodynamics, kinetic theory.
Fall 2016	PHY 598: "Biomolecular and Cellular Mechanics" *–New course developed at ASU.*

Before ASU

Winter 2006	BE/APh161, "Physical Biology of the Cell" California Institute of Technology. *Teaching assistant*, Course Instructor: Rob Phillips.

Teaching workshop

At ASU

8/1/2022	*Webinar speaker*, Examining graduate programs in Physics.
6/28–7/1/2021	New Faculty Workshop. Organized by the American Association of Physics Teachers (AAPT), the American Physical Society (APS), and the American Astronomical Society (AAS), College Park, MD.
07/13/2020	*Webinar speaker*, Active learning in Physics on the ground and online.
11/17–20/2016	New Faculty Workshop. Organized by the American Association of Physics Teachers (AAPT), the American Physical Society (APS), and the American Astronomical Society (AAS), College Park, MD.

Disciplinary service

At ASU

Referee: >15 journals, e.g., Nature, Science, others.
Grant reviewer: 4 funding agencies.
Guest editor: 1 edition.

Ad hoc referees	Nature, Science, Nature Communications, Science Advances, Communications Physics, Nucleic Acid Research, Angewandte Chemie, Accounts of Chemical Research, Nano Letters, Scientific Reports, Journal of the American Chemical Society, Langmuir, Trends in Analytical Chemistry, Nature Nanotechnology, International Conference on DNA Computing and Molecular Programming, Rapid Reviews: COVID-19, ACS Applied Nano Materials.
2025	*Proposal reviewer*, Army Research.
2025, 2023, 2022, 2021, 2018	*Proposal reviewer*, NSF.
2022	*Proposal reviewer*, The Wellcome Trust.
2021	*Proposal reviewer*, Department of Defense.
2019	*Proposal reviewer*, Human Frontier Science Program
2019	*Guest editor*, Journal of Visualized Experiments (JoVE) on Methods in structural and dynamic DNA nanotechnology.
2017–present	*Program committee*, International Conference on DNA Computing and Molecular Programming.
2017	*Organizing committee*, Biophest at ASU.

College and department-level service

At ASU

Various committees in the Department of Physics, School of Molecular Sciences, School of Life Sciences, Biodesign Institute, and on the thesis committees for >20 students.

2024–2025, 2020–2021	Graduate study committee, Department of Physics.
2023–2025	Colloquium committee, Department of Physics.
2021–2022, 2019–2020	Search committee for a faculty in the Department of Physics and Biodesign Center for Mechanisms of Evolution. – Search results: Failed search (2019–2020), Navish Wadhwa (2021–2022)
2018–2019	Search committee for a faculty in the Department of Physics with an emphasis in Experimental Biophysics. – Search outcome: Douglas Shepherd
2016–2017	Search committee for a faculty in the School of Molecular Sciences and Biodesign Center for Molecular Design and Biomimetics with an emphasis in Computational Physical Chemistry. – Search outcome: Petr Šulc
2023–2025	Colloquium committee, Department of Physics.
2023–2024	Biodesign 20th Anniversary.
2018, 2021, 2023	Organizing committee, Biodesign Center for Molecular Design and Biomimetics symposium.
2023	Fusion poster committee, Biodesign Institute

2022–2024	Chalk talk committee, Biodesign Institute.
2022–	Advisory Board, Biodesign Center for Mechanisms of Evolution.
2021–2022	Bylaws committee, Department of Physics.
2019–2020	General studies committee, Department of Physics.
2016–2018, 2022–2023	Exam committee, Department of Physics.

Community service and outreach

At ASU

10/03/2024	Grand Challenges for Engineering, *Guest lecturer*.
11/7/2023	
09/17–18/2024	PHY 194 *Guest lecturer*.
2016–	Science-inspired cartoons with a graphic illustrator (Sapto Cahyono).
07/18/2024	Nizamia Andalusia High school, *Guest lecturer*.
2025–	ASU archery club, *Advisor*.
2024–2025	Sun Devils Birdie, *Advisor*.
2023–	PERMIAS (Perhimpunan Mahasiswa Indonesia di Amerika Serikat), *Advisor*.
2023	BIOMOD, an annual biomolecular design competition for students, *Mentor and judge*.
2022–2023	ASU SCENE (SCience and ENgineering Experience), *Mentor*.
2022–2023	HYSA Robotics Club, *Treasurer*.
Summer 2022	BioSense Summer course, *Instructor*.
10/19/2022	Grand Challenges for Engineering, *Guest lecturer*.
06/13/2022	Migratory Student Summer Academy, hosted by the School of Transborder Studies, *Guest lecturer*.
02/23/2019	ASU Open Door 2019
01/30/2019	Biotechnology course, ASU Preparatory Academy, *Guest lecturer*.
2018–2019	ASU Scene, *Mentor*.
08/03–09/2018	2018 Asian Science Camp, Manado, Indonesia. *Steering committee (chair)* & *speaker*. – Attended by ∼250 students from 25 countries.
08/07/2018	Science outreach at Eben Haezar Catholic High School, Manado, Indonesia. – *Speaker*, alongside Ron Vale (then at the University of California, San Francisco).
05/11/2018	Career Day, Arizona Cultural Academy, *Speaker*.
02/23/2018	ASU Open Door 2018.
10/21/2017	Future Physics Sun Devil, Department of Physics, Arizona State University.
02/24/2017	Arizona State University Night of the Open Door 2017.
2017	BIOMOD, an annual biomolecular design competition for students. *Judge*.

Before ASU

2014	College 101, University of Michigan, *Instructor*.
09/22/2013	Webinar: How to apply to graduate schools in the US, *Speaker*
03/16–17/2012	Bridging International Cooperation between Indonesia and America, Washington, DC, *Conference Chair*.
07/16/2011	National Seminar of Science and Technology, Aceh, Indonesia, *Invited speaker*.
2011	Science outreach at Universitas Negeri Medan, Indonesia, *Speaker*.

2009 Science outreach at Satya Wacana Christian University, *Speaker*.
2009 Science outreach at Paramadina University, *Speaker*
2008 2008 Asian Science Camp, Bali, Indonesia, Invited speaker.
2008 Science outreach at Tugasku elementary school, Jakarta, Indonesia, *Speaker*.

Entrepreneurship

After employment at ASU

1 ASU startup.

2020– Exodigm Bioscience Inc.
Co−founder alongside Hao Yan and General Inception.
– Secured funding from IARPA (Intelligence Advanced Research Projects Activity).

Before ASU

2014–2015 ImmunoRodeo.
Co−founder, alongside Carter Swanson.
– *Semi finalist (1 of ∼70 semi finalists, out of >600 proposals)* in OneStart Competition.

Support

Internal funding

2019 Global Security Initiative (GSI), Arizona State University
$50,000
PI: Rizal F. Hariadi
(*i*) *Purchase of an FPLC and* (*ii*) *2-month support for a visiting scholar.*

Trainee funding (>$5K)

1 postdoc fellowship; 1 graduate student fellowship; 3 REU supplements.

2023–2025 American Heart Association (AHA) Predoctoral Fellowship
$ 65,106
PI: Gde Bimananda Mahardika Wisna (then: GRA Year 3)
Investigations of single-molecule integrin under tension using DNA origami multi-axial tension device

2024 National Science Foundation REU supplement
$20,000 for 2 REU students (Aaron Sakai and Kavi Ullal).

2023 National Science Foundation REU supplement
$16,000 for 2 REU students (Rayhan Rizqi and Youssef Hassan).

2022 National Science Foundation REU supplement.
$8,000 for 1 REU student (Ritvik Warrier).

2018–2020 Kazato Research Foundation.
¥ 2,000,000 (equivalent to ∼$ 15,000 in 2018)
PI: Daisuke Inoue (Postdoc Year 1)
Design of microtubule structure by DNA origami.

External funding

Total: 11 grants (3 NIH, 3 NSF, 1 ABRC, 1 Flinn Foundation, 1 DoD STEM, 1 DARPA, and 1 IARPA).
$15,654,174 in total funding
$8,229,283 to Hariadi = $5,146,862 administered by ASU + $2,311,460 from a grant administered by Exodigm Biosciences.

08/15/2025– HR0011-25-9-0218
Defense Advanced Research Projects Agency (DARPA)
CatalyTronix: A Nanoelectronic Artificial Ribosome
$4,044,982
PI: Joshua Hihath, Co-PIs: Rizal F. Hariadi **15%**
CatalyTronix: A Nanoelectronic Artificial Ribosome.

09/01/2025–08/31/2027 1R21GM160865-01
National Institutes of Health
$413,036
PI: Xu Wang, Co-I: Rizal F. Hariadi **40%**
Single Molecule Glycosaminoglycan Sequencing using Lysosomal Enzymes

02/01/2025–07/31/2026 24-17692
Flinn foundation
$100,000
PI: Rizal F. Hariadi **100%** = $100,000
Live-cell RNA detection probes for cell sorting and therapeutic applications

02/01/2024–01/31/2029 MCB 2341002
National Science Foundation
$1,099,951
PI: Rizal F. Hariadi **100%** = $1,099,951
CAREER: High-throughput multi-axial tension-inducing DNA origami device for investigating mechanosensitive signaling pathways and protein structures under defined tension.

05/01/2023−04/30/2026 1R61CA278558-01
National Institutes of Health, National Cancer Institute (NCI) Innovative Molecular Analysis Technologies (IMAT)
$706,500
PI: Hao Yan, Co-PI: Rizal F. Hariadi **50%** = $353,250
High-throughput, purification-free, and ultrasensitive transmembrane nanosensor arrays for digital counting of microRNA biomarkers of intact exosomes.

11/01/2022–10/31/2025
2227650
National Science Foundation
$1,500,000
PI: Hao Yan, Co-PIs: (*i*) Rizal F. Hariadi **25% = $375,000** (*ii*) Petr Šůlc and (*iii*) Sui Yang
SemiSynBio-III: DNA templated chiral metamaterials for information storage.

09/01/2021–8/31/2024
Completed
HQ00342110007
Department of Defense
$1,399,584
PI: Abhishek Singharoy, Co-Is: Rizal F. Hariadi **10% ∼ $140,000** + 7 other Co-Is.
National Defense Education Program: A zero-cost online biotechnology program for middle and high schools.

10/01/2020–09/30/2023
Completed
2027215
National Science Foundation
$1,500,000
PI: Hao Yan, Co-PIs: (*i*) Rizal F. Hariadi **33% = $500,000** and (*ii*) Chao Wang
SemiSynBio II: DNA-based memory for high-density information storage and molecular cryptography with fast readout methods.

09/30/2018–08/30/2023
Completed
1DP2AI144247–01
National Institutes of Health Director's New Innovator Award
$2,353,661
PI: Rizal F. Hariadi **100% = $2,353,661**
Nanoscale reconstruction of mechanical systems involved in disease pathogenesis.

04/01/2018–03/31/2021
Completed
ADHS17-00007401
Arizona Biomedical Research Commission (ABRC) New Investigator Award
$225,000
PI: Rizal F. Hariadi **100% = $225,000**
An ultra-sensitive and low-cost diagnostic for valley fever.

Funding administered by Exodigm Biosciences, Inc.

06/2023–06/2025
Completed
N6600123C4504
Intelligence Advanced Research Projects Activity (IARPA)
$2,311,460
PI: Rizal F. Hariadi **100% = $2,311,460**
Transmembrane nanosensors for live cell genotyping and enrichment.