

Travis S. Schlappi

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Education

Chemical Engineering, Ph.D., Sept. 2012-Aug. 2017

*California Institute of Technology
Pasadena, CA*

- 3.5/4.0 GPA
- M.S. in Chemical Engineering received June 2015

Chemical Engineering, B.S., Sept. 2007-April 2011

*Brigham Young University
Provo, UT*

- 3.9/4.0 GPA
 - Minors: Strategy, Economics, Philosophy and Business
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Teaching Experience

Assistant Teaching Professor, Jan. 2023-present

*Arizona State University
College of Health Solutions
Phoenix, AZ*

- Courses: Immunoassays, Molecular Diagnostics, Biomedical Diagnostic Research, Applied Projects, Biomedical Device Design
- Implemented 100% online, asynchronous teaching and learning modalities: recorded videos, created online forums, assignments, projects, and mentored remote team projects
- Professional development certifications: Master Class in Online Teaching
- New courses in development: Quality in Biomedical Diagnostics

Assistant Professor of Medical Diagnostics, Sep. 2017-Dec. 2022

*Keck Graduate Institute
Claremont, CA*

- Co-taught a course in medical diagnostics to first-year master's students.
- Implemented a "flipped classroom" by making concept videos for students to watch before class and implementing active learning methods in class via project-based learning.
- Co-led three course sections in a class-wide team project (4 members each in 8 teams, all working together) in the research and design of an in vitro diagnostic device, in addition to a business plan that included marketing and regulatory aspects of launching the product.
- Advised two master's thesis teams in a year-long consulting project for medical device companies.

High School Math Teacher, June 2011-June 2012

*Bertie High School
Windsor, NC*

- Joined Teach For America (TFA) corps because I believe that education is a key component of improving the quality of life for individuals and society.
- Completed 5 week intensive teacher training course in Greenville, Mississippi.
- Taught full class load in high school math department to 11th and 12th grade students.

Graduate Teaching Assistant, Jan.-Apr. 2014, Apr.-June 2015

*California Institute of Technology
Pasadena, CA*

- Courses: Design, Invention, and Creativity in Microfluidics; Mass Transport
- Mentored groups in their capstone microfluidic projects.
- Held weekly recitation sessions to teach and clarify confusing concepts from mass transport lectures.

Lead Portuguese Teacher, May 2007-April 2011

*Missionary Training Center
Provo, UT*

- Led 16 other teachers in the training and teaching of college-aged volunteers.
- Taught daily, curriculum-based instruction in Portuguese grammar, speaking, reading, and writing to college-aged students in class sizes ranging from 4 to 22 students.
- Created interactive group and individual learning activities to target class learning needs.
- Led weekly meetings in training and collaboration.
- Led a team of 8 other Portuguese translators in the live translation of speeches at annual conference.

Undergraduate Teaching Assistant, May-June 2009, Sept.-Dec. 2010

*Brigham Young University
Provo, UT*

- Courses: Chemical Process Principles; Engineering and Society

Publications and Patents

- “REASSURED Multiplexed Diagnostics: A Critical Review and Forecast.” Jonas A. Otoo, **Travis S. Schlappi**. *Biosensors*, 2022, 12(124). <https://doi.org/10.3390/bios12020124>.
- “Picoliter Droplet Generation and Dense Bead-in-Droplet Encapsulation via Microfluidic Devices Fabricated via 3D Printed Molds.” Tochukwu Anyaduba, Jonas Otoo, **Travis S. Schlappi**. *Micromachines*, 2022, 13(1946). <https://doi.org/10.3390/mi13111946>.
- “Effects of cannabidiol on infantile spasms and seizures in Rett syndrome.” Christian Mark Antonio, Vanessa Patrao, Suzanne Liu, **Travis S. Schlappi**. *Neurology Reviews*, April 2021, 64-70.
- *Nathan G. Schoepp, ***Travis S. Schlappi**, Matthew S. Curtis, Slava S. Butkovich, Shelley Miller, Romney M. Humphries, Rustem F. Ismagilov. 2017. "Rapid pathogen-specific phenotypic antibiotic susceptibility testing using digital LAMP quantification in clinical samples." *Science Translational Medicine*. 9(410): eaal3693. doi:10.1126/scitranslmed.aal3693.
- ***Travis S. Schlappi**, *Stephanie E. McCalla, Nathan G. Schoepp, and Rustem Ismagilov. “Flow-through Capture and *in Situ* Amplification Can Enable Rapid Detection of a Few Single Molecules of Nucleic Acids from Several Milliliters of Solution”, *Anal. Chem.*, 2016, 88 (15), 7647–7653.
- *Nathan G. Schoepp, *Eugenia M. Khorosheva, **Travis S. Schlappi**, Matthew S. Curtis, Romney M. Humphries, Janet A. Hindler and Rustem F. Ismagilov. 2016. "Digital Quantification of DNA Replication and Chromosome Segregation Enables Determination of Antimicrobial Susceptibility After Only 15 Minutes of Antibiotic Exposure." *Angewandte Chemie*. 55(9):557–9561.
- *Shencheng Ge, *Weishan Liu, **Travis Schlappi** and Rustem Ismagilov. “Digital, ultrasensitive, end-point protein measurements with large dynamic range via Brownian trapping with drift”, *J. Am. Chem. Soc.*, 2014, 136, 14662–14665.
- Ju Hun Yeon, Nima Mazinani, **Travis S. Schlappi**, Karen Y. T. Chan, James R. Baylis, Stephanie A. Smith, Alexander J. Donovan, Damien Kudela, Galen D. Stucky, Ying Liu, James H. Morrissey, Christian J. Kastrup. “Localization of short-chain polyphosphate enhances its ability to clot flowing blood plasma”. *Scientific Reports*, 2017, 7, 42119.
- Rustem Ismagilov, Stephanie McCalla, **Travis Schlappi**, Toan Huynh, Justin Rolando, Weishan Liu, Shencheng Ge, Jason E. Kreutz. “Digital assay for quantifying and concentrating analytes”. Publication Number: US 2016/0266105 A1. Publication date: Sep 15, 2016.
- Rustem Ismagilov, Eugenia Khorosheva, **Travis Schlappi**, Matthew Curtis, Nathan Schoepp, Hedia Maamar, Feng Shen, Erik Jue. “Microfluidic measurements of the response of an organism to a drug”. Publication Number: US 2016/085632 A2. Int’l publication date: June 2, 2016.

Research Grants, Awards, Presentations, and Posters

- NIH Small Grant Program (R03), 1R03AI169303-01. “Pilot study for low-cost, rapid, and accessible infectious disease diagnostics.” 1/12/2022 – 12/31/2023. 140k total.
- NIH Research Scientist Development Award (K Award), 1K01EB027718. “Multiplexed Pathogen Identification via Bead-based Isothermal Amplification in a Low-cost Microfluidic Device.” 9/1/19-6/30/22. 600k total.
- Silver Medalist. *National Inventors Hall of Fame Collegiate Inventors Competition*, 11/4/17; Washington, DC.
- Diagnostics World Early Innovator Award. *Molecular Med Tri-Con*, 2/22/17; San Francisco, CA.
- “The role of Rapid POC Diagnostics in Public Health Emergencies”. Talk, *Bay Area Biomedical Device Conference*, March 30, 2021.
- “Primer Payload/ Delivery Systems for Multiplex Isothermal Amplification”. Poster Session, *City of Hope Biomedical Research Symposium*, 8/24/18; Duarte, CA.
- “30 Minute Phenotypic Antibiotic Susceptibility Test Directly from Clinical UTI Samples”. Talk, *Molecular Med Tri-Con 2017*, 2/24/17; San Francisco, CA.
- “30 Minute Phenotypic Antibiotic Susceptibility Test Directly from Clinical UTI Samples”. Talk, *Molecular Diagnostics EUROPE 2017*, 4/13/17; Lisbon, Portugal.

- “30 Minute Phenotypic Antibiotic Susceptibility Test Directly from Clinical UTI Samples”. Talk, *Next Generation Dx Summit: Digital PCR Symposium*, 8/18/17; Washington, DC.

Research Experience

Assistant Professor of Medical Diagnostics, *Sep. 2017-Dec. 2022* *Keck Graduate Institute*

- Led research for an interdisciplinary team of engineers, chemists, and biologists *Claremont, CA* to develop a method and device for isothermal multiplexed nucleic acid amplification to rapidly identify pathogens and combat the rise of antibiotic resistance.
- Managed operations for a research lab consisting of 1-2 PhD students and 5-10 MS students.
- Served as a research advisor for undergraduate and high school students in summer programs intended to engage and inspire the next generation of scientists.

Ph.D. Candidate, *Sept. 2012-Aug. 2017* *California Institute of Technology*

- Collaborated in multi-disciplinary teams of bioengineers, biologists, chemists, *Pasadena, CA* and physicists to design and fabricate handheld diagnostic devices that quantify biomarkers
- Developed several new techniques and methods to shorten a phenotypic antibiotic susceptibility test from several hours to less than 30 min, under review at *Science Translational Medicine*.
- Designed and fabricated a 3D matrix that captures and amplifies low amounts of nucleic acids from large volumes (i.e., 10 copies of DNA from 10 mL); published in *Analytical Chemistry*.
- Developed statistical methods to determine phenotypic antibiotic susceptibility with only 15 minutes of antibiotic exposure, published in *Angewandte Chemie*.
- Provided the theoretical and mathematical framework for a digital protein assay, published in *JACS*.
- Performed and analyzed spatio-temporal simulations of polyP-activated blood clotting under flow, published in *Nature Scientific Reports*.
- Experimental skills acquired: microfluidics (HF etching, photolithography on wafer and paper substrates), nucleic acid amplification (qPCR, qRT-PCR, LAMP, digital PCR), absorbance and fluorescence measurements, sample preparation, nucleic acid extraction, BSL2 and BSL2+ experience, bacteria culture, enrichment of pathogens from urine, plasma, and blood.
- Mathematical modeling skills acquired: Comsol Multiphysics, Matlab, Mathematica, ODEs and PDEs, stochastic modeling.

Engineering Intern, *May 2010-Dec. 2010* *Bard Access Systems*

- Investigated the root cause of failure for various medical devices. *Salt Lake City, UT*
- Analyzed data and prepared reports for Board of Executives and other managers.
- Decreased the time required to produce these reports by 25% using Excel macros.

Undergraduate Research Assistant, *Sept. 2008-Aug. 2009* *Brigham Young University*

- Studied the effects of the partial pressures of H₂ and CO on bacteria cell growth. *Provo, UT*
- Increased ethanol production by 20% by varying the amount of cysteine given to the bacteria.
- Sought training in regression analysis and tested experimental data for statistical significance.

Laboratory Intern, *June 2008-Aug. 2008* *Kronos Science Laboratory*

- Led the integration and employee training of a new computer program. *Phoenix, AZ*
- Created Excel shortcuts and unique formulas to decrease the time required to perform data analyses from 20 minutes to only 6 minutes.

Service/Awards/Languages

- Mentor for >20 undergraduate and high school student researchers in the SURE (Summer Undergraduate Research Experience) Program. Judge for SURE posters and talks.
- Volunteer tutor for chemistry, statistics, and math
- Volunteer for Southern California Science Olympiad competitions
- Served as a volunteer representative for two years in Cape Verde, West Africa (Jan. 2005-Jan. 2007)
- Eagle Scout award
- BYU Heritage Scholarship and Robert C. Byrd Scholarship
- Outstanding Junior and Senior Award in BYU Chemical Engineering Department
- Fluent in Portuguese; conversational in Spanish