

Rizal Fajar Hariadi

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🌐 <http://www.rizalhariadi.com>

📅 Latest update: Sunday 21st October, 2018

1 Educational background

- 2011 *Ph.D.* in Applied Physics
California Institute of Technology.
– Thesis advisors: Erik Winfree, co-advised by Bernard Yurke.
- 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
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*
Wyss Institute for Biologically-inspired Engineering
Harvard University
– PI: Peng Yin.
- 4/2011 – 7/2015 *Postdoctoral Research Fellow*
Department of Cell and Developmental Biology
University of Michigan
– PI: Sivaraj Sivaramakrishnan.

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 1 accepted, 1 currently under review, and 3 in preparation.

■ Since employment at ASU

- Summary: 8 publications including 1 accepted, 1 currently under review, 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. Rothmund, **R. F. Hariadi***, and A. Gopinath*, “Facile, cleanroom-free fabrication of single molecule nanoarrays”.
*Co-last/co-corresponding authors contributed 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.
- Under review* I. Sgouralis, S. Madaan, F. Djutanta, R. Kha, **R. F. Hariadi**, and S. Pressé, “A Bayesian Nonparametric Approach to Single Molecule FRET”, *under review*.
- Under review* 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**, *under review*.
- 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**, pp 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), pp 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. 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. *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.
- 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 Universityments”. **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 Rothmund (California Institute of Technology).
AzTE Invention ID: D18-062.
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

- 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

- 03/31/2017 School of Biological and Health Systems Engineering, Arizona State University
02/02/2017 Department of Physics, Arizona State University

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*)

Since employment at ASU

| | |
|-------------------------|--|
| Laurent Blanchoin | Alternative Energies and Atomic Energy Commission (CEA), Grenoble, France. |
| Elisa Franco | University of California, Los Angeles. |
| Ashwin Gopinath | GoogleX, will start at Massachusetts Institute of Technology (January 2019). |
| Jongmin Kim | Pohang University of Science and Technology. |
| Manu Prakash | Stanford University. |
| Steve Pressé | Arizona State University. |
| Paul W. K. Rothmund | California Institute of Technology. |
| Nicholas Stephanopoulos | Arizona State University. |
| Petr Šulc | Arizona State University. |
| Manuel Théry | IUH/Hopital Saint-Louis, Paris, France. |
| 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 (<i>chronological order</i>) |  Rishabh Manoj Shetty | SBHSE Merit Award |
| |  Franky Djutanta (<i>incoming</i> , co-advised with Petr Šulc (75%)) | |
| |  Swarup Dey (co-advised with Hao Yan (50%)) | |
| |  Devika Kishnan | |
| Undergraduate students (<i>alphabetical order</i>) |  Michelle Anthony (Spring – Summer 2018) | |
| |  Nabil Attlassy (Fall 2017 – Spring 2018) | |
| |  Shane Bachtel (Spring 2018) | Barrett's Honors Enrichment Contract |
| |  Indrajit Badvaram (now a Ph.D. student at Johns Hopkins University) | |
| |  Sarah Brady | |
| |  Alexander DaSilva (Summer – Fall 2017) | Barrett Fellow CLAS |
| |  Dustin Foote | |
| |  Chase Hanson (Summer 2018) | |
| |  Gabrielle Hirneise | |
| |  Skyler Hong | |
| |  Rachael Kha | |
| |  Maeve Kennedy | Flinn Scholar |
| |  Joyce Kuang | |
|  Eric Le | TW Lewis Scholar | |
|  Aidan McGirr | 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) | Barrett's Honors Enrichment Contract |
|  | Irene Zhang | |

High school students
(*alphabetical order*)

– *Through ASU SCENE (Science and Engineering Experience)* program

| | |
|---|---|
|  | Adrian Kwiatkowski (Red Mountain high school) |
|  | Rohan Nishtala (Hamilton high school) |

Summer / Skyping () students
(*alphabetical order*)

| | |
|---|--|
|  | Gaby Almira (then at Osaka University) |
|  |  Mo Awanah (Göttingen University) |
|  | Isyatul Azizah (then at Universitas Brawijaya) |
|  | Emilio Bachtiar (then at Johns Hopkins University, now at Duke University) |
|  | Anshuman Bakshi (University of California, Berkeley) |
|  | Fania Feby Ramadhani (Institut Teknologi Bandung) |
|  | 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 at JPMorgan Chase |
| Summer 2005 |  | Christina Wright | then at Massachusetts Institute of Technology, now at Google |

10 Teaching

📌 Since employment at ASU

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|--------------------------|---|
| 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.

11 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.

12 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 Program committee, 24th International Conference on DNA Computing and Molecular Programming.
2017 Organizing committee, Biophest.

13 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 theory.

14 College and department-level service

📌 **Since employment at ASU**

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

15 Community service and outreach

📌 **Since employment at ASU**

2016 – Science-inspired cartoon with 2 graphic illustrators, Sapto Cahyono and Daisuke Inoue

- 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.*
- 2013 Webinar: How to apply to graduate schools in the US, *Speaker*
– organized by International Society of Indonesia Scholar.
- 2012 Bridging International Cooperation between Indonesia and America, Washington, DC, *Conference Chair.*
- 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.*
- 2008 2008 Asian Science Camp, Bali, Indonesia, *Invited speaker.*
- 2008 Science outreach at Tugasku elementary school, Jakarta, Indonesia, *Speaker.*

16 Entrepreneurship

📌 Before employment at ASU

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

17 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.