

DIEGO A. HUYKE

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EDUCATION

Stanford University	Stanford, CA
Candidate for PhD in Mechanical Engineering, GPA 4.0/4.0	Apr 2019 - Present
MS in Mechanical Engineering, GPA 3.7/4.0	Sept 2017 - Apr 2019
<i>Advised by Prof. Juan G. Santiago</i>	
Massachusetts Institute of Technology (MIT)	Cambridge, MA
BS in Mechanical Engineering, GPA 4.6/5.0	Sept 2013 - Feb 2017

AWARDS AND FELLOWSHIPS

Graduate Research Fellowship, National Science Foundation (NSF)	Sept 2019 - Present
Mechanical Engineering Graduate Fellowship, Stanford University	Sept 2017 - Aug 2019
Scholarship, Kinesis Foundation Puerto Rico	Sept 2013 - Dec 2018
Scholarship, Avon Foundation	Sept 2013 - June 2017
Whitelaw Prize for Design, MIT	May 2015
Finalist, National Merit Scholarship	Feb 2013

RESEARCH AND INDUSTRY EXPERIENCE

Research Assistant: Stanford University	Apr 2020 - Present
<i>Molecular diagnostics using CRISPR</i>	

- Developed electric field-driven microfluidic device to detect SARS-CoV-2 genetic material from nasopharyngeal swab samples in under 1 h.
- Optimized experimental data acquisition procedure and built **custom algorithm in Python** to more sensitively measure fluorescence signals from microscope images.
- Resulted in **one peer-reviewed article, conference presentation, and two grants worth \$100k.**

Research Assistant: Stanford University	July 2018 - Present
<i>High-throughput measurement of cell mechanical properties</i>	

- **Co-led a collaboration among seven scientists** across two Stanford departments to develop a microfluidic platform to measure the stiffness of thousands of human red blood cells in under a minute.
- Developed morphological image processing code in MATLAB to automatically detect, track, and measure shape parameters of fast-moving cells.
- Resulted in **one peer-reviewed article, two conference presentations, and four grants worth \$80k.**

Research Assistant: Stanford University, SLAC National Lab, University of Guadalajara	Sept 2017 - Present
<i>Fast mixing to observe chemical reactions via X-ray spectroscopy</i>	

- **Led a collaboration among 14 scientists** across three institutions with expertise in fluid mechanics, chemical kinetics, and X-ray science.
- Developed the first combined model and experimental approach to track the functional mechanisms of proteins in the millisecond timescale via X-ray spectroscopy.
- Resulted in **two peer-reviewed articles, five conference presentations, and one grant worth \$140k.**

Manufacturing Quality Engineer: Apple, Inc.	June – Aug 2016 and Feb – June 2017
• Constructed model to simulate and stack manufacturing errors from multiple sources. These simulations were used to predict assembly yields against several specifications.	
• Designed coordinate-measuring, material-testing, and custom machine protocols for mass manufactured parts and aligned measurement procedures across independent vendors in China, Taiwan, and Korea.	

JOURNAL PUBLICATIONS

1. **DA Huyke**, A Ramachandran, O Ramirez-Neri, JA Guerrero-Cruz, LB Gee, A Braun, D Sokaras, B Garcia-Estrada, EI Solomon, B Hedman, MU Delgado-Jaime, DP DePonte, T Kroll, JG Santiago. "Millisecond

time-scale reactions observed via X-ray spectroscopy in a 3D microfabricated fused silica mixer.”

Journal of Synchrotron Radiation 28 (2021): *in press*.

2. A Ramachandran, **DA Huyke**, E Sharma, MK Sahoo, CH Huang, N Banaei, BA Pinsky, JG Santiago. “Electric field-driven microfluidics for rapid CRISPR-based diagnostics and its application to detection of SARS-CoV-2.” *Proceedings of the National Academy of Sciences* 117 (2020) 47: 29518-29525.
3. A Saadat*, **DA Huyke***, DI Oyarzun*, PV Escobar, IH Øvreeide, ESG Shaqfeh, JG Santiago. “A system for high-throughput measurements of the shear modulus distribution of human red blood cell samples.” *Lab on a Chip* 20 (2020) 24: 4638-4639.
4. **DA Huyke**, A Ramachandran, DI Oyarzun, T Kroll, DP DePonte, JG Santiago. “On the competition between mixing rate and uniformity in a coaxial hydrodynamic focusing mixer,” *Analytica Chimica Acta*. 1103 (2020): 1-10.

* equal contribution

CONFERENCE PROCEEDINGS AND PRESENTATIONS

1. **DA Huyke**, A Ramachandran, T Kroll, DP DePonte, JG Santiago. “Chemical kinetics and spectroscopy enabled by 3D hydrodynamic focusing and mixing in a 3D-printed microfluidic device” *Bulletin of the American Physical Society*. 73rd APS Online (2020): U10.00001.
2. **DA Huyke**, A Ramachandran, T Kroll, DP DePonte, JG Santiago. “A 3D printed microfluidic mixer for reaction kinetics studies via X-ray spectroscopy” *European Molecular Biology Laboratory*. Microfluidics: Designing the Next Wave of Biological Inquiry (2020).
3. **DA Huyke**, A Ramachandran, T Kroll, DP DePonte, JG Santiago. “Three dimensional hydrodynamic focusing in a monolithic fused silica microfluidic device” *μTAS Abstracts*. 24th μTAS Online (2020).
4. A Ramachandran, **DA Huyke**, E Sharma, MK Sahoo, N Banaei, BA Pinsky, JG Santiago. “A microfluidic approach to rapid crispr-based detection of SARS-CoV-2 RNA” *μTAS Abstracts*. 24th μTAS Online (2020).
5. **DA Huyke**, A Ramachandran, T Kroll, DP DePonte, JG Santiago. “Fast and homogenous mixing in a coaxial capillary device with two sheath flows” *Bulletin of the American Physical Society*. 72nd APS in Seattle, WA (2019): Q35.00002.
6. A Saadat, **DA Huyke**, IH Ovreeide, DI Oyarzun, PV Escobar, JG Santiago, ESG Shaqfeh. “A Microfluidic Platform for the Study of Cell Deformability” *Bulletin of the American Physical Society*. 72nd APS in Seattle, WA (2019): A32.007.
7. **DA Huyke**, A Ramachandran, T Kroll, DP DePonte, JG Santiago. “A three-dimensional microfluidic mixer with independently adjustable mixing and probing regions” *μTAS Abstracts*. 23rd μTAS in Basel, Switzerland (2019): 1474-1475.
8. T Kroll, LB Gee, **DA Huyke**, A Braun, M Mara, M James, A Ramachandran, D Sokaras, U Bergmann, EI Solomon, DP DePonte, JG Santiago. “A three-dimensional microfluidic mixer with independently adjustable mixing and probing regions” *μTAS Abstracts*. 23rd μTAS in Basel, Switzerland (2019): 1472-1473.

OTHER

Relevant coursework: Machine Learning, Artificial Intelligence, Programming Methodology, Data Analysis, Experimental Investigation of Engineering Problems, Partial Differential Equations, Linear Algebra

Teaching experience: Fluid Mechanics, Experimental Methods in Fluid Mechanics, Underwater Robotics

Organizer: Bay Area Microfluidics Network - *currently founding our first-ever mentorship program*

Native speaker: English, Spanish

For fun: Like to play basketball, squash, and tennis. President - MIT Karaoke Club (2016-2017). Member - MIT Association of Puerto Ricans (2013-2017).