

Sheel C. Dodani

The University of Texas at Dallas, Department of Chemistry and Biochemistry

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Research Interests

I am a supramolecular engineer whose work bridges the chemistry-biology interface. My research program is centered on engineering biomolecular hosts to measure and manipulate anionic guests in aqueous environments. Currently, we are developing genetically encoded fluorescent indicators to illuminate how cells manage and utilize anions, particularly chloride and nitrate, for homeostasis and signaling in healthy and disease states. By pushing the frontier unmet, we will not only enable the design of anion targeted diagnostics and therapeutics but also make fundamental contributions to decode the supramolecular principles for aqueous anion recognition.

Appointments

2022–present Associate Professor of Chemistry and Biochemistry, The University of Texas at Dallas
2016–2022 Assistant Professor of Chemistry and Biochemistry, The University of Texas at Dallas
2013–2016 NIH Postdoctoral Fellow, California Institute of Technology
Advisor: Professor Frances H. Arnold
2007–2013 Graduate Student Researcher, University of California, Berkeley
Advisor: Professor Christopher J. Chang
2007–2009 Graduate Student Teaching Assistant, University of California, Berkeley
2007 Summer Student Research Assistant, University of California, Berkeley
Advisor: Professor Kenneth N. Raymond
2004–2007 Undergraduate Student Researcher, The University of Texas at Dallas
Advisor: Professor John W. Sibert
2003, 2004 Anson L. Clark Scholar Program Fellow, The University of Texas at Dallas
Advisor: Professor Dennis Miller, Professor John W. Sibert

Education

2013 University of California, Berkeley Ph.D. in Chemistry
2007 The University of Texas at Dallas B.S. in Chemistry

Training Workshops

2021 Hanover Research Grant Academy
2018 NSF-CHE Early Career Investigator Workshop
2017 Cottrell Scholars Collaborative New Faculty Workshop
2017 NIH Annual Mentoring Workshop for New Faculty in Organic and Biological Chemistry

Honors and Awards

2024 Maximizing Investigators' Research Award (R35), NIH, NIGMS
2024 Zasshikai Lectureship, University of Tokyo
2023 NSF CAREER Award
2020 The University of Texas at Dallas Office of Research FRIEND Award
2020 Sessler Early Career Researcher Prize
2018 Maximizing Investigators' Research Award (R35), NIH, NIGMS
2015 Rising Stars in Chemistry Symposium, University of Chicago
2014 Rising Stars in Chemical Biology Symposium, University of Utah
2014 Poster awarded top honors, Biocatalysis Gordon Research Conference and Seminar
2013–2016 Ruth L. Kirschstein Postdoctoral Individual National Research Service Award, NIH, NIGMS
2011 Taihi Hong Memorial Graduate Student Education Award
2011 Novartis Fellowship in Organic Chemistry for Minorities and Women
2010 Poster selected for oral presentation, Metals in Biology Gordon Research Conference
2007 The University of Texas at Dallas *summa cum laude*
2007 Merck Index Women in Chemistry Scholarship

2007	Dallas-Fort Worth American Chemical Society Scholarship
2007	Julia Williams Van Ness Merit Scholarship
2006	Frank and Sara McKnight Prize in Undergraduate Chemistry
2006	Poster awarded top honors, Annual UTD Chemistry and Biology Symposium
2005–2006	The University of Texas at Dallas Presidential Achievement Scholar
2004	Poster awarded top honors, SWRM ACS
2003, 2004	Anson L. Clark Scholarship
2003–2007	Academic Honors Scholarship

Publications

† indicates equal contributions; ‡ indicates undergraduate co-author; * indicates corresponding author

1. Tutol, J. N.†; Ong, W. S. Y.†; Phelps, S. M.; Peng, W.; Goenewan, H.‡; **Dodani, S. C.*** “Engineering the ChlorON Series: Turn-on fluorescent protein sensors for imaging labile chloride in living cells.” *bioRxiv*, DOI: 10.1101/2022.08.13.503807. *ACS Central Science*, 10, 77–86 (2024). (Featured Supplementary Cover).
2. Phelps, S. M.; Tutol, J. N.; Advani, D.‡; **Dodani, S. C.*** “Unlocking chloride sensing at physiological pH in a fluorescent rhodopsin-based host.” *ChemComm*, 59, 8460–8463 (2023). (Part of the 2023 Emerging Investigators Collection).
3. Ong, W. S. Y.†; Ji, K.†; Pathiranaage, V.; Maydew, C.; Baek, K.; Villones, R. L. E.; Meloni, G.; Walker, A.* R.; **Dodani, S. C.*** “Rational Design of the β -Bulge Gate in a Green Fluorescent Protein Accelerates the Kinetics of Sulfate Sensing.” *Angewandte Chemie International Edition*, e202302304 (2023). (Highlighted by Behind the Science Interview, Link: <https://onlinelibrary.wiley.com/doi/10.1002/anie.202306838>).
4. Peng, W.; Maydew, C.; Kam, H.; Lynd, J.‡; Tutol, J. N.; Phelps, S. M.; Abeyrathna, S.; Meloni, G.; **Dodani, S. C.*** “Discovery of a monomeric green fluorescent protein sensor for chloride by structure-guided bioinformatics.” *Chemical Science*, 13, 12659–12672 (2022). (Part of the 2022 Chemical Science HOT Article Collection; Highlighted by ChemSci Voices Interview, Link: <https://blogs.rsc.org/sc/2023/04/28/chemsci-voices-an-interview-with-sheel-dodani/>, <https://www.youtube.com/watch?v=xSdqISZKwBg>).
5. Chi, H.†; Zhou, Q.†; Tutol, J. N.†; Phelps, S. M.†; Lee, J.; Kapadia, P.‡; Morcos, F.*; **Dodani, S. C.*** “Coupling a live cell directed evolution assay with coevolutionary landscapes to engineer an improved fluorescent rhodopsin chloride sensor.” *ACS Synthetic Biology*, 11, 1627–1638 (2022).
6. Diwakara, S. D.; Ong, W. S. Y.; Wijesundara, Y. H.; Gearhart, R. L.‡; Herbert, F. C.; Fisher, S.; McCandless, G. T.; Alahakoon, S. B.; Gassensmith, J. J.; **Dodani, S. C.**; Smaldone, R. A.* “Supramolecular Reinforcement of a Large Pore 2D Covalent Organic Framework.” *Journal of the American Chemical Society*, 144, 2468–2473 (2022).
7. Ji, K.; Baek, K.; Peng, W.; Alberto, K. A.; Torabifard, H.; Nielsen, S. O.*; **Dodani, S. C.*** “Biophysical and *in silico* characterization of NrtA: A protein-based host for aqueous nitrate and nitrite recognition.” *ChemComm*, 58, 965–968 (2022). (Part of the Host-Guest Chemistry Collection).
8. Baek, K.†; Ji, K.†; Peng, W.†; Liyanaarachichi, S. M.; **Dodani, S.C.*** “The design and synthesis of protein-based fluorescent sensors for ions in biology.” *Protein Engineering, Design, and Selection*, 34, gzab023 (2021).
9. Chen, C.; Tutol, J. N.; Tang, L.; Zhu, L.; Ong, W. S. Y.; **Dodani S. C.***; Fang, C.* “Excitation ratiometric chloride sensing in a yellow fluorescent protein is powered by the interplay between excited-state proton transfer and conformational reorganization.” *Chemical Science*, 12, 11382–11393 (2021).
10. Tutol, J. N.; Lee, J.; Chi, H.; Faizuddin, F.‡; Zhou, Q.; Abeyrathna, S. S.; Meloni, G.; Morcos, F.; **Dodani, S. C.*** “A single point mutation converts a proton-pumping rhodopsin into a red-shifted, turn-on fluorescent sensor for chloride.” *Chemical Science*, 12, 5655–5663 (2021).
11. Baglia, R.A.†; Mills, K. R.†; Mitra, K.†; Tutol, J. N.†; Ball, D.; Page, K. M.; Kallu, J.; Gottipolu, S.‡; D’Arcy S.; Nielsen, S. O.; **Dodani, S. C.*** “An activity-based fluorescent sensor for the detection of the phenol sulfotransferase SUL1A1 in living cells.” *RSC Chemical Biology*, 2, 830–834 (2021). (Selected as Editor’s Choice)
12. Gallenito, M. J.; Qasim, T. S.‡; Tutol, J. N.; Prakash, V.; **Dodani, S. C.**; Meloni, G. “A recombinant platform to characterize the role of transmembrane protein hTMEM205 in Pt(II)-drug resistance and extrusion.” *Metallomics*, 12, 1542–1554 (2020).
13. Ong, W.; Smaldone, R. A.*; **Dodani, S. C.*** “A neutral porous organic polymer host for the recognition of anionic dyes in water.” *Chemical Science*, 11, 7716–7721 (2020). (Part of the Celebrating 10 years of Chemical Science Collection).
14. Kam, H.†; Ranathunga, D. T. S.†; Payne, E. R.‡; Smaldone, R. A.; Nielsen, S. O.; **Dodani, S. C.*** “Spectroscopic characterization and *in silico* modelling of polyvinylpyrrolidone as an anion-responsive fluorescent polymer in aqueous media.” *Supramolecular Chemistry*, 31, 514–522 (2019). (Part of the Emerging Supramolecular Chemists in North America Issue).

15. Tutol, J. N.; Kam, H.; **Dodani, S. C.*** "Identification of mNeonGreen as a pH-Dependent, turn-on fluorescent protein sensor for chloride." *ChemBioChem*, 20, 1759–1765 (2019). (Part of the ChemBioTalents Issue; Featured cover article).
16. Tutol, J. N.[†], Peng, W.[†]; **Dodani, S. C.*** "Discovery and characterization of a naturally occurring, turn-on fluorescent Sensor for chloride." *Biochemistry*, 58, 31–35 (2019). (Part of the Future of Biochemistry: The International Issue; Highlighted by Chemical and Engineering News, Link: <https://cen.acs.org/biological-chemistry/biochemistry/Building-better-chloride-sensors/96/web/2018/12>).
17. Boulet, A.; Vest, K. E.; Maynard, M. K.; Gammon, M. G.; Russell, A.C.; Mathews, A.T.; Cole, S. E.; Zhu, X.; Phillips, C. B.; Kwong, J. Q.; **Dodani, S. C.**; Leary, S. C.; Cobine, P. A.* "The mammalian phosphate carrier SLC25A3 is a mitochondrial copper transporter required for cytochrome c oxidase biogenesis." *Journal of Biological Chemistry*, 293, 1887–1896 (2018).
18. Herwig, L.; Rice, A. J.; Bedbrook, C. N.; Zhang, R. K.; Lignell, A.; Cahn, J. K. B.; Renata, H.; **Dodani, S. C.**; Cho, I.; Cai, L.; Gradinaru, V.; Arnold, F. H.* "Directed evolution of a bright near-infrared fluorescent rhodopsin using a synthetic chromophore." *Cell Chemical Biology*, 24, 1–11 (2017).
19. **Dodani, S. C.**[†]; Kiss, G.[†]; Cahn, J. K. B.; Su, Y.[‡]; Pande, V. S.*; Arnold, F. H.* "Discovery of a regioselectivity switch in the nitrating cytochrome P450 TxtE guided by MD simulations and Markov models." *Nature Chemistry*, 8, 419–425 (2016). (Featured cover article).
20. Heel, T.; McIntosh, J. A.; **Dodani, S. C.**; Meyerowitz, J. T.; Arnold, F. H.* "Non-natural olefin cyclopropanation catalyzed by diverse cytochrome P450s and other hemoproteins." *ChemBioChem*, 15, 2556–62 (2014).
21. **Dodani, S. C.**; Cahn, J. K. B.; Heinisch, T.; Brinkmann-Chen, S.; McIntosh, J. A.; Arnold, F. H.* "Structural, functional, and spectroscopic characterization of the substrate scope of the novel nitrating cytochrome P450 TxtE." *ChemBioChem*, 15, 2259–2267 (2014).
22. **Dodani, S. C.**[†]; Firl, A.[†]; Chan, J.[†]; Nam, C. I.; Onak, C.; Feller, M. F.*; Chang, C. J.* "Copper is an endogenous modulator of neural circuit spontaneous activity." *Proceedings of National Academy of Sciences*, 111, 16280–16285 (2014). (Highlighted by Lawrence Berkeley National Lab News, Chemical and Engineering News, and Research and Development World).
23. Hong-Hermesdorf, A.; Miethke, M.; Gallaher, S. D.; Kropat, J.; **Dodani, S. C.**; Chan, J.; Barupala, D.; Domaille, D. W.; Shirasaki, D. I.; Loo, J. A.; Weber, P. K.; Pett-Ridge, J.; Stemmler T. L.; Chang, C. J.; Merchant, S. S.* "Subcellular metal imaging identifies dynamic sites of Cu accumulation in Chlamydomonas." *Nature Chemical Biology* 10, 1034–1042 (2014).
24. Garcia-Molina, A.; Andrés-Colás, N.; Perea-García, A.; Neumann, U.; **Dodani, S. C.**; Huijser, P.; Peñarrubia, L.; Puig, S.* "The Arabidopsis COPT6 transport protein functions in copper distribution under copper-deficient conditions." *Plant Cell Physiology*, 54, 1378–1390 (2013).
25. Cusick, K. D.; Wetzal, R. K.; Minkin, S. C. Jr.; **Dodani, S. C.**; Wilhelm, S. W.; Sayler, G. S.* "Paralytic shellfish toxins inhibit copper uptake in Chlamydomonas reinhardtii." *Environmental Science and Technology*, 32, 1388–1395 (2013).
26. Chan, J.; **Dodani, S. C.**; Chang, C. J.* "Reaction-based small-molecule fluorescent probes for chemoselective bioimaging." *Nature Chemistry* 4, 973–984 (2012).
27. Bernal M.; Casero D.; Singh V.; Wilson G. T.; Grande, A.; Yang H.; **Dodani, S.C.**; Pellegrini, M.; Huijser, P.; Connolly, E. L.; Merchant S. S.; Krämer, U.* "Transcriptome sequencing identifies SPL7-regulated copper acquisition genes FRO4/FRO5 and the copper dependence of iron homeostasis in arabidopsis." *Plant Cell*, 24, 2738–2761 (2012).
28. Cusick, K. D.; Minkin, S.; **Dodani, S. C.**; Chang, C. J.; Wilhelm, S. W.; Sayler, G. S.* "Inhibition of copper uptake in yeast reveals that the copper transporter Ctr1p as a potential molecular target of saxitoxin." *Environmental Science and Technology*, 45, 2959–2966 (2012).
29. Beadoin, J.; Ioannoni, R.; Lopez-Maury, L.; Bahler, J.; Ait-Mohand, S.; Guerin, B.; **Dodani, S.C.**; Chang, C.J., Labbe, S.* "Mfc1 is a novel forespore membrane copper transporter in meiotic and sporulating cells." *Journal of Biological Chemistry*, 286, 34356–34372 (2011).
30. **Dodani, S. C.**; Leary, S. C.; Cobine, P. A.; Winge, D. R.; Chang, C. J.* "A targetable fluorescent sensor reveals that copper-deficient SCO1 and SCO2 patient cells prioritize mitochondrial copper homeostasis." *Journal of the American Chemical Society*, 133, 8606–8616 (2011).
31. **Dodani, S. C.**[†]; Domaille, D. W.[†]; Nam, C. I.[†]; Miller, E. W.; Finney, L. A.; Vogt, S.; Chang, C. J.* "Calcium-dependent copper redistributions in neuronal cells revealed by a fluorescent copper sensor and X-ray fluorescence microscopy." *Proceedings of National Academy of Sciences*, 108, 5980–5985 (2011).
32. Moore, E. G.; Xu, J.; **Dodani, S. C.**; Jocher, C. J.; D'Alo, A.; Seitz, M.; Raymond, K. N.* "1-Methyl-3-hydroxy-pyridin-2-one complexes of near infra-red emitting lanthanides: efficient sensitization of Yb(III) and Nd(III) in aqueous solution." *Inorganic Chemistry*, 49, 4156–4166 (2010).
33. **Dodani, S. C.**; He, Q.; Chang, C. J.* "A turn-on fluorescent sensor for detecting nickel in living cells." *Journal of the American Chemical Society*, 131, 18020–18021 (2009).

Presentations

1. "Fluorescent Biosensors to Illuminate Chloride in Homeostasis and Signaling," Janelia Conference: Fluorescent Proteins and Biological Sensors VII, Ashburn, VA October 2023 (Invited poster).
2. "Exploiting the Plasticity of Anion Binding Proteins for Biosensing," Aqueous Supramolecular Chemistry Workshop, Bozeman, MT July 2023 (Invited seminar).
3. "Discovery and Evolution of Biological Supramolecular Hosts for Chloride," University of Ottawa, Ottawa, Ontario, Canada April 2023 (Invited seminar).
4. "Discovery and Evolution of Biological Supramolecular Hosts for Chloride," KAUST, November 2022 (Invited virtual seminar).
5. "Fluorescent Biosensors to Illuminate Chloride in Homeostasis and Signaling," Brain Nanomedicine Workshop: Barriers and Opportunities, UT Dallas, Richardson, TX May 2023 (Invited Seminar).
6. "Discovery and Evolution of Biological Supramolecular Hosts for Chloride," Symposium for Professor Mindy Levine's ACS Award for Encouraging Women into Careers in the Chemical Sciences at the National American Chemical Society Meeting, San Diego, March 2022 (Invited virtual seminar).
7. "Decoding the Supramolecular Principles of Biological Anion Recognition," University of Illinois, February 2022 (Invited virtual seminar).
8. "Activity-based Fluorescent Sensors for the Detection of Sulfotransferases in Living Cells," Pacificchem, December 2021 (Invited virtual seminar).
9. "Discovering, Engineering, and Repurposing Fluorescent Proteins for Aqueous Chloride Sensing," Pacificchem, December 2021 (Virtual seminar).
10. "Discovery, Evolution, and Applications of Biological Supramolecular Hosts for Chloride," University of Delaware, October 2021 (Invited virtual Seminar).
11. "Discovery and Evolution of Biological Supramolecular Hosts for Chloride" King's College London, September 2021 (Invited virtual seminar).
12. "Discovery and Evolution of Biological Supramolecular Hosts for Chloride" Texas Tech University, September 2021 (Invited virtual Seminar).
13. "Exploring the Negative (X^-) Side of Biology with Fluorescent Protein-based Biosensors," Welch Summer Scholar Program, August 2021 (Virtual seminar).
14. 3rd Workshop on Aqueous Supramolecular Chemistry Workshop, Bozeman MT, July 2021 (Invited seminar, canceled due to Covid-19).
15. Photochemistry Gordon Research Conference, Lewiston, ME July 2021 (Invited seminar, canceled due to Covid-19).
16. "Discovery and Evolution of Biological Supramolecular Hosts for Chloride," Protein Engineering and Design Webinar, February 2021 (Invited virtual seminar).
17. "Optical Imaging Tools for Elucidating the Roles of Anions in Cellular Signaling," University of Texas at Dallas, Richardson, TX February 2021 (Invited virtual seminar).
18. "Discovery and Evolution of Biological Supramolecular Hosts for Chloride," University of Alberta, Edmonton, Alberta, Canada November 2020 (Invited virtual seminar).
19. "Discovery and Evolution of Biological Supramolecular Hosts for Chloride," University of Minnesota, Twin Cities, MN October 2020 (Invited virtual seminar).
20. "Discovery and Evolution of Biological Supramolecular Hosts for Chloride," Tulane University, New Orleans, LA October 2020 (Invited virtual seminar).
21. International Symposium on Macrocyclic and Supramolecular Chemistry, Sydney, Australia July 2020 (Invited seminar, canceled due to Covid-19).
22. 4th Protein Engineering Canada (PEC) Conference, Montreal, Canada June 2020 (Invited seminar, canceled due to Covid-19).
23. Novartis Chemical Sciences Symposium, University of Chicago, Chicago, IL June 2020 (Invited seminar, canceled due to Covid-19).
24. Catalysis and Sensing for our Environment (CASE) 2020 Conference, Isle of Skye, Scotland June 2020 (Invited Seminar, canceled due to Covid-19).
25. 2nd Texas Chemical Biology Conference, Texas A&M, College Station, TX May 2020 (Invited seminar, canceled due to Covid-19).
26. "Exploring the Negative (X^-) Side of Biology: Engineering Proteins and Polymers for the Recognition of Anions in Water," Trinity University, San Antonio, TX February 2020 (Invited seminar).
27. "Genetically Encoded Fluorescent Sensors to Illuminate Cellular Chloride Signaling," 71st Southeastern Regional Meeting of the American Chemical Society, Savannah, GA October 2019 (Invited Seminar).
28. "Discovering, Evolving, and Repurposing Proteins for Aqueous Chloride Sensing," University of North Texas, Denton, TX September 2019 (Invited seminar).

29. "Repurposing and Evolving Pigment-Containing Proteins for Aqueous Anion Sensing," Telluride Science Research Center Workshop on Aqueous Supramolecular Chemistry, Telluride, CO August 2019 (Invited seminar).
30. "Exploring the Negative Side (X⁻) of Biology: Genetically Encoded Fluorescent Sensors to Illuminate Cellular Chloride Signaling," University of Texas at Arlington, Arlington, TX March 2019 (Invited seminar).
31. "Genetically Encoded Fluorescent Sensors to Illuminate Cellular Chloride Signaling," 16th Annual Advanced Imaging Methods Workshop, Berkeley, CA January 2019 (Invited seminar).
32. "Repurposing and Evolving Pigment-Containing Proteins for Aqueous Anion Sensing," Metals in Biology Gordon Research Conference, Ventura, CA January 2019 (Poster).
33. "Molecular Cameras for Exploring the Negative (X⁻) Side of Biology," Scholar's Day, The University of Texas at Dallas Richardson, TX November 2018 (Invited seminar).
34. "Genetically Encoded Fluorescent Sensors to Illuminate Cellular Chloride Signaling," Janelia Conference: Fluorescent Proteins and Biological Sensors VI, Ashburn, VA October 2018 (Invited seminar).
35. "Exploring the Negative (X⁻) Side of Biology: Genetically Encoded Fluorescent Sensors to Illuminate Cellular Chloride Signaling," Southern Methodist University, Dallas, TX September 2018, (Invited seminar)
36. "Optical Imaging Tools for Elucidating the Roles of Anions in Cellular Signaling," International Symposium on Macrocyclic and Supramolecular Chemistry, Quebec City, Canada July 2018 (Invited seminar).
37. "Optical Imaging Tools for Elucidating the Roles of Anions in Cellular Signaling," International Symposium on Macrocyclic and Supramolecular Chemistry, Quebec City, Canada July 2018 (Poster).
38. "Optical Imaging Tools for Elucidating the Roles of Anions in Cellular Signaling," American Society for Biochemistry and Molecular Biology Meeting, San Diego, CA, April 2018 (Seminar).
39. "Optical Imaging Tools for Elucidating the Roles of Anions in Cellular Signaling," American Society for Biochemistry and Molecular Biology Meeting, San Diego, CA, April 2018 (Invited poster).
40. "Optical Imaging Tools for Elucidating the Roles of Anions in Cellular Signaling," Texas Protein Folders and Function Meeting, Cleveland, TX, April 2018 (Invited seminar).
41. "Optical Imaging Tools for Elucidating the Roles of Anions in Cellular Signaling," 255th National Meeting of the American Chemical Society, New Orleans, LA, March 2018 (Seminar).
42. "Exploring the Negative (X⁻) Side of Biology: Molecular Technologies for Elucidating the Roles of Cellular Anions," Advanced Imaging Research Center at the UT Southwestern Medical Center, Dallas, TX, September 2016 (Invited seminar).
43. "From Neurons to Microbes: Discovering New Bioinorganic Chemistry," Rising Stars in Chemistry Symposium, University of Chicago, Chicago, IL, June 2015 (Invited seminar).
44. "Simulation Guided Discovery of a Regioselectivity Switch in the Nitrating Cytochrome P450 TxtE," Young Investigator Workshop on Biocatalysis, Schwarzenberg, Austria, March 2015 (Seminar).
45. "Cytochrome P450 TxtE: A Biological Nitration Platform for the Development of Aromatic Nitration Biocatalysts," Metals in Biology Gordon Research Conference and Seminar, Ventura, CA, January 2015 (Poster).
46. "A Chemical Biology Approach for Elucidating New Roles of Copper in Cell Signaling," Rising Stars in Chemical Biology Mini-Symposium, University of Utah, Salt Lake City, UT, October 2014 (Invited seminar).
47. "A Chemical Biology Approach for Elucidating New Roles of Copper in Cell Signaling," The University of Texas at Dallas, Richardson, TX, September 2014 (Invited seminar).
48. "Cytochrome P450 TxtE: A Novel Platform for the Development of Aromatic Nitration Biocatalysts," Biocatalysis Gordon Research Conference and Seminar, Smithfield, RI, July 2014 (Poster).
49. "A Chemical Biology Approach for Elucidating New Roles of Copper in Cell Signaling," Bioinorganic Chemistry Gordon Research Seminar, Ventura, CA, January 2013 (Seminar).
50. "A Chemical Biology Approach for Elucidating New Roles of Copper in Cell Signaling," University of California, Berkeley Biological and Biomedical Sciences Retreat, Asilomar, CA, January 2013 (Seminar).
51. "Probing the Roles of Copper in Cell Signaling Using New Fluorescent Sensors," Howard Hughes Medical Institute Scientific Meeting, Ashburn, Virginia, June 2011 (Poster).
52. "Expanding the Palette of Fluorescent Sensors for Studying the Cell Biology of Metals," Metals in Medicine Gordon Research Conference, Andover, NH, July 2010 (Seminar selected from poster session).
53. "Expanding the Palette of Fluorescent Sensors for Studying the Cell Biology of Metals," Metals in Medicine Gordon Research Conference, Andover, NH, July 2010 (Poster).
54. "Targetable Fluorescent Sensors for Studying the Cell Biology of Copper," 239th National Meeting of the American Chemical Society, San Francisco, CA, March 2010 (Seminar).
55. "Tuning the Potential of Wurster's Crowns: Toward the Development of an Electrochemical Toolbox for Redox Sensing/Switching," 234th National Meeting of the American Chemical Society, Boston, MA, August 2007 (Seminar).
56. "Wurster's Thiocrown Ethers and Related Acyclic Ligands," 233rd National Meeting of the American Chemical Society, Chicago, IL, March 2007 (Poster).

57. "The Synthesis and Properties of Tunable Redox-Active *para* Wurster's Crowns," UT Southwestern Biochemistry Research Retreat, New Braunfels, TX, November 2006 (Poster).
58. "Cation- π Bonding in a Redox-Responsive Wurster's Cryptophane," 232nd National Meeting of the American Chemical Society, San Francisco, CA, September 2006 (Poster).
59. "The Synthesis and Properties of Tunable Redox-Active *para* Wurster's Crowns," 232nd National Meeting of the American Chemical Society, San Francisco, CA, September 2006 (Poster).
60. "The Synthesis and Properties of Tunable Redox-Active *para* Wurster's Crowns," 11th Annual Chemistry and Biology Symposium of the University of Texas at Dallas, Richardson, TX, March 2006 (Poster).
61. "The Design and Synthesis of a Wurster's Crown-Based, Redox-Switchable MRI Contrast Agent," 60th Southwestern Regional Meeting of the American Chemical Society, Fort Worth, TX, September 2004 (Poster).

Research Support

Current research support

1. NIH, NIGMS (PI), 2R35GM128923, Fluorescent biosensors to illuminate chloride homeostasis and signaling, 02/01/24–01/31/29, \$1,375,000 direct costs.
2. NSF (PI), 2240095, CAREER: Discovering and engineering protein-based sensors for nitrate in biology, 09/01/23–08/31/28, \$448,719 direct costs.
3. UT Dallas Sustainability Seed Program for Interdisciplinary Research (co-PI), Optimizing bioconcrete for sustainable marine infrastructure, 06/01/23–5/31/24, \$29,856 direct costs.
4. ACS (Supervising PI to Jasmine N. Tutol), Irving S. Sigal Postdoctoral Fellowship, 09/01/22–08/30/24, \$150,000 direct costs.
5. Welch Foundation (PI), AT-2060-20210327, Harnessing the plasticity of anion-binding proteins to engineer genetically encoded fluorescent indicators and integrators, 06/01/21–05/31/24, \$240,000 direct costs.

Completed research support

1. NIH, NIGMS Supplement (PI), R35GM128923, Supplement for Optical imaging tools for elucidating the roles of anions and anionic modifications in cellular signaling, 08/01/19–01/31/24, \$235,735 direct costs.
2. NIH, NIGMS (PI), R35GM128923, Optical imaging tools for elucidating the roles of anions and anionic modifications in cellular signaling, 08/01/18–01/31/24, \$1,250,000 direct costs.
3. Welch Foundation (PI), AT-1918-20170325, Exploring the negative (X^-) side of biology: molecular and protein-based technologies for imaging cellular chloride, 06/01/17–05/31/20, \$195,000 direct costs.
4. University of Texas System Rising STARs program (PI), 08/01/16–07/31/19, \$400,000 direct costs.
5. NIH, NIGMS (PI), F32 GM106618, Biocatalytic use of cytochrome P450 enzymes, 09/01/13–08/31/16, \$148,518.

Mentorship at UT Dallas

Current research group members

Postdoctoral researchers: Jasmine Tutol (2021–present, ACS Irving S. Sigal Postdoctoral Fellow); Ke Ji (2024–present)

Graduate students: Shelby Phelps (2020–present); Mariah Cook (2020–present); Derik Adams (2021–present); Liz Pack (2021–present); Gyeongseo Kim (2022–present); Jack Sibert (2023–present); Dylan Wicherts (2023–present); Sydney Barnes (2023–present)

Previous research group members

Postdoctoral researchers: Koushambi Mitra (2018–2020, University of Chicago); Kiheon Baek (2020–2021, Corteva Agriscience); Regina Baglia (2019–2021, National Renewable Energy Laboratory)

Graduate students: Jasmine Tutol (Chemistry PhD, 2016–2021); Jyothi Kallu (Chemistry rotation student, 2016–2017); Jessica Lee (Molecular and Cell Biology M.S./Research technician, 2016–2017, DAVA Oncology); Hsichuan Chi (Biotechnology M.S./Research technician, 2016–2018, REGIMMUNE Limited); Hiu Kam (Chemistry M.S./Research technician, 2018–2019); Kierstin Page (Chemistry M.S., 2018–2020, Pharmacy training); Sureshee Liyanaarachchi, 2019–2021); Caden Maydew (Chemistry M.S., 2020–2021); William Morrison (Chemistry rotation student, 2021); Whitney Ong (Chemistry PhD, 2017–2022, Merck); Weicheng Peng (Biology PhD, 2018–2023); Ke Ji (Chemistry PhD, 2019–2023)

Undergraduate students: Farah Faizuddin (Biochemistry, 2016–2018); Kaivalya Gudooru (Biochemistry, 2017–2018); Drew Hargrove (Chemistry, 2019); Josh Peedikayil (Biology, 2018–2019, UTSW Medical School); Christiane Calderon (Biochemistry, Clark Scholar 2018); Alexander Alvarado (Biology, Clark Scholar 2019); Sriharika Gottipolu (Biochemistry, 2017–2020, UTMB Health); Deeya Advani (Biology, 2018–2019, Pfizer); Jacob Lynd (Biochemistry, 2018–2020, Graduate Student at SMU); Fariha Hossain (Biochemistry, 2018–2020, DOE SULI 2021, Graduate Student at UTD); Helen Goenawan (Biochemistry, 2018–2020, UTSW Green Fellow 2021); Pavan Govu (Computer Science, 2020); Joel George (Computer Science, 2020)

High school students: Christopher Chen (Welch Summer Scholar, 2018, UT Austin); Cristina Pontaza (Welch Summer Scholar, 2019, Johns Hopkins University); Alisha Spears (Welch Summer Scholar, 2023)

Teaching

Spring 2024	CHEM/BIOB 3361/3161, Biochemistry I
Spring 2023	CHEM/BIOB 3361/3161, Biochemistry I
Spring 2022	CHEM/BIOB 3361/3161, Biochemistry I
Spring 2021	CHEM 6v69, Supramolecular Recognition in Biology
Fall 2020	CHEM 6100, Chemistry Department Seminar
Spring 2020	CHEM 5361, Advanced Biochemistry
Fall 2019	CHEM 6100, Chemistry Department Seminar
Spring 2019	CHEM 6100, Chemistry Department Seminar
Fall 2018	CHEM 6100, Chemistry Department Seminar
Fall 2018	CHEM 3341, Inorganic Chemistry I
Spring 2018	CHEM/BIOB 3361/3161, Biochemistry I
Fall 2017	CHEM 3341, Inorganic Chemistry I
Fall 2016	CHEM 3341, Inorganic Chemistry I

Professional Activities

Community activities

2024	Panel reviewer for the NSF Macromolecular, Supramolecular and Nanochemistry (MSN) Program
2023–present	Early career advisory board member for <i>Chemical & Biomedical Imaging</i>
2023	<i>ad hoc</i> reviewer for the NIH Chemical Biology and Probes (CBP) study section
2022	<i>ad hoc</i> reviewer for the NIH Synthetic and Biological Chemistry A (SBCA) study section
2020–present	Editorial advisory board member for <i>Protein Engineering, Design, and Selection</i>
2020	Judge for the International Symposium on Macrocyclic and Supramolecular Chemistry virtual poster session
2019–present	Organizing committee member for the <i>Aqueous Supramolecular Chemistry Workshop</i>
2018	ConTex collaborative grant reviewer
2014–present	Manuscript reviewer

Outreach activities

2023	Faculty Mentor for the Welch Summer Scholar Program
2021–present	Development of Hofmeister in the Kitchen – a general chemistry lab to introduce biochemistry
2021	Speaker for the Welch Summer Scholar Program Seminar Series
2020, 2021	Comet Career Pathways virtual seminar series
2019	Summer seminar series for undergraduate and graduate students and postdoctoral researchers at The University of Texas at Dallas
2018	Scholar's Day for incoming freshmen at The University of Texas at Dallas
2018, 2019	Faculty Mentor for the Welch and Clark Summer Scholar Programs
2017–2018	Women in Science and Engineering mentor, Team pHuture awarded second place
2017–2019	Summer Comet Chemistry Camp for middle-school age girls
2017	Judge for Greenwood Hills Elementary Science Fair
2014, 2015	Women in STEM, California Institute of Technology
2014–2015	Women Mentoring Women, California Institute of Technology
2014	Reddit AMA Ladies of Science with NPR's Kelly McIvers

Service at The University of Texas at Dallas

2023–present Committee member for the School of Natural Sciences and Mathematics strategic plan
2023–present Department academic affairs committee
2023 *ad hoc* committee member for mid-probationary tenure review in the School of Behavioral and Brain Sciences
2023 committee member for promotion of professor of instruction in the School of Natural Sciences and Mathematics
2022–2023 Search committee member for a professor of inorganic chemistry
2021–2023 Department graduate curriculum committee
2021–2023 Department graduate admissions committee
2020–2022 Library committee member
2020 Search committee member for the dean of the School of Natural Sciences and Mathematics
2019–2020 Search committee member for a professor of analytical chemistry
2019 Department coordinator for the Anson L. Clark summer research program
2018–2021 Department seminar committee co-chair
2017–2019 Department graduate student recruitment committee
2017 Core facility advisory committee