

## **Ming C. Hammond – Curriculum Vitae**

### **ACADEMIC APPOINTMENTS**

*July 2018 – current* Associate Professor  
Department of Chemistry  
Henry Eyring Center for Cell & Genome Science  
University of Utah

*2009 – 2018* Assistant Professor  
Department of Chemistry  
Department of Molecular & Cell Biology  
University of California, Berkeley

### **OTHER AFFILIATIONS**

*2020 – current* Co-Director, UoU Beckman Scholar Program, College of Science,  
University of Utah

*2019 – current* Co-Director, NSF Research Experiences for Undergraduate Program,  
Department of Chemistry, University of Utah

*2018 – current* Executive Committee Member, Henry Eyring Center for Cell and Genome  
Science, University of Utah

*2018 – current* Biological Chemistry Graduate Program, University of Utah

*2011 – 2019* Faculty Scientist, Physical Biosciences Division, Lawrence Berkeley  
National Laboratory (LBNL)

*2009 – 2018* California Institute for Quantitative Biosciences (QB3), UC Berkeley

*2011 – 2018* Synthetic Biology Institute (SBI), UC Berkeley

*2012 – 2017* NIGMS Center for RNA Systems Biology (CRSB), UC Berkeley

### **EDUCATION AND TRAINING**

*2005 - 2009* Postdoctoral Research Fellow, Molecular Biology  
Yale University, New Haven, CT  
BWF CASI Postdoctoral Fellow (*Jan 2008 - June 2009*)

*Summer 2008* Visiting Scientist at Heidelberg Institute of Plant Science  
Heidelberg University, Heidelberg, Germany

*2000 - 2005* Ph.D., Chemistry (*May 2005*)  
University of California, Berkeley, CA  
HHMI Predoctoral Fellow (*Aug 2000 - May 2005*)

*1996 - 2000* Bachelor of Science with Honors, Chemistry (*June 2000*)  
California Institute of Technology, Pasadena, CA  
Beckman Scholar (*June 1998 - Sept 1999*)

### **HONORS AND AWARDS**

*2016* Women in Science Award, Chau Hoi Shuen Foundation

*2011 - 2016* National Institutes of Health New Innovator Award

*2011* Regents' Junior Faculty Fellowship (UC Berkeley)

*2010 - 2013* Chevron Chair of Chemistry (UC Berkeley)

*2010* Thieme Chemistry Journal Award

*2008 - 2016* Burroughs Wellcome Fund Career Award at the Scientific Interface

*2000 - 2005* Howard Hughes Medical Institute Predoctoral Fellowship

*2000* National Science Foundation Graduate Fellowship (declined)

*2000* Richard P. Schuster Memorial Prize in Chemistry

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1999 - 2000	Carnation Merit Award - full merit scholarship (Caltech)
1999	Arie J. Haagen-Smit Memorial Award - Chemistry department award
1998 - 1999	Beckman Scholar Fellowship
1998 - 1999	Caltech Prize Award - full merit scholarship

### PEER-REVIEWED PUBLICATIONS (corresponding authors are in bold)

48. Manna, S.\*, Truong, J.\*, **Hammond, M. C.** "Guanidine biosensors enable comparison of cellular turn-on kinetics of riboswitch-based biosensor and reporter" *ACS Synthetic Biology* (2021) *In Press*.  
Related Highlights: Front cover, 10<sup>th</sup> anniversary issue (Mar 2021)
47. Manna, S., Kellenberger, C. A., Hallberg, Z. F., **Hammond, M. C.** "Live cell imaging using riboswitch-spinach tRNA fusions as metabolite-sensing fluorescent biosensors" *Methods Mol Bio* (2021) *In Press*. (*Invited Chapter*)
46. **Palmer, A. E., Hammond, M. C.** "Editorial overview: Molecular imaging" *Curr Opin Chem Biol* (2020) 57, A5-A7.  
Related Highlights: Co-editor of annual issue on Molecular Imaging
45. Kitto, R. Z.\*, Dhillon, Y.\*, Bevington, J. et. al. **Welch, C., McKay, C. P., Hammond, M. C.** "Synthetic biological circuit tested in spaceflight" *Life Sci Space Res* (2020) 28, 57-65.
44. Kitto, R. Z., Christiansen, K. E., **Hammond, M. C.** "RNA-based fluorescent biosensors for live cell detection of bacterial sRNA" *Biopolymers* (2020) e23394. (*Invited Paper*)
43. Yao, L., Fin A., Rovira, A. R., Su, Y., Dippel, A. B., Valderrama, J. A., Riestra, A. M., Nizet, V., Hammond, M. C., **Tor, Y.** "Tuning the innate immune response to cyclic dinucleotides using atomic mutagenesis" *ChemBioChem* (2020) 21, 2595-2598.
42. Anderson, W. A., Dippel, A. B., Maiden, M. M., Waters, C., **Hammond, M. C.** "Chemiluminescent sensors for quantitation of the bacterial second messenger cyclic di-GMP" *Methods in Enzymology* (2020) 640, 83-104. (*Invited Chapter*)
41. Su, Y. and **Hammond, M. C.** "RNA-based fluorescent biosensors for live cell imaging of small molecules and RNAs" *Curr Opin Biotech* (2020) 63, 157-166. (*Invited Review*)
40. Dippel, A. B.\*, Anderson, W. A.\*, Park, J. H., Yildiz, F. H., **Hammond, M. C.** "Development of ratiometric bioluminescent sensors for *in vivo* detection of bacterial signaling" *ACS Chem Biol* (2020) 15, 904-914.
39. Wright, T. A., Jiang, L., Park, J., Anderson, W. A., Chen, G., Hallberg, Z.F., Nan, B., **Hammond, M. C.** "Second messengers and divergent HD-GYP enzymes regulate 3', 3'-3',3'-cGAMP signaling" *Mol Microbiol* (2020) 113, 222-236.
38. Wright, T. A., Dippel, A. B., **Hammond, M. C.** "Cyclic di-GMP signaling gone astray: cGAMP signaling via Hypr GGDEF and HD-GYP enzymes" In Chou, S.-H., Guillian, N., Lee, V., Romling, U. (ed), *Microbial Cyclic Di-Nucleotide Signaling*. (*Invited Book Chapter*)
37. Dippel, A. B., **Hammond, M. C.** "A poxin on both of your houses: Poxviruses degrade the immune signal cGAMP" *Biochemistry* (2019) 58, 2387-2388. (*Invited Viewpoint*)
36. Hallberg, Z. F.\*, Chan, C. H.\*, Wright, T. A., Kranzusch, P. J., Doxzen, K. W., Park, J. J., **Bond, D. R., Hammond, M. C.** "Structure and mechanism of a Hypr GGDEF enzyme that activates cGAMP signaling to control extracellular metal respiration" *ELife* (2019) e43959.  
Related Highlights: Chosen by editors to be featured in *ELife Science Digest*
35. Villa, J.\*, Su, Y.\*, **Contreras, L. M., Hammond, M. C.** "Synthetic biology of small RNAs and riboswitches" in *Regulating with RNA in Bacteria and Archaea*, Ed. Gisela Storz, Ed. Kai Papenfort, ASM Press, 2019, 527-545. (*Invited Book Chapter*)

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34. Dippel, A. B., Anderson, W. A., Evans, R. S., Deutsch, S., **Hammond, M. C.** "Luminescent biosensors for detection of second messenger cyclic di-GMP" *ACS Chem Biol* (2018) 13, 1872-1879. (*Invited Paper*)

Related Highlights: "Sensors" special issue in honor of Roger Tsien; *Nat Chem Biol* research highlight; *JGI* science highlight

33. Truong, J., Hsieh, Y. F., Jia, G., **Hammond, M. C.** "Circular permutation strategies for engineering RNA-based fluorescent biosensors", *Methods* (2018) 143, 102-109. (*Invited Paper*)

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### Publications above were published after move to University of Utah (July 2018)

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32. Yeo, J., Dippel, A. B., Wang, X. C., **Hammond, M. C.** "In Vivo Biochemistry: Single-cell dynamics of cyclic di-GMP in *E. coli* in response to zinc overload" *Biochemistry* (2018) 57, 108-116. (*Invited Paper*)

Related Highlights: "Future of Biochemistry" special issue

31. Yeo, J., Wang, X. C., **Hammond, M. C.** "Live flow cytometry analysis of c-di-GMP levels in single cell populations" *Methods Mol Biol* (2017) 1657, 111-130. (*Invited Book Chapter*)
30. Hallberg, Z. F., Su, Y., Kitto, R., **Hammond, M. C.** "Engineering and in vivo applications of riboswitches" *Annual Rev Biochem* (2017) 86, 515-539. (*Invited Review*)
29. Bose, D.\*, Su, Y.\*, Marcus, A., Raulet, D. H., **Hammond, M. C.** "An RNA-based fluorescent biosensor for high-throughput analysis of the cGAS-cGAMP-STING pathway" *Cell Chem Biol* (2016) 23, 1539-1549.
28. Wang, X. C., Wilson, S. C., **Hammond, M. C.** "Next-generation RNA-based fluorescent biosensors enable anaerobic detection of cyclic di-GMP" *Nucleic Acids Res* (2016) 44, e139.
27. Su, Y., Hickey, S. F., Keyser, S. G. L., **Hammond, M. C.** "In vitro and in vivo enzyme activity screening via RNA-based fluorescent biosensors for S-adenosyl-L-homocysteine (SAH)" *J Am Chem Soc* (2016) 138, 7040-7047.
26. Hallberg, Z. F., Wang, X. C., Wright, T. A., Nan, B., Ad, O., Yeo, J., **Hammond, M. C.** "Hybrid promiscuous (Hypr) GGDEF enzymes produce cyclic AMP-GMP (3', 3'-cGAMP)" *Proc Natl Acad Sci* (2016) 113, 1790-1795.

Related Highlights: Faculty of 1000 recommended article

25. Muller, R. Y., Hammond, M. C., Rio, D. C., **Lee, Y. J.** "An efficient method for electroporation of small interfering RNAs (siRNAs) into ENCODE Project Tier 1 GM12878 and K562 cell lines" *J Biomol Techniques* (2015) 26, 142-149.
24. Gonzalez, T. L., Liang, Y., Nguyen, B., Staskawicz, B. J., Loque, D., **Hammond, M. C.** "Tight regulation of plant immune responses by combining promoter and suicide exon elements" *Nucleic Acids Res* (2015) 43, 7152-7161.
23. Kellenberger, C. A., Sales-Lee, J., Pan, Y., Gassaway, M. M., Herr, A. E., **Hammond, M. C.** "A minimalist biosensor: quantitation of cyclic di-GMP using the conformational change of a riboswitch aptamer" *RNA Biol* (2015) 12, 1189-1197.
22. Kellenberger, C. A.\*, Chen, C.\*, Whiteley, A. T., Portnoy, D. A., **Hammond, M. C.** "RNA-based fluorescent biosensors for live cell imaging of second messenger cyclic di-AMP" *J Am Chem Soc* (2015) 137, 6432-6435.
21. Ren, A., Wang, X. C., Kellenberger, C. A., Rajashankar, J. R., Jones, R., **Hammond, M. C., Patel, D. J.** "Structural basis for molecular discrimination by a 3', 3'-cGAMP sensing riboswitch" *Cell Reports* (2015) 11, 1-12.
20. Kellenberger, C. A.\*, Wilson, S. C.\*, Hickey, S. F., Gonzalez, T. L., Su, Y., Hallberg, Z. F., Brewer, T. F., Iavarone, A. T., Carlson, H. K., Hsieh, Y. F., **Hammond, M. C.** "GEMM-I

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riboswitches from *Geobacter* sense the bacterial second messenger c-AMP-GMP” *Proc Natl Acad Sci* (2015) 112, 5383-5388.

Related Highlights: Signaling Breakthroughs of the Year, *Science Signaling*

19. Kellenberger, C. A., Hallberg, Z. F., **Hammond, M. C.** “Live cell imaging using riboswitch-Spinach tRNA fusions as metabolite-sensing fluorescent biosensors” *Methods Mol Biol* (2015) 1316, 87-103. (*Invited Book Chapter*)
18. Kellenberger, C. A., **Hammond, M. C.** “*In vitro* analysis of riboswitch-Spinach aptamer fusions as metabolite-sensing fluorescent biosensors” *Methods Enz* (2015) 550, 147-172. (*Invited Book Chapter*)
17. Pan, Y., Duncombe, T. A., Kellenberger, C. A., Hammond, M. C., **Herr, A. E.** “High-throughput electrophoretic mobility shift assays for quantitative analysis of molecular binding reactions” *Anal Chem* (2014) 86, 10357-10364.
16. Wilson, S. C., Cohen, D. T., **Hammond, M. C.** “A neutral pH thermal hydrolysis method for quantification of structured RNAs” *RNA* (2014) 20, 1153-1160.
15. Hickey, S. F., **Hammond, M. C.** “Structure-guided design of fluorescent S-adenosyl-methionine analogs for a high-throughput screen to target SAM-I riboswitch RNAs” *Chem Biol* (2014) 21, 345-356.
14. Sadhu, M. J., Guan, Q., Sales-Lee, J., Iavarone, A. T., Hammond, M. C., Cande, W. Z., **Rine, J.** “Nutritional control of epigenetic processes in yeast and human cells” *Genetics* (2013) 195, 831-844.
13. Diner, E. J., Burdette, D. L., Wilson, S. C., Monroe, K. M., Kellenberger, C. A., Hyodo, M., Hayakawa, Y., **Hammond, M. C., Vance, R. E.** “The innate immune DNA sensor cGAS produces a noncanonical cyclic dinucleotide that activates human STING” *Cell Rep* (2013) 3, 1355-1361.
12. Leppek, K., Schott, J., Reitter, S., Poetz, F., Hammond, M. C., **Stoecklin, G.** “Roquin promotes constitutive mRNA decay via a conserved class of stem-loop recognition motifs” *Cell* (2013) 153, 869-881.
11. Kellenberger, C. A., Wilson, S. C., Sales-Lee, J., **Hammond, M. C.** “RNA-based fluorescent biosensors for live cell imaging of second messengers cyclic di-GMP and cyclic AMP-GMP” *J Am Chem Soc* (2013) 135, 4906-4909.
10. Karns, K., Vogan, J. M., Qin, Q., Hickey, S. F., Wilson, S. C., **Hammond, M. C., Herr, A. E.** “Microfluidic screening of electrophoretic mobility shifts elucidates riboswitch binding function” *J Am Chem Soc* (2013) 135, 3136-3143.
9. Hickey, S. F., Sridhar, M., Westermann, A. J., Qin, Q., Vijayendra, P., Liou, G., **Hammond, M. C.** “Transgene regulation in plants by alternative splicing of a suicide exon” *Nucleic Acids Res* (2012), 40, 4701-10.

Related Highlights: Featured Article (top 5%), *Nucleic Acids Res*

8. **Hammond, M. C.** “A tale of two riboswitches” *Nat Chem Biol* (2011), 7, 342-343. (*Commentary*)
7. Meyer, M. M., Hammond, M. C., Salinas, Y., Roth, A., Sudarsan, N., **Breaker, R. R.** “Challenges of ligand identification for riboswitch candidates” *RNA Biol* (2011), 8, 5-10.
6. Block, K. F., Hammond, M. C., **Breaker, R. R.** “Evidence for widespread gene control function by the *ydaO* riboswitch candidate” *J Bacteriol* (2010), 192, 3983-3989.
5. Hammond, M. C., Wachter, A., **Breaker, R. R.** “A plant 5S rRNA mimic regulates alternative splicing of transcription factor IIIA pre-mRNAs” *Nat Struct and Mol Biol* (2009), 16, 541-549.
4. Weinberg, Z., Regulski, E. E., Hammond, M. C., Barrick, J. E., Yao, Z., Ruzzo, W. L., **Breaker, R. R.** “The aptamer core of SAM-IV riboswitches mimics the ligand-binding site of SAM-I riboswitches” *RNA* (2008), 14, 822-828.

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3. Hammond, M. C., **Bartlett, P. A.** "Synthesis of amino acid-derived cyclic acyl amidines for use in beta-strand peptidomimetics" *J Org Chem* (2007), 72, 3104-3107.
2. Hammond, M. C., Harris, B. Z.; Lim, W. A., **Bartlett, P. A.** "Beta-strand peptidomimetics as potent PDZ ligands" *Chem Biol* (2006), 13, 1247-1251.
1. Sudarsan, N.\*, Hammond, M. C.\*, Block, K. F., Welz, R., Barrick, J. E., Roth, A., **Breaker, R. R.** "Tandem riboswitch architectures exhibit complex gene control functions" *Science* (2006), 314, 300-304. **\*co-first authors**

### MANUSCRIPTS (in final preparation or invited for 2021)

1. Lowry, R. C., Hallberg, Z. F., Lambert, C., Till, R., Nottingham, R., Want, F., **Hammond, M. C., Sockett, R. E.** "Production of 3', 3'-cGAMP by a *Bdellovibrio bacteriovorus* promiscuous GGDEF enzyme, Bd0367, regulates exit from prey by gliding motility" *in prep*
2. Bevington, J., Zapotek, K., Dhillon, Y., Potapov, V., Berger, T., Giege, P., Manefield, M., Hammond, M. C., Favier, J.-J., Osborne, B., Welch, C., Gardener, A., **Tullman-Ercek, D.** "Effects of space particle radiation exposure on DNA" *in prep*
3. "RNA-based fluorescent biosensors" *Acc Chem Res (Invited Review – Sept 2021)*
4. "Riboswitching on the light" In Sugimoto, N. (ed), *Handbook of Chemical Biology of Nucleic Acids. (Invited Book Chapter – Dec 2021)*

### PATENTS AND PATENT APPLICATIONS

- Hammond, M. C., Wright, T. A. "Methods of producing cyclic dinucleotides" US Pat Appl 62/438,126 (filed 2016)
- Hammond, M. C., Su, Y., Bose, D. "Fluorescent biosensor for 2', 3'-cGAMP" US Pat Appl 62/349,556 (filed 2016)
- Related Highlights: Material transfer agreement to potential licensees  
Biosensor technology team endorsed for national I-CORPS program and \$50K grant
- Hammond, M. C., Su, Y., Keyser, S. G. L., Hickey, S. F. "A fluorescent biosensor for high throughput screening of methyltransferase activity" US Pat Appl 62/246,953 (filed 2015)
- Related Highlights: Material transfer agreement to potential licensees
- Vance, R. E., Hammond, M. C., Burdette, D., Diner, E. J., Wilson, S. C. "Cyclic di-nucleotide induction of type I interferon" US Pat Appl 14/268,967 (filed 2014)
- Related Highlights: Licensed, patent royalties to UC Berkeley
- Hammond, M. C., Westermann, A. J., Qin, Q. "A P5SM suicide exon for regulating gene expression" U.S. Patent 13/747,395 (filed 2013)
- Bartlett, P. A., Hammond, M. C. "Peptide beta-strand mimics based on pyridinones, pyrazinones, pyridazinones, and triazinones" US Pat Appl Publ (2005).

### INVITED SEMINAR LECTURES (underlined are international)

72. University of California, San Diego (**student-invited**, virtual), Dec 2020
71. (*Postponed*) John Innes Centre (Norwich, England)
70. Northwestern University (**student-invited**), Mar 2020
69. Google X, Oct 2019
68. New England Biolabs, Oct 2019
67. University of Utah, April 2019
66. Concordia University (Montreal, Canada), Jan 2019
65. INRS (Montreal, Canada), Jan 2019
64. University of Utah, Oct 2018

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63. Pfizer La Jolla, Sept 2018

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62. University of Minnesota, April 2018

61. San Jose State University, Nov 2017

60. Joint Genome Institute-LBNL, Nov 2017

59. University of Michigan, Ann Arbor, Oct 2017

58. University of Colorado, Boulder (**student-invited**), Oct 2017

57. Joint Bioenergy Institute-LBNL, Oct 2017

56. University of Utah (**Novartis Lecturer**), Sept 2017

55. McMaster University (Toronto, Canada), June 2017

54. University of Minnesota (**student-invited**), May 2017

53. UC Santa Cruz, Mar 2017

52. University of Maryland, Sept 2016

51. National Institutes of Health, Oct 2016

50. Tufts University, Sept 2016

49. University of Minnesota, April 2016

48. Tufts University, April 2016

47. Joint BioEnergy Institute-DOE, Feb 2016

46. University of Wyoming, Dec 2015

45. University of California, Davis, Sept 2015

44. University of California, Berkeley, Sept 2015

43. Kyoto University (Japan), Aug 2015

42. Chinese Academy of Medical Sciences (Beijing, China), Aug 2015

41. Peking University (Beijing, China), Aug 2015

40. University of California, San Francisco, May 2015

39. Stanford University, May 2015

38. University of Chicago, May 2015

37. University of Texas, Austin, April 2015

36. California Institute of Technology, April 2015

35. Princeton University, April 2015

34. Yale University, April 2015

33. Massachusetts Institute of Technology, April 2015

32. Max Planck Institute of Molecular Physiology (Dortmund, Germany), Mar 2015

31. RWTH Aachen University (Austria), Mar 2015

30. John Innes Centre (Norwich, UK), Mar 2015

29. MRC Laboratory of Molecular Biology (Cambridge, UK), Mar 2015

28. University of Wisconsin, Madison, Feb 2015

27. University of California, San Diego, Feb 2015

26. Scripps Research Institute, Feb 2015

25. University of Pennsylvania, Jan 2015

24. HHMI-Janelia Research Campus, Jan 2015

23. University of Colorado, Boulder, Jan 2015

23. University of California, Irvine, Nov 2014

22. University of North Carolina, Oct 2014

21. Duke University, Oct 2014

20. University of Illinois, Urbana-Champaign (**student-invited**), Mar 2014

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19. Boston College, Mar 2014
18. Brandeis University, Mar 2014
17. University of California, Berkeley, Mar 2014
16. University of Southern California, Feb 2014
15. Colorado State University, Oct 2013
14. National Cancer Institute-NIH, July 2013
13. Joint BioEnergy Institute-DOE, Feb 2013
12. German Cancer Research Center (Heidelberg, Germany), May 2012
11. Goethe University (Frankfurt, Germany), Institute for Molecular Biosciences, May 2012
10. Leopold Franzens University (Innsbruck, Austria), May 2012
9. Santa Clara University, Dec 2010
8. University of California, Berkeley, 2010
7. University of California, Riverside, Sept 2009
6. University of Southern California, Jan 2009
5. University of California, San Diego, Jan 2009
4. University of California, Berkeley, Dec 2008
3. Tufts University, Dec 2008
2. Columbia University, Nov 2008
1. Columbia University, June 2007

### **INVITED CONFERENCE TALKS** (\* are scheduled, underlined are international)

- 39.\* RNA Nanotechnology Gordon Conference, Jan 2023
- 38.\* Activity-Based Sensing Symposium, Pacificchem (Hawaii), Dec 2021
- 37.\* Functional Nucleic Acids Symposium, Pacificchem (Hawaii), Dec 2021
36. Chemistry Graduate Student Symposium, University of Utah (**keynote**), Feb 2021
35. (*Postponed*) Penn State Summer Symposium in Molecular Biology, Aug 2020
34. Beckman Scholar Symposium, Aug 2020
33. Sensory Transduction in Microorganisms Gordon Conference (Ventura, CA), Jan 2020
32. Telluride Workshop on Aqueous Supramolecular Chemistry, Aug 2019
31. Triple I Symposium, University of Utah (Salt Lake City, Utah), Oct 2019
30. "Targeting RNA with Drugs" session, ACS National Meeting, Mar 2019
29. Bacterial Locomotion and Signal Transduction meeting (**session chair** on "Technology Innovations", speaker), Jan 2019
28. NYU-Nature Conference on Chemical Biology, Aug 2018

### **Seminars above given after move to University of Utah (July 2018)**

27. (*Declined due to lab move*) MetaRNA symposium (Francis Crick Institute, London, UK), 2018
26. (*Declined due to lab move*) FB3 Conference (Glasgow, UK), 2018
25. Bioorganic Chemistry Gordon Conference, June 2018
24. "Seeing is Believing" session, American Society of Microbiology, June 2018
23. FNano – Foundations of Nanoscience Conference (Snowbird, Utah), April 2018
22. "Discovery of Small Molecules Targeting RNA" session, ACS National Meeting, Mar 2018
21. Biophysics of Nuclear Organization and Function, UC Berkeley (**plenary speaker**), July 2017
20. Nucleosides, Nucleotides & Oligonucleotides Gordon Conference, June 2017
19. Nucleic Acid Chemistry and Biology Symposium - Canadian Society for Chemistry 100<sup>th</sup> Anniversary Conference (Toronto, Canada), May 2017
18. Chemical Tools for Complex Biological Systems, Janelia Research Campus, Apr 2017

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17. Predictive Crop Design: Genome-to-Phenome, University of Nebraska-Lincoln, Apr 2017
16. RNA Nanotechnology Gordon Conference, Jan 2017
15. International Conference on Biomolecular Engineering, Jan 2017
14. Tri-Institutional Chemical Biology Symposium (**keynote speaker**), Aug 2016
13. Molecular Genetics and Phages Meeting (**session chair**, speaker), Aug 2016
12. Telluride Workshop on Nucleic Acid Chemistry, July 2016
11. American Society for Microbiology Annual Meeting, Jan 2016
10. NIH High Risk-High Reward Research Symposium, Jan 2015
9. IHÉS Conference on Cellular and Molecular Biotechnology (Paris, France), Dec 2015
8. Young Academic Investigators Symposium, ACS National Meeting, Aug 2015
7. Golden Jubilee Chemistry Conference (Singapore), Aug 2015
6. Synthetic Biology Meets Organic Synthesis Conference, UC Berkeley, Nov 2014
5. “Chemical approaches toward understanding and reprogramming RNA”, ACS National Meeting (**session co-chair**, speaker), Aug 2014
4. Symposium on Host-Microbe Systems Biology, University of Oregon, Aug 2014
3. ACS Chemical Biology award symposium in honor of Peter Dervan, ACS National Meeting, Mar 2014
2. International Synthetic Biology Workshop: A Bio-Based Future, Aug 2011
1. RNA Chemistry Meets Biology Conference, Lund University (Sweden), Sept 2006

### **ADDITIONAL CONFERENCE TALKS** (underlined are international)

9. International Symposium on Nucleotide Second Messenger Signaling in Bacteria (Berlin, Germany), Sept 2018

### **Seminars above given after move to University of Utah (July 2018)**

8. International Symposium on c-di-GMP Signaling in Bacteria (Berlin, Germany), Mar 2015
7. Fluorescent Biomolecules and Their Building Blocks Conference (FB3), Aug 2014
6. American Chemical Society National Meeting, Sept 2013
5. Challenges in Chemical Biology Conference (Boston, MA), July 2013
4. Bioorganic Chemistry Gordon Conference, June 2013
3. International Conference of RNA Nanotechnology and Therapeutics, Apr 2013
2. American Society of Biochemistry and Molecular Biology Annual Meeting, “RNA: processing, transport, and regulation” symposium, Apr 2009
1. Nucleic Acids Gordon Conference, June 2008

### **PRESS**

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| <i>Feb 2020</i> | “Beckman Bites Podcast (Episode 2): Interview with Ming Hammond”, Beckman Foundation<br><a href="https://www.beckman-foundation.org/latest-news/new-beckman-bites-podcast-episode-2-now-available/">https://www.beckman-foundation.org/latest-news/new-beckman-bites-podcast-episode-2-now-available/</a>                                                                                                                         |
| <i>Jan 2020</i> | “Congratulations 2020 Beckman Scholar Program Awardees”, Beckman Foundation<br><a href="https://www.beckman-foundation.org/latest-news/congratulations-2020-beckman-scholars-program-awardees/">https://www.beckman-foundation.org/latest-news/congratulations-2020-beckman-scholars-program-awardees/</a><br><a href="https://chem.utah.edu/news/beckmanscholaraward.php">https://chem.utah.edu/news/beckmanscholaraward.php</a> |
| <i>Oct 2019</i> | “New twists and turns in bacterial locomotion and signal transduction”, Jan 2019<br>BLAST Meeting research talk featured in Conference Report<br><a href="https://doi.org/10.1128/JB.00439-19">https://doi.org/10.1128/JB.00439-19</a>                                                                                                                                                                                            |



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- Apr 2019 Research paper highlighted in eLife Science Digest  
<https://doi.org/10.7554/eLife.43959.002>
- Feb 2019 “Marriott Library Honors Women Scientists”, University of Utah  
<https://newsletter.lib.utah.edu/marriott-library-honors-women-scientists/>
- Jan 2019 “Recent advances and current trends in nucleotide second messenger signaling in bacteria”, Sept 2018 Berlin research talk featured in Conference Report  
<https://doi.org/10.1016/j.jmb.2019.01.014>
- Jan 2019 “U professor successfully grows plants on space station”, Science & Tech article, KSL.com  
<https://www.ksl.com/article/46490813/u-professor-successfully-grows-plants-on-space-station>
- Dec 2018 “U researchers send bioengineered plants into space”, Science & Tech article, KSL.com  
<https://www.ksl.com/article/46456408/u-researchers-experiment-sends-bioengineered-plants-into-space>
- Dec 2018 “Synthetic biology goes to space”, EurekAlert article, AAAS  
[https://www.eurekalert.org/pub\\_releases/2018-12/uou-sbg122018.php](https://www.eurekalert.org/pub_releases/2018-12/uou-sbg122018.php)
- Dec 2018 “ISU’s Hydra-1 experiment launched to the international space station”, International Space University press release  
<http://www.isunet.edu/news/isu-s-hydra-1-experiment-launched-to-iss/599>
- Dec 2018 “U Chemistry in Space”, University of Utah press release  
<https://unews.utah.edu/u-chemistry-in-spaaaaaaace/>
- Oct 2018 “Humans of the U” profile, University of Utah press release  
<https://attheu.utah.edu/facultystaff/humans-of-the-u-july-october/>
- June 2018 “Innovative technology improves our understanding of bacterial signaling”, Joint Genome Institute (JGI) Science Highlight  
<https://jgi.doe.gov/innovative-technology-improves-understanding-bacterial-cell-signaling/>
- Mar 2018 “Spotting the signal”, Research Highlight in *Nature Chemical Biology*  
<https://www.nature.com/articles/s41589-018-0047-y>
- Jan 2018 Research paper published in Future of Biochemistry special issue, *Biochemistry*  
<https://pubs.acs.org/toc/bichaw/57/1>  
<https://chemistry.berkeley.edu/news/the-future-of-biochemistry>
- Feb 2016 “Hammond’s high risk/high reward research pays off”, UC Berkeley College of Chemistry press release  
<https://chemistry.berkeley.edu/news/hammond-research-pays-off>
- Jan 2016 Research paper highlighted in “2015: Signaling Breakthroughs of the Year” editorial guide from *Science Signaling*  
<http://stke.sciencemag.org/content/9/409/eg1.full>

## Ming C. Hammond – Curriculum Vitae

### **RESEARCH FUNDING**

#### **Current**

Office of Naval Research (PI, from Feb 1, 2021 to Jan 31, 2024) on “Biosensors for rapid prototyping of functional materials”. *Recommended for funding*. This research is focused on developing a molecular sensing platform to improve energy harvesting yields of catalytic biomaterials.

Joint Genome Institute-DOE (Large-scale DNA synthesis services from Nov 1, 2020 to Oct 30, 2023) on “Community Science Program: High-throughput functional discovery of bacterial sensory-enzymes”. This research is focused on screening novel and engineered small molecule-binding domains.

University of Utah (co-PI, from Feb 1, 2020 to Aug 31, 2021) on “1U4U: Development of beta-lactamase as a self-labeling protein tag”. This research is focused on development of an enzyme fusion tag for fluorescence microscopy.

Arnold and Mabel Beckman Foundation (from May 15, 2020 to Oct 15, 2023) on “UoU Beckman Scholar Program”. This grant supports undergraduate researchers as Beckman Scholars at the University of Utah.

Office of Naval Research (from Jan 28, 2019 to June 31, 2021) on “Riboswitching on the light: Breaking the speed limit of riboswitches to make fast optical sensor cells”. N00014-19-1-2043: This research is focused on improving the response speed of cell-based biosensors.

National Science Foundation-Binational Science Foundation (from Aug 1, 2018 to July 31, 2021\*) on “NSF/MCB-BSF: Elucidating the transient contact-dependent molecular trade in multispecies bacterial communities”. 1815508: This research is focused on detecting RNA and cyclic dinucleotide transfer via bacterial nanotubes.\*No-cost extension to 2022 will be requested

National Science Foundation (from June 1, 2017 to Aug 31, 2021) on “REU Site: Catalysis in a collaborative REU program at the University of Utah”. 1659579: This grant supports the Research Experience for Undergraduates (REU) program at the University of Utah Department of Chemistry.

National Institutes of Health (from Sept 1, 2017 to July 31, 2021\*) on “Enabling high-throughput analysis and single-cell imaging of bacterial signals”. R01 GM124589: This research is focused on biosensor development to study bacterial signaling within hosts and communities. \*No-cost extension to 2022 will be requested

#### **Completed**

National Science Foundation (from July 1, 2018 to Dec 31, 2020) on “Collaborative Research: A model for divergent bacterial signaling networks; linking new cyclic dinucleotides to environmental and electrical lifestyles”. 1915466: This research is focused on cyclic dinucleotide signaling in *Geobacter sulfurreducens*.

Gilead Sciences (from July 1, 2019 to Oct 1, 2019) on “Synthesis of labeled 2',3'-cGAMP”. Sponsored project

Agilent Technologies (from Mar 1, 2012 to Dec 31, 2018) on “Synthetic Biology Institute: Synthesis and Analysis of Fluorescent Riboswitch Ligands”. Sponsored project

National Institutes of Health (co-PI on Project 1 of 3, from July 1, 2012 to June 30, 2017) on “Center for RNA Systems Biology”.

Women in Science Award – Chau Hoi Shuen Foundation (PI, from Mar 1, 2016 to Dec 31, 2016) on “Bringing Chemical Tools to Study RNA Epigenetics”.

## **Ming C. Hammond – Curriculum Vitae**

Joint Genome Institute-DOE (DNA synthesis services from Sept 20, 2013 to Sept 19, 2016) on "Community Science Program: Synthesis and parallel construction of a library of large binary vectors for the screening of suicide exons for multi-gene pathway engineering in plants"

NIH Director's New Innovator Award – National Institutes of Health (from Sept 30, 2011 to Aug 31, 2016) on "A Chemical Biology Approach to Tagging RNAs in Live Cells". DP2 OD008677

Career Award at the Scientific Interface – Burroughs Wellcome Fund (from July 1, 2019 to Dec 31, 2015) on "Large-Scale Discovery and Analysis of Regulatory RNAs using Computational and Chemical Approaches".

Regents' Junior Faculty Fellowship – UC Berkeley (from Aug 1, 2011 to Aug 31, 2011) on "Lighting Up RNAs: Fluorescent Tags for Live Cell Imaging of RNAs"

### **LEADERSHIP AND PROFESSIONAL SERVICE (from 2018 to current)**

underlined are international

#### **Grant reviewer**

*June 2020* NIH-EBIT study section, ad hoc reviewer  
*Dec 2019* Canada Council for the Arts, Killam Fellowship Reviewer  
*Sept 2019* NSF-CAREER ad hoc grant reviewer  
*June 2019* NIH-EBIT study section, ad hoc reviewer  
*May 2019* French National Research agency grant reviewer  
*Apr 2019* NSF-MCB grant panel reviewer (Systems and Synthetic Biology)  
*Feb 2019* NIH-SBCA study section, ad hoc reviewer  
*Sept 2018* NSF-CAREER ad hoc grant reviewer  
*Feb 2018* Houska Award (Austria) grant reviewer

#### **Journal editorships**

*2020-2023* Analysis & Sensing, Chemistry Europe journal, Inaugural Editorial Board Member  
*2020-2023* FEMS Microbiology Reviews, Federation of European Microbiological Societies journal, Editorial Board Member  
*Jul 2019-Jun 2020* *Current Opinion in Chemical Biology*, Co-Editor, Molecular Imaging section

#### **Other professional service**

*2020-2022* American Chemical Society, Alternate Councilor (elected), Division of Biological Chemistry  
*2019-current* Faculty Member, Faculty Opinions (former Faculty of 1000) – Chemical Biology of the Cell Section  
*2019- 2020* Synthetic Biology: Engineering, Evolution & Design Conference – Organizing Committee  
*Jan 2019* Session chair, "Technologies Innovations", Bacterial Locomotion and Signal Transduction (BLAST) Meeting

#### **University leadership positions**

## **Ming C. Hammond – Curriculum Vitae**

2020-current Co-Director, UoU Beckman Scholar Program  
2020-2022 Council Member (elected), College of Science  
2019-current Executive committee, Center for Cell & Genome Science  
2019-current Co-Director, NSF REU Program

### **Department service committees**

2020-current Chair, Seminar committee (Department of Chemistry)  
2019-current Chair, Junior Faculty Mentoring committee (Department of Chemistry)  
2019-current Graduate Education committee (Department of Chemistry)  
2019-2020 Curriculum committee (Biological Chemistry Graduate Program)  
2018-2020 Graduate Admissions committee (Department of Chemistry)  
2018-2019 Chemical Education / CSME faculty search committee (Department of Chemistry)  
2018-2019 Biological Chemistry Graduate Admissions committee (Biological Chemistry Graduate Program)

### **Invited Workshops**

Oct 2019 NSF Square-Table workshop on Programmable Interfaces: Exploring the Intersection of Synthetic Biology, Biomaterials, and Soft Matter  
Mar 2018 DOE-Joint Genome Institute SynBio Strategy Meeting

## **TEACHING**

### **University of Utah**

#### *Chemistry 5750, Advanced Chemical Biology Laboratory*

Chem 5750 is a half-semester upper-division lab course designed to provide undergraduate students with an exposure to select experimental procedures in chemical biology through a set of guided lab exercises that comprise two main projects and a final student-proposed project. (Spring 2019A, Spring 2020A, Spring 2021B)

#### *Chemistry 2325, Organic Chemistry Laboratory*

The purpose of the laboratory is to give students hands on experience with the scientific method, teach critical thinking and writing skill as well as important techniques to prepare students for advanced work in chemistry and related science and engineering fields, review concepts learned in lecture, and to introduce certain concepts that are well-suited to hands-on discovery. (Spring 2019B)

#### *Chemistry 7430, Chemical Biology of Proteins – Graduate Lecture*

This course is intended for advanced undergraduate and first-year graduate students in Chemistry, Biology, Biochemistry, Biotechnology, and Bioengineering. The subject matter will include a brief background on biomolecular structure and function, then focus on the use of organic chemistry as a tool for manipulating biomolecules, exploring the breakthrough technologies that have enabled recent advantages in fields including protein labeling, protein interactions, biosensors, and nanotechnology. (Fall 2019A, Fall 2020A)

## Ming C. Hammond – Curriculum Vitae

### *Chemistry 7470 (5470), Nucleic Acid Chemistry – Graduate Lecture*

This course is intended for advanced undergraduate and first-year graduate students. Topics include chemical synthesis of DNA and RNA, nucleoside and oligomer analogs, chemistry of DNA damage and repair, nucleic acid-targeted drugs and binding agents.

(Spring 2020B, Spring 2021B)

### **UC Berkeley**

### *Chemistry C96, Introduction to Research and Study in the College of Chemistry – Seminar*

Introduces freshmen to research activities and programs of study in the College of Chemistry, includes lectures by faculty, the opportunity to meet alumni and advanced undergraduates in an informal atmosphere, and tours of research labs.

(Fall 2010, Fall 2013)

### *Chemistry 3BL, Organic Chemistry Laboratory*

The synthesis and purification of organic compounds will be explored. Natural product chemistry will be introduced. Advanced spectroscopic methods including infrared, ultraviolet, and nuclear magnetic resonance spectroscopy and mass spectrometry will be used to analyze products prepared and/or isolated. Qualitative analysis of organic compounds will be covered.

(Fall 2015)

### *Chemistry 4B, General Chemistry & Quantitative Analysis – Lecture*

Series is intended for majors in physical, biological sciences, and engineering. It presents the foundation principles of chemistry, including stoichiometry, ideal and real gases, acid-base and solubility equilibria, oxidation-reduction reactions, thermochemistry, entropy, nuclear chemistry and radioactivity, the atoms and elements, the periodic table, quantum theory, chemical bonding, molecular structure, chemical kinetics, and descriptive

(Spring 2018)

### *Chemistry 114, Advanced Chemical Biology – Lecture*

One-semester pilot course designed to provide undergraduate students with an exposure to select topics in modern chemical biology through the presentation and discussion of case studies. Students will gain a working knowledge of different chemical biology approaches to study protein and nucleic acid function.

(Spring 2017)

### *Chemistry 115, Organic Chemistry – Advanced Laboratory Methods*

Advanced synthetic methods, chemical and spectroscopic structural methods, designed as a preparation for experimental research.

(Spring 2010, Spring 2012)

### *Chemistry 135, Chemical Biology – Lecture*

Introduction to biochemistry and chemical biology, geared towards chemistry and chemical biology majors.

(Spring 2011, Fall 2011, Spring 2014, Fall 2014)

### *Chemistry 271 / Molecular and Cell Biology 212, Chemical Biology I-III – Graduate Lecture*

Survey of current topics in chemical biology research with a focus on concepts and tools from chemistry that are uniquely enabling of biological discovery.

(Spring 2015, Spring 2016)

### *Molecular and Cell Biology 290, Graduate Seminar*

Graduate student presentations on selected research topics in molecular and cell biology.

(Spring 2012)