

Curriculum Vitae
Jane M. Liu

Pomona College
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EDUCATION AND TRAINING

Tufts University School of Medicine, Boston, MA, USA: 2006-2009
IRACDA Postdoctoral Fellow

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

Swarthmore College, Swarthmore, PA, USA: 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; chemistry education

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

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 using 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

Grants

Howard Hughes Medical Institute IE3 Learning Grant: 2021-2023

Program Director

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

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

Principal 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"

Principal 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"

Principal Investigator

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

National Science Foundation 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. *Hollond C, Sung R-J, **Liu JM**. Integrating anti-racism, social justice, and equity themes in a biochemistry class. *Journal of Chemical Education*. **Article ASAP**. DOI: 10.1021/acs.jchemed.1c00382
2. *Beck C, Perry S, Stoebel DM, **Liu JM**. Cra and cAMP receptor protein have opposing roles in the regulation of *fruB* in *Vibrio cholerae*. *Journal of Bacteriology*. **2021**. 203, e00044-21.
3. *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.
4. *Zhang M, **Liu JM**. Transcription of *cis* antisense small RNA MtlS in *Vibrio cholerae* is regulated by transcription of its target gene, *mtIA*. *Journal of Bacteriology*. **2019**. 201, e00178-19.

5. *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.
6. *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.
7. ***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.
8. *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.
9. *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.
10. *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.
11. ***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**.
12. ***Liu JM**, Camilli A. A broadening world of bacterial small RNAs. *Current Opinions in Microbiology* **2010**, 13, 18-23.
13. 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.
14. 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.
15. **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.
16. **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.
17. **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.
18. 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.
19. 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)

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1. ***Liu JM**, Hollond C, Sung R-J. **2021**. Incorporating anti-racism and equity themes in a biochemistry class. ASBMB 2021 Annual Meeting: Virtual Conference. (Poster Presentation)
 2. *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)

3. *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)
4. ***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)
5. ***Liu JM**. 2019. On again and off again: A riboswitch story: Loyola Marymount University. (Invited Seminar on Research)
6. ***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)
7. ***Liu JM**. 2018. RNA + Bacteria + Evolution = Sensors! Department of Chemistry: Hope College. (Invited Seminar on Research)
8. *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]
9. *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]
10. ***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)
11. *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)
12. ***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)
13. *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)
14. *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)
15. ***Liu JM**. 2014. Small RNAs, Big Roles in Gene Regulation. Department of Microbiology: University of California, Riverside. (Invited Seminar on Research)
16. *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)
17. ***Liu JM**. 2013. Small RNAs and sugars in *Vibrio cholerae*: Sweet regulation. Department of Biology: Harvey Mudd College. (Invited Seminar on Research)
18. ***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)
19. ***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)

20. **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
Eleanor Mackey ('22)	Sept 2021 – present	current Pomona undergradaute
Eugene Kwon ('23)	Summer 2021	current Pomona undergraduate
Andrea Perla ('22)	Jan 2021 – present	current Pomona undergraduate
Amy Kaneshiro ('22)	Jan 2021 – present	current Pomona undergraduate
David Kim ('23)	Oct 2020 – Aug 2021	current Pomona undergraduate
Dylan Santa ('23)	Sept 2020 – Dec 2020	current Pomona undergraduate
Jo Rodriguez ('21)	Sept 2020 – May 2021	B.A. Chemistry & Theatre
<u>Christabel Egemba</u> ('21)	Sept 2020 – May 2021	B.A. Chemistry
Megan Chang ('23)	May 2020 – present	current Pomona undergraduate
Alana Weiss ('22)	May 2020 – present	current Pomona undergraduate
Christine Cannon ('23)	Summer 2020	current Pomona undergraduate
Nathalie Hong ('21)	May 2020 – May 2021	Ph.D. student, Stanford University
Sayde Perry* ('22)	May 2019 – present	current Pomona undergraduate
Eric Tang ('21)	May 2019 – May 2021	B.A. Chemistry
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 – May 2021	B.A. Gender and Women's Studies
<u>Caitlin Halligan</u> ('21)	Jan 2019 – May 2019	B.A. Molecular Biology
<u>Micayla George</u> ('20)	Jan 2019 – May 2020	Research Assistant, Broad Institute
Hussein Faara ('21)	Jan 2019 – May 2019	B.A. Molecular Biology
<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	Masters Engineering, 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., 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

Student (class year)	Term(s)	Current/last known position
<u>Stacey Ceron</u> ('12)	Sept 2011 – May 2012	Ph.D., Dartmouth College
Aleksander Kubiak ('13)	Summer 2011	M.D., 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	B.A. Biochem. Mol. Biol
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	Med student, Hacettepe Medical School
<u>Lisa Maria Mustachio#</u> ('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 T, 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)

SELECTED PROFESSIONAL SERVICE

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

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

SELECTED POMONA COLLEGE SERVICE

Leadership Training

2020 – 2021 Claremont Faculty Leadership Program

Committees

2020 – 2021 Faculty Committee on Strategic Vision Implementation

2020 – 2021 Research Committee, chair

2019 – 2021 Faculty Advisor, Pomona Scholars of Science 7

2019 – 2023 PD, 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