

Curriculum Vitae

Robert Todd Batey

University of Colorado
Department of Biochemistry
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Birthdate: May 20, 1968; Thousand Oaks, California, USA

Education

- 1997 – 2001 **Jane Coffin Childs Postdoctoral Fellow**, Dept. of Molecular Biophysics and Biochemistry, Yale University
Advisor: Professor Jennifer A. Doudna
- 1990 – 1997 **Doctor of Philosophy in Biology**, Massachusetts Institute of Technology
Thesis Advisor: Professor James R. Williamson, Department of Chemistry.
Thesis Title: Interaction of the *Bacillus stearothermophilus* ribosomal protein S15 with rRNA.
- 1986 – 1990 **Bachelor of Science in Chemistry** (*Magna Cum Laude*), University of California at Irvine
Bachelor of Science in Biological Sciences (*Magna Cum Laude*), University of California at Irvine

Academic Employment

- 2018 – present **Full Professor** (with tenure). Department of Biochemistry, University of Colorado at Boulder
- 2013 – 2018 **Full Professor** (with tenure). Department of Chemistry and Biochemistry, University of Colorado at Boulder
- 2007 – 2013 **Associate Professor** (with tenure). Department of Chemistry and Biochemistry, University of Colorado at Boulder
- 2001 – 2007 **Assistant Professor**. Department of Chemistry and Biochemistry, University of Colorado at Boulder

Honors and Awards

- 2010 Inventor of the Year, University of Colorado Research Excellence Award
- 2005 Semi-finalist, Keck Foundation Distinguished Young Scholars in Medical Research
- 2004 American Cancer Society, Research Scholar Grant
- 2003 Butcher Seed Grant Award
- 2002 Research Innovation Award, Research Corporation
- 1997 – 2001 Jane Coffin Childs Memorial Cancer Fellowship
- 1990 – 1991 Keck Foundation Pre-doctoral Fellowship
- 1990 Outstanding Chemistry Major Award, American Chemical Society, Orange County Section

1990 Special Service Award, Department of Biological Sciences
Univ. of California, Irvine
1998 Phi Beta Kappa

Professional Affiliations

American Chemical Society
RNA Society
American Society of Biochemistry and Molecular Biology

Research Support (Grants Awarded)

Current Grant Support.

R01 GM073850 4/2005 - 8/2023
National Institutes of Health \$200,00.00 per year, direct
Basis of gene regulation by a purine and cobalamine binding mRNAs.

R01 GM120347 (Wuttke and Batey, MPI) 4/1/2016 - 3/31/2020
National Institutes of Health \$250,000.00 per year, direct
lncRNAs as Organizers of and Bridges between Proteins and RNA

R01 GM133184 (Palmer and Batey; MPI) 4/2019-3/2023
National Institutes of Health \$200,000 total direct costs
Riboglow: a robust multi-color riboswitch-based platform for imaging RNA in living cells.

Prior Grant Support.

1. Butcher Genomics and Biotechnology Initiative, University of Colorado
Development of high-throughput RNA structural genomics
Total award: \$40,000
Duration: 7/2003 – 6/2004
2. W. M. Keck Foundation initiative in RNA science at the University of Colorado
Single Molecules Studies of RNA
Total Award: \$40,000
Duration: 8/2004 – 7/2006
3. Keck Foundation Distinguished Young Scholars in Medical Research, Semi-Finalist
Total Award: \$10,000
Duration: 9/2005 – 8/2006
4. The National Academies Keck Futures Initiative
(Co-P.I. with Prof. Thomas Perkins)
A widely applicable, highly sensitive RNA-based biosensor
Total Award: \$75,000
Duration: 6/2005 – 5/2006
5. Research Corporation Young Investigator Award
Development of a tool for X-ray crystallographic structural analysis of RNA-drug interactions.
Total award: \$35,000
Duration: 12/2002 – 12/2007
6. American Heart Association
Structural Studies of Target Recognition by the Signal Recognition Particle
Total Award: \$260,000
Duration: 1/2004 – 12/2007
7. American Cancer Society Research Scholar Grant

- Structural basis of gene regulation by a guanine-binding mRNA element*
 Total Award: \$497,000
 Duration: 1/2005 – 12/2008
8. National Institutes of Health, 1S10RR026516-01
Purchase of an Isothermal Titration Calorimeter
 Total Award: \$128,795
 Duration: 4/2010 – 3/2011
 9. University of Colorado, Boulder; Innovative Seed Grant
Development of new selection methods based upon riboswitches
 Total award: \$40,000
 Duration: 7/1/11 – 6/30/12
 10. National Science Foundation, 1150834 (Batey, P.I. and Copley, co-P.I.)
Modular Riboswitch Reporters for Directed Protein Evolution
 Total award: \$400,000
 Duration: 2/1/12 - 1/31/15
 11. National Institutes of Health, R01 GM083953
Structural and mechanism of SAM-responsive riboswitches
 Total award: \$2,299,651 (total over lifetime of project)
 Duration: 4/1/2008 - 4/30/2017
 12. Sponsored Research, Meira GTx
Development of aptamers that recognize FDA-approved drugs
 Total award: \$160,000 (direct over lifetime of project)
 Duration: 8/1/2017 – 07/31/2018

Research works

(OCRID ID 0000-0002-1384-6625, H-index: 41; 5,119 citations; 58.84 ave. citations per article, Jan. 2020)

Publications as an Independent Investigator (Peer-reviewed)

1. Matyjasik MM, Batey RT. (2019) "Structural basis for 2'-deoxyguanosine recognition by the 2'-dG-II class of riboswitches." *Nucleic Acids Res.* **47**: 10931-10941.
2. Parsonnet NV, Lammer NC, Holmes ZE, Batey RT*, Wuttke DS*. (2019) "The glucocorticoid receptor DNA-binding domain recognizes RNA hairpin structures with high affinity." *Nucleic Acids Res.* **47**: 8180-8192. (*co-corresponding authors)
3. Vicens Q, Mondragón E, Reyes FE, Coish P, Aristoff P, Berman J, Kaur H, Kells KW, Wickens P, Wilson J, Gadwood RC, Schostarez HJ, Suto RK, Blount KF, Batey RT. (2018) "Structure-Activity relationship of flavin analogues that target the Flavin Mononucleotide riboswitch." *ACS Chem Biol.* **13**: 2908-2919.
4. Braselmann E, Wierzba AJ, Polaski JT, Chromiński M, Holmes ZE, Hung ST, Batan D, Wheeler JR, Parker R, Jimenez R, Gryko D, Batey RT, Palmer AE. (2018) "A multicolor riboswitch-based platform for imaging of RNA in live mammalian cells." *Nat Chem Biol.* **14**: 964-971.
5. Polaski JT, Kletzien OA, Drogalis LK, Batey RT. (2018) "A functional genetic screen reveals sequence preferences within a key tertiary interaction in cobalamin riboswitches required for ligand selectivity." *Nucleic Acids Res.* **46**: 9094-9105.
6. Ozdilek BA, Thompson VF, Ahmed NS, White CI, Batey RT*, Schwartz JC*. (2017) "Intrinsically disordered RGG/RG domains mediate degenerate specificity in RNA binding." *Nucleic Acids Research* **45**: 7984-7996. (*co-corresponding authors)

7. Polaski JT, Webster SM, Johnson JE Jr, Batey RT. (2017) "Cobalamin Riboswitches Exhibit a Broad Range of Ability to Discriminate between Methylcobalamin and Adenosylcobalamin." *J. Biol. Chem.* **292**: 11650-11658.
8. Miao Z, Adamiak RW, Antczak M, Batey RT, Becka AJ, Biesiada M, Boniecki MJ, Bujnicki J, Chen SJ, Cheng CY, Chou FC, Ferré-D'Amaré AR, Das R, Dawson WK, Feng D, Dokholyan NV, Dunin-Horkawicz S, Geniesse C, Kappel K, Kladwang W, Krokhotin A, Łach GE, Major F, Mann TH, Magnus M, Pachulska-Wieczorek K, Patel DJ, Piccirilli JA, Popena M, Purzycka KJ, Ren A, Rice GM, Santalucia J Jr, Sarzynska J, Szachniuk M, Tandon A, Trausch JJ, Tian S, Wang J, Weeks KM, Williams B 2nd, Xiao Y, Xu X, Zhang D, Zok T, Westhof E. (2017) "RNA-Puzzles Round III: 3D RNA structure prediction of five riboswitches and one ribozyme." *RNA* **23**: 655-672.
9. Porter EB, Polaski JT, Morck MM, Batey RT. (2017) "Recurrent RNA motifs as scaffolds for genetically encodable small-molecule biosensors" *Nature Chem Biol* **13**: 295-301.
10. Polaski JT, Holmstrom ED, Nesbitt DJ, Batey RT. (2016) "Mechanistic Insights into Cofactor-Dependent Coupling of RNA Folding and mRNA Transcription/Translation by a Cobalamin Riboswitch." *Cell Rep.* **15**: 1100-10.
11. Wostenberg C, Ceres P, Polaski JT (2015) "A highly coupled network of tertiary interactions in the SAM-I riboswitch and their role in regulatory tuning" *J Mol Biol* **427**: 3473-90.
12. Trausch JJ, Marcano-Velázquez JG, Matyjasik MM, Batey RT (2015) "Metal ion-mediated nucleobase recognition by the ZTP riboswitch" *Chem Biol* **22**: 829-37.
13. Marcano-Velázquez JG, Batey RT (2015) "Structure-guided mutational analysis of gene regulation by the *Bacillus subtilis pbuE* adenine responsive riboswitch in a cellular context" *J Biol Chem* **290**: 4464-75.
14. Holmstrom ED, Polaski JT, Batey RT*, Nesbitt DJ* (2014) "Single-molecule conformational dynamics of a biologically functional hydroxocobalamin riboswitch" *J Am Chem Soc* **136**: 16832-16843. (*co-corresponding authors)
15. Trausch JJ, Xu Z, Edwards AE, Reyes FE, Ross PE, Knight R, Batey RT (2014) "Structural basis for diversity in the SAM clan of riboswitches" *Proc Natl Acad Sci U S A* **111**: 6624-6629.
16. Trausch JJ, Batey RT (2014) "A disconnect between high-affinity binding and efficient regulation by antifolates and purines in the tetrahydrofolate riboswitch" *Chem Biol* **21**: 205-216.
17. Ceres P, Trausch JJ, Batey RT (2013) "Engineering modular 'ON' RNA switches using biological components" *Nucleic Acids Research* **41**: 10449-61.
18. Ceres P, Garst AD, Marcano-Velazquez JG, Batey RT (2013) "Modularity of select riboswitch expression platforms enables facile engineering of novel genetic regulatory devices" *ACS Synth Biol* **2**: 463-472.
19. Stoddard CD, Widmann J, Trausch JJ, Marcano-Velazquez JG, Knight R, and Batey RT (2013) "Nucleotides adjacent to the ligand-binding pocket are linked to activity tuning in the purine riboswitch." *J Mol Biol* **425**: 1596-1610.
20. Fiegland LR, Garst AD, Batey RT, Nesbitt DJ (2012) "Single-molecule studies of the lysine riboswitch reveal effector dependent conformational dynamics of the aptamer domain." *Biochemistry* **51**: 9223-9233.
21. Johnson JE, Reyes FE, Polaski J, Batey RT (2012) "B12 cofactors directly stabilize an mRNA regulatory switch." *Nature* **492**: 133-137.
22. Garst AD, Porter EB, Batey RT (2012). "Insights into the regulatory landscape of the lysine riboswitch." *J Mol Biol.* **423**: 17-33.
23. Trausch J, Reyes FE, Ceres P, Batey RT (2011). "The structure of a tetrahydrofolate-sensing riboswitch reveals two ligand binding sites in a single aptamer." *Structure* **19**: 1413-1423.

24. Vicens Q, Mondragón E, Batey RT (2011). "Molecular sensing by the aptamer domain of the FMN riboswitch: a general model for ligand binding by conformational selection." *Nucleic Acids Research* **39**: 8586-8598.
25. Daldrop P, Reyes FE, Robinson DA, Hammond CM, Lilley DM, Batey RT, Brenk R (2011). "Novel ligands for a purine riboswitch discovered by RNA-ligand docking." *Chemistry & Biology* **18**: 324-335.
26. Stoddard CD, Montange RK, Hennelly SP, Rambo RP, Sanbonmatsu KY, Batey RT (2010). "Free state conformational sampling of the SAM-I riboswitch aptamer domain." *Structure* **18**: 787-797.
27. Edwards AL, Reyes FE, Heroux A, Batey RT (2010). "Structural basis for recognition of S-adenosylhomocysteine by riboswitches." *RNA* **16**: 2144-2155.
28. Montange RK, Mondragon E, van Tyne D, Garst AD, Ceres P, Batey RT (2010). "Discrimination between closely related cellular metabolites by the SAM-I riboswitch." *J Mol Biol* **396**: 761-772.
29. Gelinias AD, Paschini M, Reyes FE, Heroux A, Batey RT, Lundblad V, Wuttke DS (2009) "Telomere capping proteins are structurally related to RPA with an additional telomere-specific domain" *Proc Natl Acad Sci U S A* **106**: 19298-19303.
30. Vicens Q., Gooding AR, Duarte LF, and Batey RT (2009) "Preparation of group I introns for biochemical studies and crystallization assays by native affinity purification" *PLoS One* **4**:e6740.
31. Gilbert SD, Reyes FE, Edwards AL, and Batey RT (2009) "Adaptive ligand binding by the purine riboswitch in the recognition of guanine and adenine analogs" *Structure* **17**: 857-868.
32. Hardin JW, Reyes, FE, and Batey RT (2009) "Analysis of a critical interaction within the archaeal box C/D small ribonucleoprotein complex" *J. Biol. Chem.* **284**: 15317-15324.
33. Edwards, A. L. and Batey, R. T. (2008) "A structural basis for the recognition of 2'-deoxyguanosine by the purine riboswitch" *J. Mol Biol.* **385**: 938-948.
34. Garst, A.D., Héroux, A., Rambo, R. P., and Batey, R. T. (2008) "Crystal structure of the lysine riboswitch regulatory mRNA element" *J. Biol. Chem.* **283**: 22347-22351.
35. Stoddard, C. D., Gilbert, S. D., and Batey, R. T. (2008) "Ligand-dependent folding of the purine riboswitch" *RNA* **14**: 675-684.
36. Gilbert, S.D., Rambo, R. P., Van Tyne, D., and Batey, R. T. (2008) "Structure of the SAM-II riboswitch bound to S-adenosylmethionine" *Nature Structural and Molecular Biology* **15**: 177-182.
37. Gilbert, S. D., Love, C. E., Edwards, A. L., and Batey, R. T. (2007) "Mutational analysis of the purine riboswitch aptamer domain." *Biochemistry* **46**: 13297-13309.
38. Keel, A. Y., Rambo, R. P., Batey, R. T., Kieft, J. S. (2007) "A general strategy to solve the phase problem in RNA crystallography." *Structure* **15**: 761-772.
39. Batey, R. T., Kieft, J.S. (2007) "Improved native affinity purification of RNA." *RNA* **13**: 1384-1389.
40. Gilbert, S. D., Mediatore, S. J. and Batey, R. T. (2006) "Modified pyrimidines specifically bind the purine riboswitch." *Journal of the American Chemical Society* **128**: 14214-14215.
41. Hardin, J. W. and Batey R. T. (2006) "The bipartite architecture of the sRNA in an Archaeal Box C/D complex is a primary determinant of specificity." *Nucleic Acids Research* **34**: 5039-5051.
42. Montange, R. K. and Batey, R. T. (2006) "Structure of the S-adenosylmethionine riboswitch regulatory element." *Nature* **441**: 1172-1175.
43. Gilbert, S. D., Wise, S. J., Stoddard, C. and Batey, R. T. (2006) "Thermodynamic and kinetic investigation of ligand binding by the purine riboswitch." *Journal of Molecular Biology* **359**: 754-768.

44. Pleshe, E., Truesdell, J. and Batey R. T. (2005) "Crystal structure of a class II TrmH tRNA modifying enzyme from *Aquifex aeolicus*." *Acta Crystallographica F* **61**: 722-728.
45. Batey, R. T., Gilbert, S. D., and Montange, R. K. (2004) "Structure of a natural guanine-responsive riboswitch complexed with the metabolite hypoxanthine." *Nature* **432**: 411-416.
46. Kieft, J. S. and Batey, R. T. (2004) "A general method for rapid and nondenaturing purification of RNAs." *RNA* **10**: 988-995.
47. Cochrane, J. C., Batey, R. T., and Strobel, S. A. (2003) "Quantitation of free energy profiles in RNA-ligand interactions by nucleotide analog interference mapping." *RNA* **9**: 1282-1289.

Other publications as an Independent Investigator (reviews or not peer reviewed)

48. Batey RT, Kieft JS (2016) "Soaking hexamine cations into RNA crystals to obtain derivatives for phasing diffraction data." *Methods in Molecular Biology* **1320**: 219-32.
49. Batey RT (2015) "Riboswitches: still a lot of undiscovered country" *RNA* **21**: 560-3.
50. Trausch JJ, Batey RT (2015) "Design of modular "plug-and-play" expression platforms derived from natural riboswitches for engineering novel genetically encodable RNA regulatory devices" *Methods Enzymol* **550**: 41-71.
51. Batey RT (2014) "Structural biology: Lariat lessons" *Nature* **514**: 173-174.
52. Porter EB, Marcano-Velázquez JG, Batey RT (2014) "The purine riboswitch as a model system for exploring RNA biology and chemistry" *Biochem Biophys Acta* **1839**: 919-930.
53. Batey RT (2014). "Advances in methods for native expression and purification of RNA for structural studies." *Curr Op Struct Biol* **26**: 1 -8.
54. Batey RT (2012). "Structure and mechanism of purine binding riboswitches." *Q. Rev. Biophys.* **45**: 345-381.
55. Batey RT (2011). "Recognition of S-adenosylmethionine by riboswitches." *Wires: RNA* **2**: 299-311.
56. Garst AD, Edwards AL, Batey RT (2011). "Riboswitches: Structures and mechanisms." *Cold Spring Harbor Perspect. Biol.* **3**: pii: a003533..
57. Edwards AL, Batey RT (2010). "Riboswitches: A common RNA regulatory element." *Nature Education* **3**: 9.
58. Reyes, F. E., and Batey, R. T. (2009) "Strategies in RNA Crystallography" *Meth. Enz.* **469**: 119-139.
59. Garst, A. D., and Batey, R. T. (2009) "A switch in time: Detailing the life of a riboswitch" *Biochim Biophys Acta* **1789**: 584-591.
60. Stoddard, C. D. and Batey, R. T. (2009) "Beyond Crystallography: Investigating the conformational dynamics of the purine riboswitch" *Non-Protein Coding RNAs, Springer Series in Biophysics* **13**: 215-228.
61. Gilbert, S. D. and Batey, R. T. (2009) "Monitoring RNA-ligand interactions using Isothermal Titration Calorimetry" *Methods in Molecular Biology* **540**: 97-114.
62. Edwards, A. L., Garst, A. D., and Batey, R. T. (2009) "Determining structures of RNA aptamers and riboswitches by X-ray crystallography" *Methods in Molecular Biology* **535**: 135-163.
63. Montange R. K. and Batey R. T. (2008) "Riboswitches: Emerging Themes in RNA Structure and Function." *Annual Reviews of Biophysics* **37**: 117-133.
64. Vincens, Q., Allen, M. A., Gilbert, S. D., Reznik, B. Gooding, A. R., and Batey, R.T. (2008). "The Cech Symposium: a celebration of 25 years of ribozymes, 10 years of TERT, and 60 years of Tom" *RNA* **14**: 397-403.
65. Stoddard, C.D., Batey R. T. (2006) "Mix-and-match riboswitches." *ACS Chemical Biology* **1**: 751-754.

66. Gilbert, S. D., Montange, R. K., Stoddard, C. D., and Batey, R. T. (2006). "Structural studies of the purine and SAM binding riboswitches" *Cold Spring Harbor Symposium on Quantitative Biology* **71**: 259-268.
67. Gilbert, S. D. and Batey, R. T. (2006) "Riboswitches: Fold and Function." *Chemistry and Biology* **13**: 805-807.
68. Batey, R. T. (2006). "Structures of regulatory elements in mRNAs." *Current Opinion in Structural Biology* **16**: 299-306.
69. Gilbert, S. D. and Batey, R. T. (2005). "Riboswitches: natural SELEXion." *Cellular and Molecular Life Sciences* **62**: 2401-2404.
70. Hardin, J. W. and Batey, R. T. (2004). "Curse of the Hairpin Loop." *Structure* **12**: 731-732.
71. Doudna, J. A. and Batey, R. T. (2004). "Structural Insights into the Signal Recognition Particle." *Annual Reviews of Biochemistry* **73**: 539-57.

Publications from work prior to becoming an Assistant Professor.

72. Batey, R. T., and Doudna, J. A. (2002). "Structural and energetic analysis of metal ions essential to SRP signal recognition domain assembly." *Biochemistry* **41**: 11703-11710.
73. Doherty, E. A., Batey, R. T., Masquida, B. and Doudna, J. A. (2001). "A universal mode of helix packing in RNA." *Nature Structural Biology* **8**: 339-343.
74. Batey, R. T., Sagar, M. B., and Doudna, J. A. (2001). "Structural and energetic analysis of RNA recognition by a universally conserved protein from the signal recognition particle." *Journal of Molecular Biology* **307**: 229-246.
75. Lucast, L. J., Batey, R. T., and Doudna, J. A. (2001). "Large-scale purification of a stable form of recombinant tobacco etch virus protease." *Biotechniques* **30**: 544-550.
76. Batey, R. T., Rambo, R. P., Lucast, L., Rha, B., and Doudna, J. A. (2000). "Crystal structure of the ribonucleoprotein core of the signal recognition particle." *Science* **287**: 1232-1239.
77. Batey, R. T., Rambo, R. P., and Doudna, J. A. (1999). "Tertiary motifs in RNA structure and folding." *Angewandte Chemie International Edition* **38**: 2326-2343.
78. Batey, R. T., and Doudna, J. A. (1998). "The parallel universe of RNA folding." *Nature Structural Biology* **5**: 337-340.
79. Batey, R. T., and Williamson, J. R. (1998). "Effects of polyvalent cations on the folding of an rRNA three-way junction and binding of ribosomal protein S15." *RNA* **4**: 984-997.
80. Batey, R. T., Cloutier, N., Mao, H., and Williamson, J. R. (1996). "Improved large scale culture of *Methylophilus methylotrophus* for ¹³C/¹⁵N labeling and random fractional deuteration of ribonucleotides." *Nucleic Acids Research* **24**: 4836-4837.
81. Batey, R. T., and Williamson, J. R. (1996). "Interaction of the *Bacillus stearothermophilus* ribosomal protein S15 with 16 S rRNA: II. Specificity determinants of RNA-protein recognition." *Journal of Molecular Biology* **261**: 550-567.
82. Batey, R. T., and Williamson, J. R. (1996). "Interaction of the *Bacillus stearothermophilus* ribosomal protein S15 with 16 S rRNA: I. Defining the minimal RNA site." *Journal of Molecular Biology* **261**: 536-549.
83. Batey, R. T., Battiste, J. L., and Williamson, J. R. (1995). "Preparation of isotopically enriched RNAs for heteronuclear NMR." *Methods in Enzymology* **261**: 300-322.
84. Batey, R. T., Inada, M., Kujawinski, E., Puglisi, J. D., and Williamson, J. R. (1992). "Preparation of isotopically labeled ribonucleotides for multidimensional NMR spectroscopy of RNA." *Nucleic Acids Research* **20**: 4515-4523.
85. Senear, D. F., and Batey, R. (1991). "Comparison of operator specific and nonspecific DNA binding of lambda cl repressor: [KCl] and pH effects." *Biochemistry* **30**: 6677-6688.

Patents awarded

Doudna JA, Lucast LJ, Batey RT. Mutant proteinase with reduced self-cleavage activity and method of purification. US Patent 7,494,786; 8,206,968; 8,470,575.

Teaching Accomplishments

Research Group Members (Past and Present)

Postdoctoral Research Associates (4 total): Quentin Vicens (2008 - 2009), James E. Johnson Jr. (2008 - 2012), Chris Wostenberg (2012 – 2015), Sandro Neuner (2017 – present)

Graduate Students (22 total): Sunny D. Gilbert (Ph.D., 2007, Chemistry and Biochemistry), John W. Hardin (Ph.D., 2007, Chemistry and Biochemistry), Elizabeth Pleshe (M.S., 2005, Chemistry and Biochemistry), Sarah J. Wise (M.S., 2004, Chemistry and Biochemistry), Rebecca K. Montange (Ph.D., 2008, Chemistry and Biochemistry), Colby Stoddard (Ph.D., 2009, Chemistry and Biochemistry), Francis Reyes (Ph.D., 2012, Chemistry and Biochemistry), Andrea Edwards (Ph.D., 2011, Chemistry and Biochemistry), Andrew Garst (Ph.D., 2012, Chemistry and Biochemistry), Pablo Ceres (Ph.D., 2013, Chemistry and Biochemistry), Jeremy Trausch (Ph.D. 2014, Chemistry and Biochemistry), Ely Porter (Ph.D., 2015, Chemistry and Biochemistry), Joan Marcano (Ph.D., 2015, Chemistry and Biochemistry), Jacob Polaski (Ph.D., 2016, Chemistry and Biochemistry), Bagdeser Akdogan (Ph.D. 2017, Molecular, Cellular and Developmental Biology), Zachary Holmes (Ph.D., 2018, Biochemistry), Michal Matyjasik (Ph.D., 2019, Biochemistry), Roman Iwasaki (Current Ph.D. student, Biochemistry), Otto Kletzien (Current Ph.D. student, Biochemistry), Desmond Hamilton (Current Ph.D. student, Biochemistry), Shelby Lennon (Current Ph.D. student, Biochemistry), Savannah Spradlin (Current Ph.D. student, Biochemistry).

Visiting Students: Vanessa Niebauer (University of Regensburg, Fall 2014), yttDavid Stelzig (University of Regensburg, Fall 2019)

Undergraduate Students (25 total): Nathan Camp (2001 - 2002), Lisa Pimentel (2002 - 2004), John Truesdell (2002 - 2003), Crystal Love (2003 – 2005), Sarah Twogood (2004 – 2005), Khoa Tran (2005 - 2007), Estefania Mondragon (2005 - 2007), Daria Van Tyne (2006), Brian Cristiano (2007 – 2008), Phillip Murray (2010 – 2011), Makenna Morck (2011 – 2014), Phillip Ross (2011 – 2013), Kristian Black (2013), Samantha Webster (2013 – present), Antonia Lin (2014 – 2017); Lea Drogalis (2015 – 2017); Maanasa Srinivasan (2016 – 2017); Marcus Urquijo (2017 – 2018), Mimi Carson (2018), Carly Peterson (2018), Edward Oropeza (2019), Xhjn~~uhh~~ Lisa Hansen (2019 – present), Logan Schwanz (2019 – present), Mia Kim (2019 – present), Aishah Odierno (2019 – present).

Professional Research Assistants: Matthew Grantz (2001- 2003), Elizabeth Pleshe (2005 - 2006), Crystal Love (2005 - 2007), Estefania Mondragon (2008 – 2010), Lea Drogalis (2017 – 2018), Marcus Urquijo (2018 – 2019), Simone Hall (2019 – present)

Classroom Teaching

Fall 2019 Foundations of Biochemistry (CHEM 2700, undergraduates), 4 credits, teaching 45 hours, organized class and graded exams.

Fall 2018 Foundations of Biochemistry (CHEM 4700, undergraduates and CHEM 5700, graduate students), 4 credits, teaching 45 hours, organized class and graded exams.

Fall 2017 Foundations of Biochemistry (CHEM 4700, undergraduates and CHEM 5700, graduate students), 4 credits, teaching 45 hours, organized class and graded exams.

Fall 2015 Foundations of Biochemistry (CHEM 4700, undergraduates and CHEM 5700, graduate students), 4 credits, teaching 45 hours, organized class and graded exams.

- Spring 2015 Undergraduate Biochemistry Laboratory (CHEM 4761, 2 sections), 4 credits, teaching 20 hours, organized class and oversaw laboratory director and graduate teaching assistants.
- Fall 2014 Methods in Molecular Biophysics (CHEM 5561), taught 3 hours as part of a team taught course.
- Spring 2014 Undergraduate Biochemistry Laboratory (CHEM 4761, 2 sections), 4 credits, teaching 20 hours, organized class and oversaw laboratory director and graduate teaching assistants.
- Fall 2013 Undergraduate Biochemistry Laboratory (CHEM 4761, 2 sections), 4 credits, teaching 20 hours, organized class and oversaw laboratory director and graduate teaching assistants.
- Spring 2012 General Biochemistry I (CHEM 4771, undergraduates and CHEM 5711, graduate students), 3 credits, teaching 45 hours, organized class and graded exams.
- Fall 2010 General Biochemistry I (CHEM 4771, undergraduates and CHEM 5711, graduate students), 3 credits, teaching 45 hours, organized class and graded exams.
- Fall 2010 Methods in Molecular Biophysics (CHEM 5561), taught 3 hours as part of a team taught course.
- Fall 2009 Advanced Biochemistry I, CHEM 5771, 5 credits, taught 45 hours, organized class and graded exams and homework.
- Fall 2009 Scientific Conduct, CHEM 5776, 1 credit, taught 8 hours.
- Fall 2008 Advanced Biochemistry I, CHEM 5771, 5 credits, taught 45 hours, organized class and graded exams and homework.
- Fall 2008 Scientific Conduct, CHEM 5776, 1 credit, taught 8 hours.
- Fall 2007 Undergraduate Biochemistry Laboratory (CHEM 4761) coordinator; responsible for redevelopment of the course in conjunction with the instructors A. Drotar and K. Hannah.
- Spring 2007 Topics in RNA (CHEM 6901), 1 credit, teaching 16 hours of organized discussion of journal articles relating to RNA biology and chemistry.
- Spring 2007 Undergraduate Biochemistry Laboratory, 4 hours of instruction on X-ray crystallography and associated laboratory activity
- Fall 2006 General Biochemistry I (CHEM 4771, undergraduates and CHEM 5711, graduate students), 3 credits, teaching 45 hours, organized class and graded exams.
- Fall 2005 General Biochemistry I (CHEM 4771, undergraduates and CHEM 5711, graduate students), 3 credits, teaching 45 hours, organized class and graded exams.
- Fall 2004 Methods of Molecular Biophysics, CHEM 5671, taught 4.5 hours.
- Fall 2004 General Biochemistry I (CHEM 4771, undergraduates and CHEM 5711, graduate students), 3 credits, teaching 45 hours, organized class and graded exams.
- Spring 2004 Signal Transduction and Cell Cycle Regulation, 3 credits, taught 3 hours.
- Fall 2003 General Biochemistry I (CHEM 4771, undergraduates, and CHEM 5711, graduate students), 3 credits, teaching 45 hours, organized class and graded exams.
- Fall 2003 Bioinformatics and Genomics, MCDB 4520, taught 1.5 hours
- Fall 2003 Advanced Biochemistry I, CHEM 5771, 6 credits, taught 3 hours
- Spring 2003 Methods of Molecular Biophysics, CHEM 5671, taught 3 hours.
- Fall 2002 Bioinformatics and Genomics, MCDB 4520, taught 1.5 hours
- Fall 2002 Advanced Biochemistry I, CHEM 5771, 5 credits, taught 45 hours, organized class and graded exams and homework.
- Fall 2002 Scientific Conduct, CHEM 5776, 1 credit, taught 8 hours.
- Spring 2002 Methods of Molecular Biophysics, CHEM 5671, taught 3 hours.

- Fall 2001 Advanced Biochemistry I, CHEM 5771, 5 credits, taught 45 hours, organized class and graded exams and homework.
- Fall 2001 Scientific Conduct, CHEM 5776, 1 credit, taught 8 hours.

Student and faculty evaluations solicited by the Department following each course are available in my permanent file. Copies of the individual FCQs (Faculty Course Questionnaire) from courses in which I was the principal instructor are also included in my file.

Other Teaching Activities

Member of Graduate Dissertation/Thesis Committee (other than principal advisor)

- Current: Peter Otoupal, candidate for Ph.D., Neil Lloyd, candidate for Ph.D., Nick Parsonett, candidate for Ph.D, Josep Ribot candidate for Ph.D., Jeremy Trager, candidate for Ph.D.
- 2017: Colleen Courtney, Ph.D., Sabrina Hunt, Ph.D., Xueyin Wang, Ph.D., Van Tra, M.S.
- 2016: Daniel Biedeman, M.S.
- 2015: Marie Balboa, M.S., Justine Debelius, Ph.D.
- 2014: Erik Holmstrom, Ph.D. Thayne Dickey, Ph.D., Cristina Sandoval, Ph.D.
- 2013: Jeremy Widman, Ph.D., John Zinder, M.S., Carol Manhardt, Ph.D.
- 2012: Sarah Altshuler, Ph.D.
- 2011: Peter Daldrop, D.Phil (Univeristy of Dundee, UK; outside examiner)
- 2010: Joshua Stahl, M.S.
- 2009: Chrysa Latrick, Ph.D., Amy Galinas, Ph.D., Stacey Wagner, Ph.D., John Hammond, Ph.D. (UCHSC), Jane Kim, Ph.D. (Yale University, outside reader)
- 2008: Jennifer Roberts, Ph.D., Nicole Grimm, M.S.
- 2007: Darren Bates, Ph.D., Liang Gao, Ph.D., Jennifer Boots, Ph.D., Celso Espinoza, Ph.D., Jennifer Pfungsten, Ph.D., (UCHSC), Jennifer Nelson, Ph.D.
- 2006: Michael Townsend, Ph.D., Lee Sanderson, Ph.D., Chris Downey, Ph.D.
- 2005: Taraka Dale, Ph.D., Fedor Karginov, Ph.D., Amy Buck, Ph.D., Luke Kroiss, M.S.
- 2004: Reneé Lagutaris, M.S.
- 2003: Annaleen Vermulen, Ph.D., Michael Giffin, Ph. D.
Robert Gottlieb, Ph. D.
- 2002: Thain Mauer, M.S.

Rotation Advisor for Graduate Students

- AY 2019 - 2020: Katy Walsh, Chris Breninger, Briana Aboulache
- AY 2018 - 2019: Savannah Spradlin, Calvin Voong, Olivia Luyties, Shelby Lennon
- AY 2017 - 2018: Allison Schier, Nicholas Lammer, Jeffrey Allen, Desmond Hamilton
- AY 2016 - 2017: Otto Kletzien
- AY 2015 - 2016: Thomas Patrick, Roman Iwasaki
- AY 2014 - 2015: Michal Matyjasek, Daniel Beideman
- AY 2013 - 2014: Hayden Swisher, Zac Holmes, Michael Minson, Tyler Matheny
- AY 2012 - 2013: Nick Parsonnet, David Protter
- AY 2011 - 2012: Benjamin Allen, Christopher Bennett, Joshua Shoreinstein, Sabrina Hunt, Bagdeser Akdogan
- AY 2010 - 2011: Jacob Polaski
- AY 2009 - 2010: Joanna Duncan, Joan Marcano, Ely Porter, John Zinder
- AY 2008 - 2009: Thayne Dickey, Mikal Sherman, Jeremey Trausch
- AY 2007 - 2008: Katarina Jansen, Jeremey Widmann

AY 2006 - 2007: Andrew Garst, Pablo Ceres, Aaron Krueger
 AY 2005 - 2006: Andrea Edwards, Francis Reyes
 AY 2004 - 2005: Colby Stoddard
 AY 2003 - 2004: Chrysa Latrick, Michael Latham, Kristi Good, Allison Wellman
 AY 2002 - 2003: Chung-Tien Lee, Elizabeth Pleshe, Sarah Wise, Jeff Butler, Nisha Low-Nam, Jennifer Roberts
 AY 2001 - 2002: Sunny Gilbert, John Hardin, Diane Starrett, Darren Bates, Rico Stephan

Member of Undergraduate Honors Thesis Committee (other than principal advisor): David Zander, B. S. *Cum laude*, Biochemistry 2002, Susie Sinor, B. S. *Summa cum laude*, Chemistry, 2003, James Mediatore, B. S. *Summa cum laude*, Biochemistry, 2003, Ashesh Thaker, B. S. *Summa cum laude*, Biochemistry, 2004, Richard Rymer, B. S. *Summa cum laude*, Chemistry, 2004, Kaitlyn Gilman, B. S. *Magna cum laude*, Biochemistry 2004, Katherine Kenerson, B. S. *Magna cum laude*, Biochemistry 2004, Sarah Gasparrini, B. S. *Summa cum laude*, Chemistry 2005, James Madsen, B. S. *Magna cum laude*, Biochemistry 2005, Sarah Urfer, B. S. *Cum laude*, Biochemistry 2005, Alejandro Ramirez, B. S. *Summa cum laude*, Biochemistry 2005, Brittany Holmes, B. S., *Summa cum laude*, Biochemistry 2005, Stephanie Lange, B. S., *Cum laude*, Biochemistry 2006, Sean Baran, B. S., *Summa cum laude*, Biochemistry 2006, Michelle Loi, B. S., *Summa cum laude*, Biochemistry 2006, Lauren Kiemele, B. S., *Magna cum laude*, Chemistry 2006, Grace Kim, B. S., *Magna cum laude*, Biochemistry 2006, Farnaz Haji, B. S. *Cum laude*, Biochemistry 2006, Ethan Sanford, B. S., *Magna cum laude*, Biochemistry 2006, Ehsan Azimi, B. S., *Summa cum laude*, Biochemistry 2006, David Barnett, B. S., *Magna cum laude*, Biochemistry 2006, Sheridan Morgan, B. S., *Magna cum laude*, M.C.D.B. 2006, Ian Smith, B. S., *Cum laude*, M.C.D.B., 2011, Reiko Kato, B. S., *Summa cum laude*, Biochemistry 2011, Laura Gentile, B.S., *Summa cum laude*, Integrated Physiology, 2013

Service Activities

Service to the University of Colorado, Boulder

Associate Chair of Graduate Affairs, Dept. of Biochemistry

2018 – present As the graduate advisor, I am responsible for organizing various aspects of graduate education such as first year rotations and teaching responsibilities, acting as a internal counselor for graduate students, and keeping general track of the progress of the students in the graduate program. In addition, as Associate Chair, I stand on the executive committee as a non-voting member to advise the Chair on departmental issues.

Oversight Committee, Dept. of Biochemistry

2018 – present Voting member of the Departmental Oversight committee that advises the Chair on departmental issues and provides consent on special financial requests made to the Chair.

Graduate Advisor/Director, Biochemistry Division

2009 – 2018 As the graduate advisor, I am responsible for organizing various aspects of graduate education such as first year rotations and teaching responsibilities, acting as an internal counselor for graduate students, and keeping general track of the progress of the students in the graduate program.

Internal Selections Committee

2007 – 2011 This committee serves as a campus-wide internal selection panel for young investigator awards that will be forwarded to the national competition
 2012 Served on the selection committee for awarding CU Innovative Research Seed Grants

Admission and Recruitment Committee

2006 – 2009 Responsible for reviewing applications of applicants to the graduate program in Biochemistry and arranging the recruitment weekend for perspective graduate students

Advising

2002- 2006 Advisor for Chemistry and Biochemistry undergraduate honors students (one of two faculty)

Seminars

2001 – 2005 Organized Biochemistry Seminar Series (one of two faculty in 2001-2002)
2006 - 2007 Organizing the Dharmacon Lecture Series

Training Grants

2002 – present Participant in the Signal Transduction and Cell Cycle Regulation Training Grant
2002 – present Participant in the Biophysics Training Grant
2008 – present Biophysics Training Grant Steering Committee

Other

2001 – present Regular member of faculty grant review committees
2004 Coordinated requirement changes for the Biochemistry Minor program

Service Outside of the University of Colorado, Boulder

Reviewer for Journals

2001 – present Refereed papers submitted to the journals including *Nature*, *Cell*, *Nature Structural and Molecular Biology*, *Proceedings of the National Academy of Sciences*, *Nucleic Acids Research*, *Journal of Molecular Biology*, *Structure*, *Protein Science*, *RNA*, *Biochemistry*, *Journal of Biochemistry*, *Journal of the American Chemical Society*, *Chemical Reviews*, and *ACS Chemical Biology*, *RNA Biology*.

Reviewer of Grant Applications

2006 *National Science Foundation*, ad hoc reviewer.
The Israel Science Foundation
Netherlands Organisation for Scientific Research.
2007 - 2010 *National Science Foundation*, Microbial and Molecular Genetics Study Section, regular member.
2008 *American Cancer Society* Genetic Mechanisms, ad hoc.
2009 *National Institutes of Health*, MSF-B study section, ad hoc.
2010 *National Science Foundation*, Chemistry Directorate, ad hoc study section member.
2011 *National Institutes of Health*, *National Science Foundation*, ad hoc.
2013 – 2016 *National Institutes of Health*, MSF-B study section, member.
2016 – 2018 *National Institutes of Health*, MSF-B study section, Chair.
2019 *National Science Foundation*, Chemistry Directorate, ad hoc study section member.
2019 *National Institutes of Health*, Special Emphasis Panel for MIRA proposals, ad hoc.
2020 *National Institutes of Health (NINDS)*, NSD-B study section, ad hoc member.

Member of Faculty of 1000

2006 - 2017 RNA structure section

Editorial Board

2009 – 2017 Associate Editor, *WIREs RNA*

2012 – present Editorial Board, *Journal of Biological Chemistry*

National Meeting Organization

2007 - 2008 Organization of “Small RNAs and dynamic RNA elements”
session for the 2008 ASBMB Annual Conference.

2015 Session Organizer, Annual RNA Society Conference.