

Curriculum Vitae
Jane M. Liu

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EDUCATION AND TRAINING

Tufts University School of Medicine, Boston, MA: 2006-2009
TEACRS (IRACDA/NIGMS) Postdoctoral Fellow

Harvard University, Cambridge, MA: 2001-2006
Ph.D., Chemistry

Swarthmore College, Swarthmore, PA: 1996-2000
B.A., Biochemistry, High Honors

ACADEMIC POSITIONS HELD

Associate Professor of Chemistry, Pomona College: 2018-present

Teaching: General Chemistry, Organic Chemistry, Biochemistry, Chemical Biology, and Research in Chemistry and Molecular Biology

Assistant Professor of Chemistry, Pomona College: 2012-2018

Assistant Professor of Chemistry, Drew University: 2009-2012

RESEARCH EXPERIENCE

Principle Investigator, Pomona College, Department of Chemistry: 2012-present

*Investigating gene regulation in *Vibrio cholerae*; engineering nucleic acid-based biosensors*

Sabbatical Leave Research: Visiting Associate of Biology and Biological Engineering, California Institute of Technology: 2015-2016

Proteome Exploration Laboratory (Laboratory directed by Sonja Hess). Research in mass spectrometry based proteomics

Principle Investigator, Drew University, Department of Chemistry: 2009-2012

*Research on non-canonical RNAs in *Escherichia coli* and *Vibrio cholerae**

NIH/NIGMS IRACDA Postdoctoral Fellow, Tufts University School of Medicine: 2006-2009

*Department of Molecular Biology and Microbiology (Laboratory of A. Camilli). Experimental discovery of new sRNAs in the enteric pathogen *Vibrio cholerae* through the use of direct cloning, 5S/tRNA-depletion and massively parallel sequencing*

NSF Predoctoral Fellow/Graduate Research Assistant, Harvard University: 2001-2006

*Department of Chemistry and Chemical Biology (Laboratory of D.R. Liu). Functional dissection of natural RNAs in *Escherichia coli* and *Saccharomyces cerevisiae* by nonhomologous random recombination and in vivo selections*

Undergraduate Research Assistant, Swarthmore College: 1999-2000

Department of Chemistry (Laboratory of R.S. Paley). Honors thesis exploring intramolecular pinacol coupling and ring-closing metathesis of enantiopure sulfinyl iron(0) dienes

Summer Research Assistant, Rutgers University - New Brunswick: 1998

Department of Chemistry (Laboratory of R.A. Jones). Synthesized ¹⁵N-labeled guanosine for investigations on metal-binding by RNA

FELLOWSHIPS, GRANTS AND AWARDS/RECOGNITION

Research grants

National Institutes of Health Research Grant R15 AI090606: 2010-2022

Title: "The Regulatory Networks that Allow *Vibrio cholerae* to Survive Between Infections and Epidemics"

Principle Investigator

National Science Foundation Research Grant IUSE-1841992: 2019-2022

Title: "Development of Novel Augmented Reality Tool for Teaching Molecular Visualization in Biochemistry"

Senior Personnel

Henry Dreyfus Teacher-Scholar Award: 2016-2021

Title: "Molecular Understanding and Applications of Bacterial RNAs"

Principle Investigator

National Science Foundation Research Grant CBET-1258307: 2012-2018

Title: "CAREER: Riboswitch-Based Whole-Cell Biosensors to Detect Small Organic Molecules: A Combined Educational and Research Plan"

Principle Investigator

Training in Education and Critical Research Skills (TEACRS) Postdoctoral Fellowship, National Institute of General Medical Science (NIGMS): 2006-2009

National Science Foundation (NSF) Graduate Research Fellowship: 2002-2005

Professional awards and recognition

Wig Distinguished Professor Award for Excellence in Teaching, Pomona College: 2015, 2020

National Institutes of Health Academic Research Enhancement Award: 2010, 2014, 2019

Jean Dreyfus Lectureship for Undergraduate Institutions (co-lead Principal Investigator): 2017

Henry Dreyfus Teacher-Scholar Award: 2016

National Science Foundation CAREER Award: 2012

Distinction in Teaching at Harvard University: 2001, 2002 (2), 2004

Elected to Phi Beta Kappa: 2000

Elected to Sigma Xi: 2000

PUBLICATIONS (asterisk: work from J. Liu's independent career; underlined: students mentored by J. Liu)

1. *Sung R-J, Wilson A, Lo S, Crowl L, Nardi J, St. Clair K, **Liu JM**. Biochem AR—an augmented reality educational tool for teaching macromolecular structure and function. *Journal of Chemical Education*. **2020**. 97, 147-153.
2. *Zhang M, **Liu JM**. Transcription of *cis* antisense small RNA MtlS in *Vibrio cholerae* is regulated by transcription of its target gene, *mtlA*. *Journal of Bacteriology*. **2019**. 201, e00178-19
3. *Page K, Shaffer J, Lin S, Zhang M, **Liu JM**. Engineering riboswitches *in vivo* using dual genetic selection and fluorescence-activated cell sorting. *ACS Synthetic Biology*. **2018**. 7, 2000-6.
4. *Byer T, Wang J, Zhang M, Blachman A, Vather N, Visser B, **Liu JM**. MtlR negatively regulates mannitol utilization by *Vibrio cholerae*. *Microbiology*. **2017**, 163, 1902-1911.
5. ***Liu JM**, Sweredoski MJ, Hess S. Improved 6-plex tandem mass tags quantification throughput using a linear ion trap-high-energy collision induced dissociation MS3 scan. *Analytical Chemistry*. **2016**, 88, 7471-7475.

6. *Vasquez TE, Saldaña C, Muzikar KA, Mashek D, **Liu JM**. Searching for synthetic antimicrobial peptides: An experiment for organic chemistry students. *Journal of Chemical Education*. **2016**, *93*, 1103–1107.
7. *Chang H, Replogle JM, Vather N, Tsao-Wu M, Mistry R, **Liu JM**. A *cis*-regulatory antisense RNA represses translation in *Vibrio cholerae* through extensive complementarity and proximity to the target locus. *RNA Biology*. **2015**, *12*, 136-148.
8. *Mustachio LM, Aksit S, Mistry RH, Scheffler R, Yamada A, **Liu JM**. The *Vibrio cholerae* mannitol transporter is regulated post-transcriptionally by the MtlS small RNA. *Journal of Bacteriology*. **2012**, *194*, 598-606.
9. ***Liu JM**, Camilli A. Discovery of sRNAs by high-throughput sequencing. In: Kwon YM, Ricke SC eds. *Methods in Molecular Biology*. Vol 733. New York, NY: Humana Press; **2011**.
10. ***Liu JM**, Camilli A. A broadening world of bacterial small RNAs. *Current Opinions in Microbiology* **2010**, *13*, 18-23.
11. Wang W, Zha J, Han Q, Wang G, Yang G, Shallop AJ, **Liu JM**, Gaffney BL, Jones, RA. Modulation of RNA metal binding by flanking bases: ¹⁵N NMR evaluation of GC, tandem GU, and tandem GA sites. *Nucleosides, Nucleotides & Nucleic Acids* **2009**, *28*, 424-434.
12. Paley RS, Berry KE, **Liu JM**, Sanan TT. Diastereoselective intramolecular pinacol couplings of sulfinyl iron(0) diene complexes. *Journal of Organic Chemistry* **2009**, *74*, 1611-1620.
13. **Liu JM**, Livny J, Lawrence MS, Kimball MD, Waldor MK, Camilli A. Experimental discovery of sRNAs in *Vibrio cholerae* by direct cloning, 5S/tRNA-depletion and parallel sequencing. *Nucleic Acids Research* **2009**, *37*, e46.
14. **Liu JM**, Liu, DR. Discovery of a mRNA mitochondrial localization element in *Saccharomyces cerevisiae* by nonhomologous random recombination and *in vivo* selection. *Nucleic Acids Research* **2007**, *35*, 6750-6761.
15. **Liu JM**, Bittker JA, Lonshteyn M, Liu DR. Functional dissection of sRNA translational regulators using nonhomologous random recombination and *in vivo* selection. *Chemistry & Biology* **2005**, *12*, 757-767.
16. Bittker JA, Le BV, **Liu JM**, Liu DR. Directed evolution of protein enzymes using nonhomologous random recombination. *Proceedings of the National Academy of Sciences USA* **2004**, *101*, 7011-7016.
17. Paley RS, **Liu JM**, Lichtenstein BR, Knoedler VL, Sanan TT, Adams DJ, Fernandez J, Rablen PR. Simultaneous and stereoselective formation of planar and axial chiralities in enantiopure sulfinyl iron diene complexes. *Organic Letters* **2003**, *5*, 309-312.

SELECTED PRESENTATIONS (asterisk: work from J. Liu's independent career; underlined: students mentored by J. Liu)

1. *Beck C, Perry S, **Liu JM**. **2020**. Regulation of the genes encoding the fructose-specific transport system of *Vibrio cholerae*. Gordon Research Conference: Sensory Transduction in Microorganisms: Ventura, CA. (Poster Presentation)
2. *Beck C, Perry S, **Liu JM**. **2019**. CRP and Cra have opposing activities in the regulation of the fructose operon in *Vibrio cholerae*. Molecular Genetics of Bacteria and Phage: Madison, WI. (Poster Presentation)
3. ***Liu JM**. **2019**. Applying the C.R.E.A.T.E. approach to bridge the jump from introductory to upper-level chemistry courses. Gordon Research Conference, Chemistry Education Research and Practice: Lewiston, ME. (Poster Presentation)

4. ***Liu JM. 2019.** On again and off again: A riboswitch story: Loyola Marymount University. (Invited Seminar on Research)
5. ***Liu JM, Page K, Shaffer J, Lin S. 2018.** Evolving novel riboswitches through *in vivo* genetic selection and cell sorting. 5th International Conference on Regulating with RNA in Bacteria and Archaea: Seville, Spain. (Poster Presentation)
6. ***Liu JM. 2018.** RNA + Bacteria + Evolution = Sensors! Department of Chemistry: Hope College. (Invited Seminar on Research)
7. *Hanson P[‡], Kowalski JR[‡], **Liu JM[‡]**, Stultz L[‡]. **2017.** Creating synergy by integrating interdisciplinary research and teaching (I²RT). 2017 IRACDA Conference: Birmingham, AL. (1.5-hour Symposium/Mini-Workshop) [[‡]Co-presenters]
8. *Cunningham A[‡] and **Liu JM[‡]**. **2017.** Starting with the end in mind: Selecting assessment tools that improve learning and satisfy accountability. 2017 WASC Senior College and University Commission Academic Resource Conference: San Diego, CA. (1-hour Symposium/Mini-Workshop) [[‡]Co-presenters]
9. ***Liu JM. 2016.** Creating riboswitch-based whole cell biosensors for small organic molecules. 252nd ACS National Meeting: Philadelphia, PA. (Oral Presentation, Young Academic Investigator Symposium)
10. *Coyle MC, Hansen E, Sweredoski MJ, Solvik T, Moradian A, Hess S, **Liu JM. 2016** The sRNA MtlS and post-translational regulation of the mannitol transporter in *Vibrio cholerae*. Gordon Research Conference, Microbial Stress Response: Mount Holyoke, MA. (Poster Presentation)
11. ***Liu JM**, Sweredoski MJ, Hess S. **2016** Increasing protein quantification in 6-plex TMT experiments. 64th ASMS Conference on Mass Spectrometry and Allied Topics: San Antonio, TX. (Poster Presentation)
12. *Vather N, Blachman A, **Liu JM. 2016** MtlR regulates transport of the sugar alcohol mannitol in *Vibrio cholerae*. Gordon Research Conference, Sensory Transduction in Microorganisms: Ventura, CA. (Poster Presentation)
13. *Coyle MC, Hansen E, Sweredoski MJ, Solvik T, Moradian A, Hess S, **Liu JM. 2015.** Mass spectrometry-based identification of proteins affected by the mannitol operon small RNA, MtlS, in *Vibrio cholerae*. 4th International Conference on Regulating with RNA in Bacteria and Archaea: Cancun, Mexico. (Poster Presentation)
14. ***Liu JM. 2014.** Small RNAs, Big Roles in Gene Regulation. Department of Microbiology: University of California, Riverside. (Invited Seminar on Research)
15. *Scheffler R, Vather N, Replogle J, Mistry R, **Liu JM. 2013** A noncoding RNA inhibits synthesis of the mannitol permease in *Vibrio cholerae*. 3rd International Conference on Regulating with RNA in Bacteria: Würzburg, Germany. (Poster Presentation)
16. ***Liu JM. 2013.** Small RNAs and sugars in *Vibrio cholerae*: Sweet regulation. Department of Biology: Harvey Mudd College. (Invited Seminar on Research)
17. ***Liu JM. 2012.** Great big world of bacterial small RNAs. Keck School of Medicine (Global Medicine Program): University of Southern California. (Invited Seminar on Research)
18. ***Liu JM**, Mustachio LM, Aksit A, Mistry R. **2011.** The *Vibrio cholerae* MtlS small RNA regulates gene expression in response to changes in carbon source. ASM Conference on Regulating RNA in Bacteria: San Juan, Puerto Rico. (Poster Presentation)
19. **Liu JM**, Kimball MD, Camilli A. **2009.** An sRNA regulator of mannitol uptake in *Vibrio cholerae*. Symposium on Bacterial Cell Biology and Pathogenesis: Umea, Sweden. (Oral Presentation)

RESEARCH EXPERIENCE WITH STUDENTS

Supervised Research Students at Pomona College (underlined: STEM student from minoritized group)
#Beckman Scholar; §Fulbright Scholar / Watson Fellow; *Goldwater Scholar; **ASM-Undergraduate Research Fellow

Student (class year)	Term(s)	Current/last known position
Dylan Santa ('23)	Sept 2020 – present	current Pomona undergraduate
Eleanor Mackey ('22)	Sept 2020 – present	current Pomona undergraduate
Kate Aris ('22)	Sept 2020 – present	current Pomona undergraduate
<u>Andrea Perla</u> ('22)	Sept 2020 – present	current Pomona undergraduate
Casey Morrison ('21)	Sept 2020 – present	current Pomona undergraduate
<u>Christabel Egemba</u> ('21)	Sept 2020 – present	current Pomona undergraduate
Nathalie Hong ('21)	May 2020 – present	current Pomona undergraduate
Sayde Perry ('22)	May 2019 – present	current Pomona undergraduate
Eric Tang ('21)	May 2019 – present	current Pomona undergraduate
Noelle Mitchell ('20)	Jan 2019 – May 2020	Ph.D. student, UCLA
Chanha Kim ('22)	Jan 2019 – Jul 2019	current Pomona undergraduate
Calder Hollond ('21)	Jan 2019 – present	current Pomona undergraduate
<u>Caitlin Halligan</u> ('21)	Jan 2019 – May 2019	current Pomona undergraduate
<u>Micayla George</u> ('20)	Jan 2019 – May 2020	Research Assistant, Broad Institute
<u>Hussein Faara</u> ('21)	Jan 2019 – May 2019	current Pomona undergraduate
<u>Sabrina Mendez-Contreras</u> ('18)	May 2017 – May 2018	M.D. student, UCSF
Maryann Zhao# ('18)	Jan 2017 – Aug 2018	M.D. student, Harvard University
Jessica Wang ('18)	Jan 2017– May 2018	M.D. student, UC Irvine
Samuel Lin ('20)	Jan 2017 – Jul 2017	B.A. Economics
<u>Theodore Lang</u> ('19)	Jan 2017 – May 2019	M.D. student, U. Chicago
Christina Beck*# ('20)	Jan 2017 – Aug 2020	Ph.D. student, MIT
Katharine Page ('17)	May 2016 – Aug 2017	Ph.D. student, Caltech
Mark Zhang# ('17)	Mar 2016 – Jul 2018	Ph.D. student, Caltech
<u>Tanner Byer</u> *§ ('17)	Mar 2016 – May 2017	Watson Fellow
Elisabeth Hansen§ ('16)	Jan 2015 – May 2016	M.D. student, Harvard University
Marek Zorawski§ ('16)	Jan 2015 – May 2016	M.D./Ph.D. student, Duke University
Jeremy Shaffer ('15)	Sept 2014 – Aug 2016	Masters' student, Cornell University
Maya Tsao-Wu ('17)	May 2014 – May 2017	M.D. student, Penn State
<u>Erick Velasquez</u> ('16)	Mar 2014 – May 2016	Ph.D. student, UCLA
Anna Blachman ('16)	Mar 2014 – May 2016	EcoTruck (Ho Chi Minh City, Vietnam)
Catherine Song ('17)	Jan 2014 – May 2015	M.D. student, USC
Daniel Phan ('16)	Jan 2014 – May 2016	M.D. student, USC
Laurel Estes ('15)	Jan 2014 – May 2015	Ginkgo Bioworks, Inc.
<u>Cristina Saldaña</u> ('15)	Summer 2013	Master's student, UC Irvine
Howard Chang ('14)	May 2013 – May 2014	M.D. student, Johns Hopkins
Abe Cass ('14)	Jan 2013 – Aug 2013	Schwarzman Scholar
Maxwell Coyle ('14)	Jan 2013 – May 2014	Ph.D. student, UC Berkeley
John Replogle ('14)	Jan 2013 – May 2014	Ph.D. student, MIT
Kristina Solvik** ('15)	Jan 2013 – May 2015	Ph.D. student, UCSF
<u>Naomi Vather</u> ('15)	Jan 2013 – May 2015	M.D. student, U. Iowa

Supervised Research Students at Drew University (underlined: STEM student from minoritized group)
* Goldwater Scholar; ** ASM-Undergraduate Research Fellow; # Successfully wrote and defended honors research thesis

<i>Student (class year)</i>	<i>Term(s)</i>	<i>Current/last known position</i>
<u>Stacey Ceron</u> ('12)	Sept 2011 – May 2012	Ph.D. student, Dartmouth College
Aleksander Kubiak ('13)	Summer 2011	M.D. student, Drexel University
Taras Varshavsky ('13)	Summer 2011	M.D., Rutgers University
Jarod Grossman ('12)	Jan 2011 – Aug 2011	Ph.D., Syracuse University
Ross Shamby ('11)	Fall 2010	Ph.D. student, Tulane University
Lalita Nekkanti ('11)	Fall 2010	Dental student, Tufts University
Robert Scheffler*# ('14)	Jul 2010 – May 2014	Ph.D., Princeton University
Ronak Mistry#('13)	May 2010 – May 2013	D.O., Rowan University
Akikuni Yamada ('11)	Jun 2010 – Dec 2010	B.A. Biochem. Mol. Biol
<u>Selime Aksit**#</u> ('12)	Jan 2010 – Aug 2012	Medical student, Hacettepe Medical School
Lisa Maria Mustachio#('11)	Jan 2010 – May 2011	Ph.D., Dartmouth College

SELECTED STUDENT RESEARCH PRESENTATIONS – PEER-REVIEWED ABSTRACTS (underlined: students mentored by J. Liu; *: presenting author)

1. Beck C*, Perry S, **Liu JM. 2020**. CRP and Cra have antagonistic roles in the regulation of the fructose operon in *Vibrio cholerae*. ASBMB 2020 Annual Meeting: San Diego, CA. (Poster Presentation) Conference canceled.
2. George M* and **Liu JM. 2020**. Regulation of the mannitol locus by MtlR in *Vibrio cholerae*. ASBMB 2020 Annual Meeting: San Diego, CA. (Poster Presentation) Conference canceled.
3. Zhang M* and **Liu JM. 2018**. Exploring the regulation of a *cis*-antisense RNA in *Vibrio cholerae*. ASM Microbe 2018: Atlanta, GA. (Poster Presentation)
4. Mendez-Contreras S*, Tsao-Wu M, **Liu JM. 2018**. Identifying regulatory targets of the small RNA MtlS in *Vibrio cholerae*. ASBMB 2018 Annual Meeting: San Diego, CA. (Poster Presentation)
5. Wang J*, Zhang M, **Liu JM. 2018**. Transcriptional and post-transcriptional regulation of *mtlA* in *Vibrio cholerae*. ASBMB 2018 Annual Meeting: San Diego, CA. (Poster Presentation)
6. Zhang M*, Byer I, Wang J, **Liu JM. 2017**. MtlR negatively regulates mannitol transport by *Vibrio cholerae*. SCASM 2017 Meeting: San Diego, CA. (Poster Presentation)
7. Hansen EE*, Coyle MC, **Liu JM. 2016**. Investigating the mechanism by which the small RNA MtlS regulates the mannitol protein transporter at the post-translational level in *Vibrio cholerae*. ASBMB 2016 Annual Meeting: San Diego, CA. (Oral Presentation)
8. Zorawski M*, Shaffer J, Velasquez E, **Liu JM. 2016**. Creating a riboswitch-based whole-cell biosensor for bisphenol A. ASBMB 2016 Annual Meeting: San Diego, CA. (Poster Presentation)
9. Shaffer J*, Velasquez E, **Liu JM. 2015**. Creating a riboswitch-based whole-cell biosensor for BPA. 2015 Synthetic Biology: Engineering, Evolution and Design (SEED) Conference: Boston, MA. (Poster Presentation)
10. Shaffer J*, Phan D*, Velasquez E, **Liu JM. 2015**. Creating riboswitch-based whole cell biosensors for small organic molecules. 115th General Meeting of the American Society for Microbiology: New Orleans, LA. (Poster Presentation)
11. Vather N*, Tsao-Wu M*, **Liu JM. 2015**. MtlR is one of several regulators of mannitol transporter synthesis in *Vibrio cholerae*. 115th General Meeting of the American Society for Microbiology: New Orleans, LA. (Poster Presentation)
12. Solvik TA*, **Liu JM. 2015**. Investigating the role of CRP in mannitol operon small RNA (MtlS) expression in *Vibrio cholerae*. 115th General Meeting of the American Society for Microbiology: New Orleans, LA. (Poster Presentation)

PROFESSIONAL SERVICE

Ad hoc reviewer for *ACS Synthetic Biology*, *Journal of Chemical Education*, Oxford University Press, *PLoS One*, *PNAS*, *WIREs RNA*: 2011 – present

Ad hoc reviewer for Austrian Science Fund: 2017

Panelist for “Funding at PUIs”, hosted by TEACRS, Tufts University: March 2015; March 2018

Panel reviewer for NSF CBET grant proposals: 2014

Panelist for “Bay Area Postdocs: Workshop on Scientific Teaching”, hosted by SEPAL: February 2014

Panelist for “Negotiating the Job Offer”, National IRACDA Conference 2010: June 2010

POMONA COLLEGE SERVICE

Committees

2020 – 2021 Faculty Committee on Strategic Vision Implementation

2020 – 2021 Research Committee, chair

2019 – 2021 Faculty Advisor, Pomona Scholars of Science 7

2019 – 2021 PI, HHMI IE3 Working Group

2019 – 2020 Ad hoc committee of assessment of P/NC grading for CHEM001A-PO

2019 – 2020 Research Committee

Spring 2019 Health Sciences Committee

2018 – 2020 Strategic Planning Steering Committee (elected position)

2016 – 2018 Executive Committee / Division II chair (elected position)

2013 – 2015 Academic Procedures Committee / Academic Discipline Board / Academic Standards Committee

PROFESSIONAL MEMBERSHIPS

American Chemical Society since 2005

American Society for Biochemistry and Molecular Biology since 2015

American Society for Microbiology since 2006