# Rizal F. Hariadi

rhariadi@asu.edu
+1-626-376-8638
rizalhariadi.com

## 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** in (*i*) School of Molecular Sciences (*ii*) School of Biological and Health Systems Engineering. **Affiliate faculty** in (*i*) Biodesign Center for Molecular Evolution, (*ii*) The Biomimicry Center, (*iii*) Global Security Initiative, (*iv*) 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 Physical 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

**Total**: 32 publications (31 published + 1 in press), including Science, Nature Nanotechnology, Nature Chemistry, Nature Cell Biology, PNAS, and Nature Communications.
Plus 8 manuscripts under review, submitted, or in preparation.

### At ASU

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

Under revision — I. F. Tengganu, S. Dey, D. Krishnan, and **R. F. Hariadi**, "A simple surface modification to generate atomically-flat and hydrophobic substrates for evaluating the activity of protein motors". ChemR$\chi$iv

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". bioR$\chi$iv

Submitted — D. Satyabola, S. Feng, P. Chopade, A. Prasad, L. Wang, N. Bamrah, L. Chen, S. Roy, A. Sakai, C. Wang, P. Šulc, **R. F. Hariadi**, H. Yan, and S. Yang, "DNA-templated chiral metamaterial array as information bits". bioR$\chi$iv

Submitted — P. Chopade, W. Xiong, J. C. Mergo, A. Bhattacharjee, H. Lisabeth, **R. F. Hariadi**, L. Zepeda, M. Upmanyu, and J. Seto, "Dynamic molecular templating of the crystalline phase: Amorphous-to-crystalline transformation through oriented phase selection of $CaCO_3$ at the interface".

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".

In preparation — G. B. M. Wisna, R. Sasmal, N. Acharya, and **R. F. Hariadi**, "DNA strand displacement surrounded by lipid bilayer for transmembrane signal transduction".

In preparation — R. Sasmal, Y. Hassan, and **R. F. Hariadi**, "Cholesterol-mediated DNA translocation across lipid vesicles enables signal transduction and amplification".

2026 A. Saurabh, G. B. M. Wisna, M. Schwieger, **R. F. Hariadi**, and S. Pressé, "Resolving FRET signal degeneracy and population heterogeneity via Bayesian nonparametrics". **Scientific Reports** (accepted). bioR$\chi$iv

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 Materials** (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*, "Benchtop 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". **Protein Science** (2016) 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. Sommese*, 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. Sommese, 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, 17(4), 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, 111, 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

2008 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, 4885–4895. Paper

## Intellectual property

## At ASU

**Total**: 20 patents & applications filed, incl. 1 issued US patent (No. 11,162,192 B2).

2026 Provisional "Programmable systems for specific and amplified cell surface labeling"
*Co-inventors*: D. Karna, P. Chopade.
Application No. 63/052,682, *filed on 04/29/2026*.

2025 Provisional "Proximity-based split-initiator system for reducing background in nucleic acid amplification"
*Co-inventors*: R. Sasmal.
Application No. 63/906,911, *filed on 10/28/2025*.

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

2024 Provisional "Compositions and methods related to imaging cancer cells"
*Co-inventors*: R. Sasmal.
Application No. 63/697,328, *filed on 09/20/2024*.

2024 Provisional "Compositions and methods related to nucleic acid nanopores"
*Co-inventors*: R. Sasmal.
Application No. 63/697,321, *filed on 09/20/2024*.

2024 Provisional "Compositions and methods related to removal of cholesterol-modified transmembrane sensors"
*Co-inventors*: R. Sasmal, Y. Hassan.
Application No. 63/663,231, *filed on 06/24/2024*.

2024 Provisional "DNA origami nanoarrays"
*Co-inventor*: P. Chopade.
Application No. 63/638,158, *filed on 04/24/2024*.

2023 Disclosure "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 PCT "Compositions and methods related to nucleic acid sensors"
*Co-inventors*: G. B. M. Wisna and R. Sasmal.
Publication WO 2023/172911, *filed on 03/07/2023*.

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

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

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

2023 Disclosure "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 Provisional "Compositions and methods related to multivalent binders for antiviral therapeutics"
*Co-inventors*: C. Swanson, Swechchha Pradhan.
U.S. provisional patent application No. 63/368,313, *filed on 07/13/2022*.

2020 Provisional "Transmembrane sensors 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 PCT "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 Issued "Materials and methods relating to single molecule arrays."
*Co-inventors*: Rishabh Shetty (ASU), Ashwin Gopinath (MIT), Paul Rothemund (California Institute of Technology).
US Patent No. 11,162,192 B2 *(issued)*; PCT Application WO-2019108954-A1

### Before ASU

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

2008 Provisional "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 03/24/2008*.

## Talks

### During ASU tenure

#### Outside ASU

>65 contributed and invited seminars/talks, e.g., MIT, Yale, Notre Dame, Georgia Tech, University of Michigan, Nature Conference, ACS, FNANO, and others.

| | |
|---|---|
| 08/03/2026 | DNA32: 32nd International Conference on DNA Computing and Molecular Programming. |
| 07/09/2026 | Seminar Series RCBE – IBB series, Universitas Indonesia. Invited |
| 03/26/2026 | Northern Arizona University. Invited |
| 02/21–25/2026 | Biophysical Society meeting. |
| 02/16/2026 | oxDNA conference. |
| 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 |

10/07/2025 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 22nd 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 Gadjah Mada. Invited
06/05/2023 Build a Cell webinar.
03/03/2023 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
03/02/2023 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 for Virology (ASV) 42nd Annual meeting
04/11/2022 2022 Foundation of Nanoscience (FNANO), Snowbird, Utah.
03/18/2022 American Physical Society March Meeting 2022
01/08/2022 Universitas Brawijaya, Department of Physics. Invited
12/10/2021 University of Michigan–Dearborn, Department of Physics. Invited
12/02/2021 Missouri State University, Department of Physics, Astronomy, and Materials Science. Invited
09/20–21/2021 Research Institute of Nanoscience and Nanotechnology, Institut Teknologi Bandung, Indonesia. Invited
08/03/2021 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 Biodesign Institute.
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: 9 advised; 2 secured faculty positions.

| | | |
|---|---|---|
| Postdocs | Deepak Karna | 09/2024–**present** |
| | Prathamesh Chopade | 01/2023–**present** |
| | Ranjan Sasmal | 02/2022–**present** |
| | Gde Bimananda Mahardika Wisna (Next stop: postdoc with David Baker, Nobel laureate, University of Washington) | 09/2025–12/2025 |
| | 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 (3 moved to postdocs at Harvard, MIT/Caltech, and the University of Washington; 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–Summer 2019 |
| | 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 (Next stop: postdoc with David Baker, Nobel laureate, University of Washington) | Fall 2020–Summer 2025 |
| | Shajeda Begum | Fall 2025–**present** |

Undergraduate Students: 40 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
Hridya Puthiyaveettil — Summer 2026–**present**
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
Manichanh Sibouth — Summer 2026–**present**
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: 7 advised

High school students

Pranati Chintada (*Next stop: Caltech*) — Summer 2024–Spring 2025
Anshuman Patel — Summer 2024
Aahan Rishi — Summer 2026
*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: 10 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
Calvin Sabastian Tanzil (*then at Institut Teknologi Bandung*) — Summer–Fall 2026
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. Kwiatkowski (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.<br>US Presidential Scholar finalist. |
| Spring 2019 | Adrian Kwiatkowski | 1st place Arizona Science and Engineering Fair (AzSEF) (Biochemistry category). |

#### University-level

| | | |
|---|---|---|
| 2024–2025 | Sri Ujjwal | 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

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

## Teaching workshop

### At ASU

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|---|---|
| 08/01/2022 | *Webinar speaker*, Examining graduate programs in Physics. |
| 06/28–07/01/2021 | 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**: 6 funding agencies.
**Guest editor**: 1 edition.

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| *Ad hoc* referees | Nature, Science, Nature Communications, Science Advances, Communications Physics, Nucleic Acids 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. |
| 2026 | *Proposal reviewer*, Alfred P. Sloan Foundation. |
| 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.<br>– 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.<br>– 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.<br>– Search outcome: Petr Šulc |
| 2023–2025 | Colloquium committee, Department of Physics. |
| 2023–2024 | Biodesign 20$^{th}$ 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

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|---|---|
| 2025– | ASU archery club, *Advisor*. |
| 2025 | Muktamar IMSA & MISG, *Steering committee*. |
| 2024 | Muktamar IMSA & MISG, *Chair*. |
| 10/03/2024 | Grand Challenges for Engineering, *Guest lecturer*. |
| 11/07/2023 | |
| 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*. |
| 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*. |

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|---|---|
| 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.

## Research Funding

## External funding

**Total**: 11 grants (3 NIH, 3 NSF, 1 DARPA, 1 IARPA, 1 ABRC, 1 Flinn Foundation, and 1 DoD STEM).
$15,654,174 in total funding
$8,230,283 to Hariadi = $5,918,823 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)
$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 Šulc and (*iii*) Sui Yang

*SemiSynBio-III: DNA templated chiral metamaterials for information storage.*

09/01/2021–08/31/2024 HQ00342110007
Completed 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 2027215
Completed National Science Foundation
$1,500,000
PI: Hao Yan, Co-PIs: (*i*) Rizal F. Hariadi **1/3 = $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 1DP2AI144247-01
Completed 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 ADHS17-00007401
Completed 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 N6600123C4504
Completed 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.*

### 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.*