Rizal Fajar Hariadi

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1 Educational background

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

2003 *B.S.* in Physics, *B.S.* in Biochemistry and Biophysics
Washington State University.

2 Academic/professional experience

07/2016 – *Assistant Professor of Physics*
Department of Physics
Biodesign Institute
Arizona State University
Other ASU affiliations:
– Biodesign Center for Molecular Design and Biomimetics
– Center for Biological Physics
– *Graduate faculty*, School of Molecular Sciences
– *Graduate faculty*, School of Biological and Health Systems Engineering
– Biodesign Center for Molecular Evolution
– The Biomimicry Center
– Global Security Initiative

8/2015 – 7/2016 *Wyss Institute Postdoctoral Fellow* (PI: Peng Yin)
Wyss Institute for Biologically-Inspired Engineering
Harvard University

4/2011 – 7/2015 *Postdoctoral Research Fellow* (PI: Sivaraj Sivaramakrishnan)
Department of Cell and Developmental Biology
University of Michigan

3 Awards

Since employment at ASU

2018 NIH Director's New Innovator Award (*with a perfect Impact Score of 10*).

2018 Arizona Biomedical Research Commission New Investigator Award.

Before employment at ASU

2002 *Top 3*, LeRoy Apker Award, American Physics Society.

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

4 Publications

Total: 25 publications including 2 accepted and 3 in preparation.

Since employment at ASU

– *Summary: 8 publications including 2 accepted and 3 in preparation.*

– *ASU mentees are underlined.*

In preparation F. Djutanta, R. Kha, B. Yurke, and **R. F. Hariadi**, "Raindrop as a means of producing cell like structures from oil films".

In preparation R. M. Shetty, S. Brady, E. Le, F. Djutanta, P. W. K. Rothemund, **R. F. Hariadi***, and A. Gopinath*, "Facile, cleanroom–free fabrication of single molecule nanoarrays".
**authors supervised equally*.

In preparation R. Rezvani*, B. Horne*, F. Djutanta, D. Showkeir, and **R. F. Hariadi**, "Low-cost LEGO-based sucrose gradient mixer for purification of DNA-origami nanostructures".
**authors contributed equally*.

Accepted I. Sgouralis, S. Madaan, F. Djutanta, R. Kha, **R. F. Hariadi**, and S. Pressé, "A Bayesian Nonparametric Approach to Single Molecule FRET", *Accepted*.

Accepted 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**, *accepted*.

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**, 135–147.

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**, 10(9), 8281–8288.
**authors contributed equally*.

2016 R. F. Sommese, **R. F. Hariadi**, M. J.Tyska, M. A. Titus, S. Sivaramakrishnan, "Precise patterning proteins on DNA nanostructures using a GFP-Nanobody". **Protein Science**, 25(11), 2089–2094.

Before employment at ASU

– *Summary: 17 publications.*

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

2015 V. Verma, L. Mallik, **R. F. Hariadi**, S. Sivaramakrishnan, G. Skiniotis, A. P. Joglekar, "Maximizing protein hybridization efficiency on multisite DNA origami scaffolds using protein dimerization", **PLoS One**, 2015 10(9): e0137125.

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. **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.

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.

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

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

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*.

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.

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

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.

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.

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.

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.

5 Patent applications and Invention Disclosures

Since employment at ASU

2017 "Modular, self-assembled, single nucleic acid and protein arrays for sensitive and non-Poisson digital diagnostics."
Co-inventors: Rishabh Shetty (Arizona State University), Ashwin Gopinath, Paul Rothemund (California Institute of Technology).
AzTE Invention ID: D18-062.
U.S. Provisional patent, *filed on 10/12/2017*.

2017 "Treatments using aggregation of target particles".
Co-inventors: Carter Swanson (Genentech).
AzTE Invention ID: D17-130. AzTE Technology ID: M17-161L.
filed on 03/16/2017.

Before employment at ASU

2008 "DNA structures self-assembled from single stranded DNA tiles: Chains, ribbons, and tubes",
Co-inventors: Peng Yin, Sudheer Sahu, Thomas H. LaBean, and John H. Reif.
U.S. Provisional patent, *filed on March 24th, 2008*.

6 Talks

Since employment at ASU

Outside ASU

05/22/2019	North Carolina State University, Department of Physics. [Invited]
05/19–22/2019	Nature conference on Engineering Biology for Medicine. [Invited]
Upcoming	University of Wisconsin, Madison. Department of Biomedical Engineering. [Invited]
09/11/2018	University of Notre Dame, Department of Aerospace and Mechanical Engineering. [Invited]
05/05/2018	2018 BioPhest, University of Arizona
12/05/2017	Massachusetts Institute of Technology, Modern Optics and Spectroscopy seminar series. [Invited]
04/10/2017	2017 Foundation of Nanoscience (FNANO), Snowbird, Utah. [Invited]

At ASU

11/06/2018	Chalk talk at Center for Biological Physics.
03/31/2017	School of Biological and Health Systems Engineering.
02/02/2017	Department of Physics.

Before employment at ASU

– 01/2013 – 06/2016.

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	DNA21 Conference – 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, 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.

7 Posters

Since employment at ASU

10/08/2018	Statistical Physics in Biology: A workshop in honor of Ken Dill, Arizona State University.
05/05/2018	Biophest, University of Arizona.
04/13/2018	FUSION 2018, Biodesign Retreat, Arizona State University.
09/25/2017	DNA23 – 23rd International Conference on DNA Computing and Molecular Programming, University of Texas, Austin, TX.
04/22/2017	Biophest, Department of Physics, Arizona State University.
04/07/2017	FUSION 2017, Biodesign Retreat, Arizona State University.
03/03/2017	2017 Arizona Imaging and Microanalysis Society Conference, Arizona State University.
02/11–15/2017	61st Annual Meeting, Biophysical Society.

8 Active collaborators (*alphabetical order*)

Laurent Blanchoin	Alternative Energies and Atomic Energy Commission (CEA), Grenoble, France.
Elisa Franco	University of California, Los Angeles.
Ashwin Gopinath	Massachusetts Institute of Technology.
Jongmin Kim	Pohang University of Science and Technology.
Manu Prakash	Stanford University.
Steve Pressé	Arizona State University.
Paul W. K. Rothemund	California Institute of Technology.
Petr Šulc	Arizona State University.
Wade Van Horn	Arizona State University.
Hao Yan	Arizona State University.
Bernard Yurke	Boise State University.

9 Mentorship

Since employment at ASU

Postdocs

- Daisuke Inoue (10/2018 –)
- Shuoxing Jiang (Fall 2016 – Summer 2018, co-advised with Hao Yan)
- Tunjung Mahatmanto (11/2016 – 6/2018).
  - now a Lecturer at Universitas Brawijaya, Indonesia

Visiting postdoc	Adi Wibowo (Summer – Fall 2017) – now a Lecturer at Universitas Diponegoro, Indonesia
Graduate students (*chronological order*)	Rishabh Manoj Shetty — SBHSE Merit Award Franky Djutanta Swarup Dey (co-advised with Hao Yan (50%)) Devika Kishnan
Undergraduate students (*alphabetical order*)	Michelle Anthony (Spring – Summer 2018) Nabil Attlassy (Fall 2017 – Spring 2018) Shane Bachtel (Spring 2018) Indrajit Badvaram (now a Ph.D. student at Johns Hopkins University) Sarah Brady Alexander DaSilva (Summer – Fall 2017) — Barrett Fellow at CLAS Dustin Foote Chase Hanson (Summer 2018) Gabrielle Hirneise (Summer 2018 – Spring 2019) Jun Skyler Hong Rachael Kha Maeve Kennedy — Flinn Scholar Joyce Kuang Eric Le — TW Lewis Scholar Aidan McGirr (Summer 2018 – Spring 2019) — Flinn Scholar Kenna McRae (Spring 2018) Christopher Ramirez Robert Rezvani Shuchi Sharma (Summer 2018) Sabrina Suhartono Tal Sneh Evangeline Taylor–Hermes (Summer 2018) — Flinn Scholar Bryan Ugaz Alexander Yurowkin (Spring 2018) Irene Zhang
High school students	– *Through ASU SCENE (Science and Engineering Experience)* program Adrian Kwiatkowski (Red Mountain high school)

Summer / Skyping (S) students (*alphabetical order*)	Gaby Almira (then at Osaka University) Mo Awanah (Göttingen University) Isyatul Azizah (then at Universitas Brawijaya, now at Heidelberg University) Emilio Bachtiar (then at Johns Hopkins University, now at Duke University) Anshuman Bakshi (University of California, Berkeley) Fania Feby Ramadhani (Institut Teknologi Bandung) Isadonna Fortune Tengganu (Surya University) Gde Bimananda Mahardika Wisna (then at Institut Teknologi Bandung, now at University of California, San Diego)

Before employment at ASU

2012 – 2017	Leopold Green	then at University of California, Riverside. now a postdoc at California Institute of Technology.
2015 – 2016	Alexander Auer	then at Wyss Institute at Harvard. now at Ludwig-Maximilians-Universität, Germany.
2013 – 2016	Abhinav Appukutty	University of Michigan.
2014 – 2016	Neerja Garikipati	then at Huron High School, Ann Arbor. now at University of Pittsburgh.
2012 – 2014	Mario Cale	then at University of Michigan. now a Medical student at UCLA.
Fall 2013	James Song	University of Michigan.
2011 – 2012	Terrence Tigney	then at University of Michigan, now at Ludwig-Maximilians-Universität, Germany
Summer 2007	Yudhistira Virgus	then at Institut Teknologi Bandung, Indonesia. now a software engineer at Airbnb.
Summer 2005	Christina Wright	then at Massachusetts Institute of Technology. now a software engineer at Toyota Research Institute.

10 Mentored Trainee Honors and Awards

Since employment at ASU

Spring 2019	Daisuke Inoue	Kazato Research Prize
Spring 2019	Dustin Foote	Fulton Grand Challenge Scholars Program
Spring 2019	Maeve Kennedy	
Spring 2019	Tal Sneh	
Spring 2019	Aidan McGirr	
Fall 2018	Swarup Dey	Mechbio Conference 2018 Travel Award
Spring 2018	Rishabh Shetty	ASU SBHSE Merit Award
Summer 2017	Alexander da Silva	Barrett Fellow at CLAS

11 Teaching

Since employment at ASU

Fall 2018, Fall 2017	PHY 478: "Advanced Biophysics Laboratory" – *New course developed at ASU*.
Spring 2019, Spring 2018	PHY 252: "Physics III"
Fall 2016	PHY 598: "Biomolecular and Cellular Mechanics" – *New course developed at ASU*.

Before employment at ASU

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

12 Teaching workshop

Since employment at ASU

11/17–20/2016	Fall 2017 New Faculty Workshop. Organized by American Association of Physics Teachers (AAPT), the American Physical Society (APS), and the American Astronomical Society (AAS), College Park, MD.

13 Disciplinary service

Since employment at ASU

	Ad hoc referees (Scientific Reports, Journal of the American Chemical Society, 24th International Conference on DNA Computing and Molecular Programming)
2018	NSF SemiSynBio review panel (SemiSynBio NSF 17-557).
2017, 2018, 2019	*Program committee*, International Conference on DNA Computing and Molecular Programming.
2017	*Organizing committee*, Biophest.

14 University-level service

Since employment at ASU

2018	Search committee for a faculty in the Department of Physics with emphasis in Experimental Biophysics.
2016	Search committee for a faculty in the School of Molecular Sciences and Biodesign Center for Molecular Design and Biomimetics with emphasis in Computational Physical Chemistry.

15 College and department-level service

Since employment at ASU

2018 – 2019	Exam committee, Department of Physics.
2018 – 2019	General studies committee, Department of Physics.
2018	Organizing committee, Biodesign Center for Molecular Design and Biomimetics symposium.
2017 – 2018	Exam committee, Department of Physics.
2016 – 2017	Exam committee, Department of Physics.

16 Community service and outreach

Since employment at ASU

2016 –	Science-inspired cartoon with 2 graphic illustrators, Sapto Cahyono and Daisuke Inoue
02/23/2019	ASU Open Door 2019
01/30/2019	Biotechnology course, ASU Preparatory Academy.
08/03 – 09/2018	2018 Asian Science Camp. *Steering committee (chair) & Speaker*.
08/07/2018	Science outreach at Eben Haezar Catholic high school, Manado, Indonesia, *Speaker* alongside Ron Vale (UCSF).
05/11/2018	Career Day, Arizona Cultural Academy, *Speaker*.
02/23/2018	Arizona State University 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 employment at ASU

2014	College 101, University of Michigan, *Instructor*.
09/22/2013	Webinar: How to apply to graduate schools in the US, *Speaker* — organized by International Society of Indonesia Scholar.
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, Indoneisa, *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*.

17 Entrepreneurship

Before employment at ASU

2014 ImmunoRodeo, (*co-founder*, alongside Carter Swanson).
– *Semi finalist (out of 630 proposals, ∼70 semi finalists)*
– OneStart Competition – the world's largest life sciences and healthcare startup accelerator program.
– Mentored by Michelle Browner (then at Johnson and Johnson Innovation)

18 Current support

09/30/2018 – 06/30/2023	1DP2AI144247–01 NIH (National Institutes of Health (NIAID) **$ 2,353,661** PI: Rizal F. Hariadi *Nanoscale reconstruction of mechanical systems involved in disease pathogenesis*.
04/01/2018 – 03/31/2021	ADHS17-00007401 Arizona Biomedical Research Commission (ABRC) **$ 225,000** PI: Rizal F. Hariadi *An ultra-sensitive and low-cost diagnostic for valley fever*.