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EDUCATION

2016-present **University of California Berkeley**
Postdoctoral Scholar, Dept. of Chemical and Biomolecular Engineering
Advisor: Markita Landry

2010-2016 **University of California Santa Barbara**
Ph.D. Mechanical Engineering, MEMS/Thermal Fluids, Winter 2016
Doctoral Advisors: Sumita Pennathur, Deborah K. Fygenson

2005-2009 **Brown University**
Sc.B. Physics-Mathematics, May 2009
Thesis Advisor: Derek Stein

AWARDS and HONORS

Shark Tank Competition Finalist, 16th Annual UC Bioengineering Symposium, 2015
UCSB Graduate Division Dissertation Fellowship, 2015
Runner up, UCSB Dept. of Mechanical Engineering "Grad Slam" Presentations, 2014
Worster Summer Research Fellowship (mentor), Department of Physics, UCSB, 2014
First Prize Poster, Microfluidics Division, APS Division of Fluid Dynamics, 2012
UCSB Department of Mechanical Engineering Departmental Fellowship, 2012, 2013
Honorable Mention, National Science Foundation Graduate Research Fellowship, 2011
Publication selected for Best of 2009 Collection by the New Journal of Physics, 2009
Mildred Widgoff Prize for Excellence in Thesis Preparation, 2009
Brown University Undergraduate Teaching and Research Award, 2008

PUBLICATIONS

1. **JT Del Bonis-O'Donnell,** Ralph H. Page, Abraham G. Beyene, Eric G. Tindall, Ian R. McFarlane, Markita P. Landry. Dual near-infrared excitation-emission two-photon microscopy for deep-tissue dopamine nanosensor imaging. *Advanced Functional Materials*. 2017, 1702112, DOI: 10.1002/adfm.201702112
2. Navid B. Saleh, Dipesh Das, Jaime Plazas-Tuttle, Darwin Yang, **Jackson Travis Del Bonis-O'Donnell**, Markita P. Landry. Importance and challenges of environmental ligand binding and exchange: Introducing single molecule imaging as a model characterization technique. *NanoImpact.* 2017, 6, 90-98
3. D Kim, C Bowman, **JT Del Bonis-O'Donnell**, A Matzavinos, D Stein. Giant acceleration of DNA diffusion in an array of entropic barriers. *Physical Review Letters.* 2017, 118, 048002
4. **JT Del Bonis-O'Donnell,** A Thakrar, J Wain Hirschberg, BN Queenan, DK Fygenson, S Pennathur. DNA-stabilized silver nanoclusters as specific, ratiometric fluorescent dopamine sensors. 2017, *In Review*
5. **JT Del Bonis-O'Donnell**, A Beyene, L Chio, G Demirer, D Yang, MP Landry. Engineering the corona phase molecular recognition of single walled carbon nanotubes. *Journal of Visualized Experiments.* 2016, 119, DOI: 10.3791/55030

6. **JT Del Bonis-O'Donnell**, D Vong, S Pennathur, DK Fygenson. A universal design for a hairpin DNA probe providing ratiometric fluorescence detection by generation of silver nanoclusters. *Nanoscale*. 2016, DOI: 10.1039/C6NR03827A
7. **JT Del Bonis-O'Donnell**, S Pennathur, DK Fygenson. Changes in spectra and conformation of hairpin DNA-stabilized silver nanoclusters induced by stem sequence perturbations. *Langmuir.* 2016, 32, 569-576,
8. S Williams, N Venkateswaran, **JT Del Bonis-O'Donnell**, P Crisalli, S Helmy, MT Napoli, S Pennathur. Assessing stability, durability and protein adsorption behavior of hydrophilic silane coatings in glass microchannels. *Journal of Analytical and Bioanalytical Techniques*. 2016*,* 7 (318), 2
9. **JT Del Bonis-O'Donnell**, DK Fygenson, S Pennathur. Fluorescent silver nanocluster DNA probes for multiplexed detection using microfluidic capillary electrophoresis. *The Analyst*. 2015, 140, 1609-1615,
10. TM Wynne, C McCallum, **JT Del Bonis-O'Donnell**, P Crisalli, S Pennathur. Hybridization thermodynamics of DNA oligonucleotides during microchip capillary electrophoresis. *Analytical Chemistry*. 2015, 87, 2811-2818
11. A Russell, **JT Del Bonis-O'Donnell**, T Wynne, M Napoli, S Pennathur. Separation behavior of short single- and double- stranded DNA in 1 micron and 100 nm glass channels. *Electrophoresis*. 2014, 35, 412–418
12. **JT Del Bonis-O'Donnell**, W Reisner, D Stein. Pressure-driven DNA Transport Across an Artificial Nanotopography. *New Journal of Physics*. 2009, 11**,** 075032 *****Selected for Best of 2009 Collection by the *New Journal of Physics*

Other Publications:

1. Co-author for ME104: Introduction to Mechatronics - Laboratory manual, UCSB, 2011
2. E Davies, L Bishop, A Lucio, JT Del Bonis-O'Donnell, S Pennathur, Y Fintschenko. *Lab-on-a-Chip Application: Field Amplified Sample Stacking (FASS) for Sample Concentration in a Nanochannel.* LabSmith Application Note. LabSmith, Inc. (2011)
3. E Davies, L Bishop, A Lucio, JT Del Bonis-O'Donnell, S Pennathur, Y Fintschenko. L*ab-On-a-Chip Application: Performing an Electrokinetic Gated Injection in a Nanochannel.* LabSmith Application Note. LabSmith, Inc. (2011)

PRESENTATIONS AND PROCEEDINGS

1. University of California System-wide Bioengineering Symposium, "Molecular recognition of dopamine using dual near-infrared excitation-emission two-photon microscopy of nanosesnors," Podium Talk, Los Angeles, CA 2017
2. Calif. Institute for Quantitative Bioscience, Postdoc Seminar Series, "Molecular recognition of dopamine using dual near-infrared excitation-emission two-photon microscopy of nanosesnors," Presentation, UC Berkeley, 2017
3. Chemical and Biomolecular Engineering Department Symposium, "Molecular recognition of dopamine using dual near-infrared excitation-emission two-photon microscopy of nanosesnors," Presentation, UC Berkeley, 2017
4. 2016 AIChE Annual Meeting, "DNA functionalized, fluorescent nanomaterials for the specific, ratiometric detection of dopamine for in vivo sensing," Session 700: Nanotechnology and Nanobiotechnology for Sensors and Imaging II, Presentation, San Francisco, CA, November 2016
5. Chemical Sciences Student Seminar, "Fluorescent silver nanoclusters: A versatile nanomaterial for the specific detection of DNA and dopamine," UC Santa Barbara, Santa Barba, CA, 2015

6. 16th Annual UC Systemwide Bioengineering Symposium, Shark Tank Competition Finalist, "Fluorescent silver nanoclusters for nucleic acid detection and diagnostics," Presentation, Santa Cruz, CA, June 2015
7. 2nd SoCal Microfluidics and Nanofluidics Symposium, "Fluorescent silver nanoclusters for fluorometric and microfluidic DNA assays," Presentation, Pasadena, CA, June 2015
8. EMBS Micro and Nanotechnology in Medicine Conference, ThBT3.2, "Microfluidic Based Detection of HepA, HepB, and HepC Using Fluorescent Silver Nanocluster Probes (AgNC-DNA)," Oahu, HI, December 2014
9. Center for Bioengineering, "DNA-based nanoscale materials," Seminar, University of California Santa Barbara, May 2014
10. American Physical Society 65th Annual Division of Fluid Dynamics, BAPS.2012.DFD.F1.8, "Resolving distinct conformations of spectrally similar silver-DNA nanoclusters using electrokinetic flows," San Diego, CA November 2012 (Graduate Student Award Winner)
11. University of Twente – BIOS/LabChip Group Seminar, "Electrokinetic behavior of DNA:silver nanoclusters in microfluidic flows," Enschede, Netherlands, September 2012
12. Southern California Symposium on Flow Physics (6th) Presentation, "Resolving distinct conformations of spectrally similar silver-DNA nanoclusters using electrokinetic flow," Santa Barbara, CA, April 2012
13. Junior Nanotech Network Wolfgang Hillen Summer School Symposium, "Resolving distinct conformations of spectrally similar silver-DNA nanoclusters using electrokinetic flows," Santa Barbara, CA, March 2012
14. University of Pennsylvania, Drndic Lab Presentation, Philadelphia, PA, October 2009
15. University of Gothenburg Department of Physics Seminar, "Pressure-driven transport of DNA molecules over an artificial nanotopography," Gothenburg, Sweden, June 2009
16. American Physical Society March Meeting Session W40: Single Molecule Biophysics, "Pressure-driven single-file transport of DNA molecules along linear arrays of nanopits embedded in a slit-like nanochannel," Pittsburgh, PA, March 2009

RESEARCH EXPERIENCE

2016-current
University of California Berkeley
Postdoctoral Scholar
Dept. of Chemical and Biomolecular Engineering, Institute for Quantitative Biosciences (QB3)
Advisor: Prof. Markita Landry

- Constructed custom near infrared spectroscopy and microscopy suite for imaging and characterization of single walled carbon nanotube sensors
- Synthesis and characterization of infrared fluorescent single walled carbon nanotube sensors using adsorbed polymers, including DNA, peptoids and functionalized polymers
- Constructed a two-photon spectrometer to investigate the non-linear excitation of semi-conducting single-walled carbon nanotubes for the NIR fluorescence detection of dopamine

2016-current
Lawrence Berkeley National Lab
Affiliate
Molecular Foundry
Advisor: Ron Zuckermann

- Working as an affiliate to the Molecular Foundry through the user program on an accepted proposal for a 1-year term. I am working with the Biological Nanostructures group to functionalize infrared fluorescent carbon nanotubes with biomimetic peptoid polymers to develop new protein nanosensors.

2011-2016
University of California Santa Barbara
Graduate Student Researcher
Dept. of Mechanical Engineering, Institute for Collaborative Biotechnology
Pennathur and Fygenson Research Groups

- Synthesized and characterized DNA-templated fluorescent silver nanoclusters using microfluidics, capillary electrophoresis and fluorescence spectroscopy
- Developed novel ratiometric fluorescent probes using DNA-silver nanoclusters for specific detection of DNA and neurotransmitters
- Developed a microfluidic assay for the multiplexed detection of DNA using fluorescent silver nanocluster based probes
- Characterized the electrophoretic behavior of DNA molecules in microchannels, nanochannels and capillaries with different surface coatings in free-solution and sieving matrices

2014
California Institute of Technology
Visiting Researcher
Laboratory of Prof. Paul Rothemund, mentor Dr. Ashwin Gopinath

- Studied techniques for self-assembly and self-organization of DNA origami on surface functionalized substrates and characterization using fluid AFM

2012
Ludwig Maximillians University
Junior Nanotech Network Fellow
Center for NanoScience

- Studied techniques for characterizing biomolecules, including TEM of DNA origami and TIRF and FRET studies of tethered proteins

2009 – 2010
Brown University
Staff Research Assistant
Department of Physics
Molecular Biophysics Research Group (Prof. Derek Stein)

- Fabricated nanofluidic channels in fused silica using photolithography and wet etching
- Determined the effect of temperature on the transport and dynamics of confined DNA molecules in nanostructured fluidic channels using fluorescence microscopy
- Designed components for integrating temperature and pressure controls with nanofabricated chips using CAD software

2007 – 2009
Brown University
Undergraduate Research Assistant
Molecular Biophysics Research Group (Prof. Derek Stein)

- Performed and analyzed experiments involving DNA transport across an artificial nanotopography embedded in a nanofluidic channel culminating in first author publication

- Performed fluorescence microscopy experiments involving DNA and nanofluidic devices
- Wrote image analysis software using Matlab

TEACHING AND MENTORING

Teaching Experience:

UC Berkeley: Co-instructor of near-infrared microscopy module for 2nd Annual 4D Advanced Microscopy in Brain Circuits Workshop

UC Santa Barbara: *Assistant Lecturer*: UCSB ME152B (Fluid Mechanics)**;** *Teaching Assistant*: ME104 (Mechatronics Lab), ME6 (Circuits Laboratory), ME105(x2) (Mech. Eng. Laboratory), ME141A (Intro to Nanotechnology)**;** *Reader/Grader*: ME291A (Electricity and Magnetism), ME16 (Dynamics)

Mentoring:

Jeremy Wain-Hirschberg, Ami Thakrar, Inst. for Collaborative Biotechnologies Undergraduate Research Apprenticeship Program (URAP), 2015

Jack Kent Cooke Bridges Program for Engineering and Science Transfers, 2014

John Devany, Worster Summer Research Fellowship, UCSB, 2014

Matthieu Gadel, research experience for Masters student, ENSTA ParisTech, 2012

Early Undergraduate Research and Knowledge Acquisition (EUREKA), 2011

Adam Lucio, Research Internships in Science and Engineering (RISE), 2011

Elizaveta Davies, Internships in Nanosystems Science, Engineering and Technology (INSET), 2011

Research Experience for Teachers (RET) Summer 2009, 2010, 2011

Outreach:

Community Resources for Science, Science fair judge for Oakland Unified School District, 2017

Bay Area Scientists in Schools, 2017, Teach hour long, hands-on lessons on earth science to elementary school students around the Bay Area.

Dinner with a Scientist, 2017, Oakland Unified School District, Chabot Space and Science Center, volunteer scientist.

PROFESSIONAL CONTRIBUTIONS

Conference organizer, UCSB/UCLA Southern California Microfluidics Symposium, The Getty Villa, Los Angeles, CA. 2014

Reviewer for *Electrophoresis, Molecules, RSC Analytical Methods, Chemistry of Materials*

POSTERS AND ADDITIONAL PRESENTATIONS

1. Sculpted Light in the Brain Conference and Workshop, Poster Presentation, UC Berkeley, 2017
2. 17th Annual UC Systemwide Bioengineering Symposium, Poster, San Francisco, CA, June 2016
3. 16th Annual UC Systemwide Bioengineering Symposium, Poster, Santa Cruz, CA, June 2015
4. NanoBioTech Montreux Conference, Poster Session, Montreux, Switzerland, November 2013
5. 17th International Conference on Miniaturized Systems for Chemistry and Life Sciences (MicroTAS), Poster Session, Freiburg, Germany, October 2013
6. Center for Nanoscience (CeNS) - Ludwig Maximilians-Universität Workshop 2012, Poster Session, Venice, Italy, September 2012
7. Brown University Biophysics Journal Club Presentation, Providence, RI, November 2009, February 2010
8. Brown University Prospective Science Students Tour Research Presentation, Providence, RI, Summer 2008, 2009

9. Brown University Department of Physics Annual Poster Session, Providence, RI, November 2008
10. Brown University Summer Research Symposium Poster Session, Providence, RI, August 2008