Linda Chio

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EDUCATION

PhD **University of California, Berkeley,** Chemical Engineering, GPA: 4.0 Expected May 2020
Advisor: Markita P. Landry
Thesis: Designing Single-Walled Carbon Nanotube Optical Sensors for the Detection of Proteins

BS **California Institute of Technology,** Chemical Engineering, With Honors, GPA: 3.7 June 2015
Advisor: Frances H. Arnold
Thesis: Exploring the Robustness of Mutations on Conserved Active Site Residues Through the Directed Evolution of Cytochrome P450

HONORS AND AWARDS

- **National Defense Science & Engineering Graduate (NDSEG) Fellowship** 2017 – 2020
- **AIChE Student Paper Competition in Sensor Technology - Best Presentation Award** 2019
- **AIChE Food, Pharmaceutical and Bioengineering Division Oral Presentation Award** 2018
- **UC Berkeley Graduate Division Travel Award** 2018
- **AIChE Carbon Nanomaterials Graduate Award Session - First Runner Up** 2017
- **National Science Foundation Graduate Research Fellowship**, (Declined in favor of the NDSEG) 2017
- **Lam Research Fellow**, UC Berkeley 2016 – 2017
  Awarded to two graduate students from the College of Chemistry annually by Lam Research
- **RIKEN Quantitative Biology Center Travel Fellowship** 2016
- **Outstanding Graduate Student Instructor**, UC Berkeley 2016
- **Merck Index Award**, Caltech 2015
  Awarded to one outstanding student in the College of Chemistry in their senior year
- **SanPietro Travel Grant,** Caltech 2015
  Travel grant awarded to up to 4 applicants annually for solo adventurous travel

PUBLICATIONS

11) Pinals, R.L., **Chio, L.,** Ledesma, F., Landry, M.P. Invited submission in preparation for *Analyst.* (2020)

10) **Chio, L.**, Pinals, R.L., Murali, A., Goh, N.S., Landry, M.P. Covalent Surface Modification Effects on Single-Walled Carbon Nanotubes for Multimodal Optical Applications. Under review at *Advanced Functional Materials.* Available on *bio*RXiv (2019), DOI: 10.1101/837278v1

9) Lui, A.,* Wang, J.,* **Chio, L.**, Landry, M.P. Synthetic Probe Development for Measuring Single or Few-Cell Activity and Efflux. *Methods in Enzymology*, (2019), DOI: 10.1016/bs.mie.2019.06.019

8) **Chio, L.**, Del Bonis-O'Donnell, J.T., Kline, M.A., Kim, J.H., McFarlane, I.R., Zuckermann, R.N., Landry, M.P. Electrostatic-Assemblies of Single-Walled Carbon Nanotubes and Sequence-Tunable Peptoid Polymers Detect a Lectin Protein and its Target Sugars. *Nano Letters,* (2019), DOI: 10.1021/acs.nanolett.8b04955

7) Demirer, G.S., Zhang H., Matos J.L., Goh, N., Cunningham, F.J., Sung, Y.H., Chang R., Aditham, A.J., **Chio L.**, Cho, M.J., Staskawicz, B., Landry, M.P. High Aspect Ratio Nanomaterials Enable Delivery of Functional Genetic Material Without DNA Integration in Mature Plants. *Nature Nanotechnology,* (2019), DOI: 10.1038/s41565-019-0382-5

6) Del Bonis-O'Donnell, J.T., **Chio, L.**, Dorhliac, G., McFarlane, I.R., Landry, M.P. Advances in Nanoparticles in Brain Imaging. *Nano Research*, (2018), DOI: 10.1007/s12274-018-2145-2

5) **Chio, L.,*** Yang, D.,* Landry, M.P. Surface Engineering of Nanoparticles to Create Synthetic Antibodies. *Methods Mol. Bio.,* (2017) 1575: 363-380, DOI: 10.1007/978-1-4939-6857-2_23

4) Del Bonis-O'Donnell, J.T., Beyene, A. G., **Chio, L.**, Demirer, G. S., Yang, D., Landry, M.P. Engineering Molecular Recognition with Bio-mimetic Polymers on Single Walled Carbon Nanotubes. *Journal of Visualized Experiments* (2017), e55030, DOI: 10.3791/55030

3) Landry, M.P., Ando, H., Chen, A., Cao, J., Kottadiel, V. I., **Chio, L.**, Yang, D., Dong, J., Lu, T., Strano, M.S. Single-Molecule Detection of Protein Efflux from Isolated Microorganisms using Fluorescent Single Walled Carbon Nanotube Sensor Arrays. *Nature Nanotechnology,* (2017) DOI: 10.1038/nnano.2016.284

2) McIntosh, J. A., Heel, T., Buller, A., **Chio, L.**, Arnold, F. H. Structural Adaptability Facilitates Histidine Heme Ligation in Cytochrome P450. *J. Am. Chem. Soc.,* (2015) 137(43): 13861-13865, DOI: 10.1021/jacs.5b07107

1) Bergner, M., Duquette, D. C., **Chio, L.**, Stoltz, B. M. Exceedingly Efficient Synthesis of Grandifloracin and Acylated Analogues. *Organic Letters*, (2015) 17: 3008-3010, DOI: 10.1021/acs.orglett.5b01292

RESEARCH EXPERIENCE

Markita P. Landry's Research Group - UC Berkeley Berkeley, CA
PhD Candidate, Graduate Student Researcher Fall 2015 – present

- Constructing and characterizing nanoscale biosensors for the label-free detection of small protein analytes, particularly VEGF and oxytocin, using non-covalently linked single-walled carbon nanotubes and amphiphilic polymers, such as peptoids and DNA aptamers
- Developing single-walled carbon nanotubes with targeted biological recognition elements for high-contrast imaging and a modular platform of sensor production using covalent bioconjugation

Frances H. Arnold's Research Group - Caltech Pasadena, CA
Undergraduate Student Researcher Winter 2014 – Summer 2015

- Built enzyme libraries of the monooxygenase cytochrome P450 through directed evolution to enable the development of non-native enzyme cyclopropanation functionality for chemical synthesis
- Resolved structural rearrangements of the active site in P450 Cyp119 using absorbance spectroscopy and X-ray crystallography showing unprecedented flexibility of the active site that allows further protein directed evolution

Research Conjugation Lab - Genentech South San Francisco, CA
Protein Isolation Intern Summer 2014

- Synthesized through maleimide-sulfhydryl chemistry and preliminarily tested 8 novel antibody-drug conjugates for preclinical trials
- Improved antibody-drug conjugation purification through novel separation technology by altering the isoelectric point of the antibody

Gregory Stephanopoulos & Gerald R. Fink Groups - Whitehead Institute, MIT Cambridge, MA
Hannah Bradley SURF Fellow Summer 2013

- Created pH-sensitive fluorescent yeast strains through gene cloning in development of a quantitative high-throughput screen to improve biofuel production

Brian M. Stoltz's Research Group - Caltech Pasadena, CA
Undergraduate Student Researcher, Arthur R. Adams SURF Fellow Fall 2011 – Fall 2012

- Synthesized cancer treatment drugs through the development of less hazardous organic synthesis techniques

PRESENTATIONS

14) **237th Electrochemical Society Meeting:** The Impact of Covalent Functionalization on Single-Walled Carbon Nanotube Biosensor Fluorescence and Function; Oral Presentation; Montreal, Canada; May 2020

13) **American Institute of Chemical Engineers Annual Meeting:** The Impact of Covalent Functionalization on Single-Walled Carbon Nanotube Sensor Fluorescence and Function; Oral Presentation; Orlando, FA; November 2019

12) **American Institute of Chemical Engineers Annual Meeting:** Protein Dection with Peptoid-Functionalized Carbon Nanotube Optical Sensors; Oral Presentation; Orlando, FA; November 2019

11) **National Defense Science and Engineering Graduate Fellows Symposium:** High-throughput Development of Optical Sensors for Biological Detection; Poster Presentation; San Diego, CA; August 2019

10) **American Institute of Chemical Engineers Annual Meeting:** Probing Peptoid-Carbon Nanotube Coatings for Biological Imaging; Oral Presentation; Pittsburgh, PA; November 2018

9) **American Institute of Chemical Engineers Annual Meeting:** Protein Detection with Peptoid-Functionalized Carbon Nanotube Optical Sensors; Oral Presentation; Pittsburgh, PA; November 2018

8) **Molecular Foundry User Meeting:** Optimizing Peptoid-Carbon Nanotube Coatings for Biological Sensing; Oral Presentation; Berkeley, CA; August 2018

7) **American Institute of Chemical Engineers Annual Meeting:** Carbon Nanomaterials Graduate Award Session; Oral Presentation; Minneapolis, MN; November 2017

6) **American Institute of Chemical Engineers Annual Meeting:** Antibody-Mimetic Protein Detection with Peptoid-Functionalized Near-Infrared Carbon Nanotube Optical Sensors; Oral Presentation; Minneapolis, MN; November 2017

5) **Molecular Foundry's 10th Peptoid Summit:** Peptoid-Carbon Nanotube Sensors for Protein Detection; Lightning Round Presentation and Poster Presentation; Berkeley, CA; August 2017

4) **Zuckerberg Biohub Interlab Confab**: The Power of Near Infrared Light to Probe Complex Biological Systems; Poster Presentation; San Francisco, CA; August 2017

3) **Center for the Physics of Living Cells Summer School:** Peptoid-Carbon Nanotube Sensors for Protein Detection; Poster Presentation; Urbana-Champagne, IL; June 2017

2) **RIKEN Quantitative Cell Biology Symposium:** Synthetic Antibodies for Direct Near-infrared Imaging of Cellular Metabolites and Proteins; Poster Presentation; Osaka, Japan; September 2016

1) **University of California Systemwide Bioengineering Symposium:** Nanoparticle-Polymer Conjugates for Near-Infrared Biomolecular Detection; Poster Presentation; San Francisco, CA; June 2016

TEACHING AND MENTORING EXPERIENCE

Markita P. Landry's Research Group - UC Berkeley Berkeley, CA

Research Mentor Spring 2016 – Present

- Managed three undergraduate students and three rotation students on independent research projects

Transition to Excellence Research Mentor Summer 2019

- Mentored a California community college student in her first research opportunity

UC Berkeley Graduate Student Instructor Berkeley, CA

Chemical Engineering Thermodynamics Spring 2018

- Instructed 55 undergraduate students in discussion section each week
- Created course material for 160 undergraduate students on a core curriculum course about the laws of thermodynamics, energy cycles, phase equilibria, fugacity, and chemical activity

Technical Communications for Chemical Engineers Spring 2016

- Instructed 50+ undergraduate students in discussion section each week
- Improved students' communication skills for scientific presentations, technical writing, and ethics

Introduction to Chemical Engineering Design Fall 2015

- Led weekly discussion sections for 20 students on process development, conservation laws, and energy and mass balances
- Honored with an Outstanding Graduate Student Instructor award for teaching excellence

VOLUNTEER AND SERVICE EXPERIENCE

Contributing Reviewer for Nano Letters, ACS Sensors, Scientific Reports, Journal of the American Chemical Society

American Institute of Chemical Engineers Fall 2011 – present

- **Caltech Undergraduate Chapter:** Fall 2011 – Spring 2015

Freshmen Representative (Fall 2011 – Spring 2012), Secretary (Fall 2012 – Spring 2014): Engaged students across the chemical engineering major in outreach and academic support activities including: student-to-student mentoring, industrial mentoring, and information panels

Chemical Engineering Graduate Student Advisory Committee – UC Berkeley Fall 2015 – present

- Organizing a student-invited speaker symposium for the chemical engineering department
- Elected to plan a department social to promote communication between staff, professors, and students

Graduate Women Engineers – UC Berkeley Fall 2015 – present

- **Speaker Series Chair** (Fall 2017 – Spring 2019) – organized a speaker series with 4 speakers a year aimed at the professional development of women engineers
- **Industry and Alumni Relations Chair** (Fall 2019 – Spring 2020) – coordinating industry mentorship and establishing industry partnerships and sponsorship

Bay Area Scientists in Schools – UC Berkeley Fall 2016 – Spring 2019

- **Instructor** – taught second graders a hands-on lesson on soils within the East Bay Area community

Biotech Connection Bay Area Spring 2019 – Fall 2019

- **Consultant** – Guided client strategy in the prioritization of oncological indications

Expanding Your Horizons – UC Berkeley Spring 2017 – Spring 2019

- **Finance Planning Committee** (Fall 2017 – Spring 2019) – managed and raised over $23,000 every year for a one-day Bay Area STEM conference for middle school girls

Graduate Pathway Symposium – UC Berkeley Fall 2015 – Fall 2017

- **Mentor** – mentored 4 first generation students about graduate school
- **Recruitment Committee Member** – coordinated with area colleges to mentor students on graduate school

Graduate Assembly – UC Berkeley August 2016 – May 2017

- **Delegate Alternate** – voted as a delegate alternate for the chemical engineering department with the ability to vote on graduate student policies enacted by the Graduate Assembly during the absence of primary delegates
- **Committee on Teaching Member** – sole graduate student representative in a committee with professors to make recommendations on good teaching practices schoolwide and evaluated candidates for the Distinguished Teaching Award, the highest UC Berkeley award on teaching

Be A Scientist Program – UC Berkeley February 2016 – May 2016

- **Mentor** – mentored 5 seventh graders with hands-on instruction on independent science projects