

Aaron J. Dy

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EDUCATION

Massachusetts Institute of Technology, Cambridge MA 2014-Present

PhD in Biological Engineering

- Thesis committee: James J. Collins (Advisor), Domitilla Del Vecchio (Advisor), Mark Bathe (Chair), & Sangeeta Bhatia

Indiana University, Bloomington IN 2010-2014

B.S. in Physics (applied physics track)

- Advisor: James A. Glazier
- Thesis title: Developing A Novel Microcavity Surface Plasmon Resonance (MSPR) Sensor Instrument for Optical Protein Detection and Potential Single-Cell Studies

RESEARCH INTERESTS

Deployable synthetic biology: cell-free systems and engineering generally considered safe organisms can allow for broader impact of genetic circuits for human health.

Biosensors for global health: expanding the available inputs for synthetic gene circuits to include arbitrary nucleic acid sequences and protein activity will allow for detection of key disease biomarkers.

Efficient design for synthetic biology: modeling informed design can help avoid biochemically wasteful designs that can cause loss of function and prevent assembly of larger and more complex systems.

PUBLICATIONS (citations = 39, h-index=3)

* denotes equal authorship

5. E. Yeung, **A. J. Dy**, K. B. Martin, A. H. Ng, D. Del Vecchio, J. L. Beck, J. J. Collins, and R. M. Murray. "Biophysical Constraints Arising from Compositional Context in Synthetic Gene Networks.." *Cell Systems* 5 (2017): 1124
 - featured article for the vol. 5 issue 1 of Cell Systems
4. J. S. Gootenberg*, O. O. Abudayyeh*, J. W. Lee, P. Essletzbichler, **A. J. Dy**, J. Joung, V. Verdine, N. Donghia, N. M. Daringer, C. A. Freije, C. Myhrvold, R. P. Bhattacharyya, J. Livny, A. Regev, E. V. Koonin, D. T. Hung, P. C. Sabeti, J. J. Collins, and F. Zhang. "Nucleic acid detection with CRISPR-Cas13a/C2c2." *Science* 356.6336 (2017) 438-442.
 - highlighted in Nature Methods 'CRISPR's paper test'
 - highlighted in Nature Biomedical Engineering 'CRISPR-powered diagnostics'
 - Altmetric score of 719 is higher than 99% of contemporary papers including better than 99% also from Science
3. D. Del Vecchio, **A. J. Dy**, and Y. Qian. "Control theory meets synthetic biology." *Journal of The Royal Society Interface* 13.120 (2016): 20160380. [review]

2. **A. J. Dy**, and J. J. Collins. “Engineering Models to Scale.” *Cell* 165.3 (2016): 516-517. [preview]

1. **A. J. Dy**, A. Cosmanescu, J. Sluka, J. A. Glazier, D. Stupack, D. Amarie. “Fabricating microfluidic valve master molds in SU-8 photoresist.” *Journal of Micromechanics and Microengineering* 24.5 (2014): 057001.

AWARDS

Honorable Mention Obermayer Prize for Writing for the Public (2017) - MIT's Comparative Media Studies/Writing program

Distinguished Alumni Award (2015) - Indiana 21st Century Scholars Program

NSF Graduate Fellowship (2015-2020) - National Science Foundation

Phi Beta Kappa (2014) - Indiana University

Herman B Wells Scholarship (full ride merit scholarship) (2013) - Indiana University

Malcolm A. Kochert Scholarship (2013) - Indiana University College of Arts and Sciences

Brown Memorial Scholarship (2013) - Indiana University Department of Physics

Della J. Evans Scholarship (2010-2014) - Indiana University Hutton Honors College

TEACHING

Communication Fellow - MIT BE Communication Lab Spring 2016 - Present
-Coaching students and staff to improve scientific communication.

Undergraduate Instructor (UGI) - IU Math Dept. Spring 2013, Spring 2014
-Tutor in the Math Learning Center
-MATH V118 "Finite Mathematics with Applications"

Undergraduate Teaching Assistant (UTA) - IU Biology Dept. Spring 2014
-BIOL L112 "Foundations of Biology: Biological Mechanisms"

Graduate Teaching Assistant (TA) - MIT Biological Engineering Dept. Spring 2016
-20.380 "Biological Engineering Design"

SCIENTIFIC OUTREACH

Community Editor for PLOS Synbio Community Blog March 2016 - Present
-Wrote and edited posts on synthetic biology papers, conferences, news, and more
-Generated over 15,000 views of original content

Mentor in Collins Lab
-Supervised 13 high school students over two summers
MIT Engineering STEM Mentor

SCIENTIFIC POLICY

Federal affairs subcommittee co-chair - MIT GSC March 2016 - March 2017
-Organized and attended Capitol Hill meetings with over 30 congressional offices
-Co-wrote and edited policy positions statements on behalf of the graduate student body

Policy Liaison - EBRC SPA Aug. 2016 - Present

-Engineering Biology Research Consortium Student and Postdoc Association (SPA)
MIT Engineering STEM Mentor

INVITED TALKS

“Cell-free synthetic biology for viral diagnostics”. First International Symposium on Emergent Arbovirus, Guadalajara, Mexico (Aug. 2017).

“Strategies for doing and communicating your research”. Workshop for International Genetically Engineered Machine (iGEM) 2016 Competition (Oct. 2016)

POSTER PRESENTATIONS

A. J. Dy, D. Del Vecchio, and J. J. Collins. Rapid detection of HPV genotypes using cell-free circuits *Synthetic Biology Gordon Research Conference*, Stowe, VT (July 2017)

A. J. Dy, D. Del Vecchio, and J. J. Collins. Rapid detection of HPV genotypes using cell-free circuits *MIT Synthetic Biology Center (SBC) Symposium*, Cambridge, MA (Jan. 2017)

A. J. Dy, J. J. Collins, and D. Del Vecchio. Biophysical Limits of Control Implementations in Synthetic Gene Networks *Synthetic Biology: Engineering, Evolution & Design (SEED)*, Chicago, IL (July 2016)

A. J. Dy, D. Amarie, A. Cosmanescu, J. Clendenon, Dwayne Stupack and J. A. Glazier. Optical Detection of Biomolecules for Single-Cell Applications *NSF IDBR: Workshop on Successful Approaches for Development and Dissemination of Instrumentation for Biological Research* (May 2014)

A. J. Dy, R. Erickson, and R. Jimenez. Fabrication of a 3D Microflow Cytometer *Biomedical Engineering Society (BMES) Annual Meeting*, Seattle, WA. (Sep. 2013)

A. J. Dy, K. Shahnazi, and S. B. Klein. Extracting a Neutron Dose using only TLDs (Thermoluminescent Dosimeters) *American Association of Physicists in Medicine Annual Meeting*, Indianapolis, IN (Aug. 2013)