

Ivan Julian Dmochowski, Ph.D.

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Academic Appointments

Professor of Chemistry, University of Pennsylvania, July, 2015 – Present
Undergraduate Chair of Chemistry, University of Pennsylvania, Jan, 2015 – Present
Associate Professor of Chemistry, University of Pennsylvania, 2010 – 2015
Assistant Professor of Chemistry, University of Pennsylvania, 2003 – 2010

Education

California Institute of Technology, Pasadena, CA
Helen Hay Whitney Postdoctoral Scholar in Biophysics, Sept. 2000 – Dec. 2002

California Institute of Technology, Pasadena, CA
Ph.D. in Chemistry, May 2000, 1995-00

Johannes Gutenberg Universität, Mainz, Germany
Research Fellow in Chemistry, 1994-95

Harvard College, Cambridge, MA
A.B. in Chemistry, Magna cum Laude, 1990-94

Selected Honors

2016	Crano Award, Akron Section, American Chemical Society
2012	Awardee, McKnight Technological Innovations in Neuroscience
2011	Awardee, McGroddy Frontiers in Science, St. Joseph's Univ.
2010	Invitee, National Academies Keck Futures Initiative Imaging Meeting
2007	Camille and Henry Dreyfus Teacher-Scholar Award
2005	NSF CAREER Award
2003	Camille and Henry Dreyfus New Faculty Award
2000	Herbert Newby McCoy Award, Caltech Chemistry Department
1990	United States Presidential Scholar

Fellowships

2001-02	Helen Hay Whitney Postdoctoral Fellow
1999-00	N.I.H. Bioorganic/Bioinorganic Training Grant
1996-99	N.I.H. Biotechnology Training Grant

Peer-Reviewed Publications

1. J.A. Rego, S. Kumar, I.J. Dmochowski, H. Ringsdorf, *Synthesis of novel mixed tail triphenylene discotic liquid crystals - The search for higher order*. **Chem. Comm.** (9) 1031-1032, 1996.
2. J.J. Wilker, I.J. Dmochowski, J.H. Dawson, J.R. Winkler, H.B. Gray, *Substrates for rapid delivery of electrons and holes to buried active sites in proteins*. **Angew. Chem. Int. Ed.** (1-2) 90-92, 1999.
3. I.J. Dmochowski, B.R. Crane, J.J. Wilker, J.R. Winkler, H.B. Gray, *Optical detection of cytochrome P450 by sensitizer-linked substrates*. **Proc. Natl. Acad. Sci. USA** (23) 12987-12990, 1999.
4. I.J. Dmochowski, J.R. Winkler, H.B. Gray, *Enantiomeric discrimination of Ru-substrates by cytochrome P450cam*, **J. Inorg. Biochem.** (3) 221-228, 2000.
5. J. Bendix, I.J. Dmochowski, H.B. Gray, A. Mahammed, L. Simkhovich, Z. Gross, *Structural, electrochemical, and photophysical properties of gallium (III) 5,10,15-tris(pentafluorophenyl)corrole*, **Angew. Chem. Int. Ed.** (22) 4048-4051, 2000.
6. A.R. Dunn, I.J. Dmochowski, A.M. Bilwes, H.B. Gray, B.R. Crane, *Probing the open state of cytochrome P450cam with ruthenium-linker substrates*, **Proc. Natl. Acad. Sci. USA** (22) 12420-12425, 2001.
7. I.J. Dmochowski, A.R. Dunn, J.J. Wilker, B.R. Crane, M. Green, J.H. Dawson, S.G. Sligar, J.R. Winkler, H.B. Gray, *Ruthenium probes of P450 structure and mechanism*, **Meth. Enzym.** (357) 120-133, 2002.
8. I.J. Dmochowski, J.E. Dmochowski, P. Oliveri, E.H. Davidson, S.E. Fraser, *Quantitative imaging of cis-regulatory reporters in living embryos*, **Proc. Natl. Acad. Sci. USA** (20) 12895-12900, 2002.
9. A.R. Dunn, I.J. Dmochowski, J.R. Winkler, H.B. Gray, *Nanosecond photoreduction of cytochrome P450cam by channel-specific Ru-diimine electron tunneling wires*, **J. Am. Chem. Soc.** (125) 12450-12456, 2003.
10. X. Tang, I.J. Dmochowski, *Phototriggering of caged fluorescent oligodeoxynucleotides*, **Org. Lett.** (7) 279-282, 2005.
11. X. Tang, J.L. Richards, A.E. Peritz, I.J. Dmochowski, *Photoregulation of DNA polymerase I (Klenow) with caged fluorescent oligodeoxynucleotides*, **Bioorg. Med. Chem. Lett.** (15) 5303-5306, 2005.
12. H. Agadjanian, J. Weaver, I.J. Dmochowski, J. Kim, R. Margalit, H.B. Gray, Z. Gross, and L.K. Medina-Kauwe, *Specific delivery of corroles to cells via noncovalent conjugates with viral proteins*, **Pharmaceutical Res.** (23) 367-377, 2006.
13. J. Swift, W.A. Wehbi, B.D. Kelly, X. Fu Stowell, J.G. Saven, I.J. Dmochowski, *Design of functional ferritin-like proteins with hydrophobic cavities*, **J. Am. Chem. Soc.** (128) 6611-6619, 2006.
14. X. Tang, I.J. Dmochowski, *Controlling RNA digestion by RNase H with a light-activated DNA hairpin*, **Angew. Chem. Int. Ed.** (45) 3523-3526, 2006.

15. Q. Wei, G.K. Seward, P.A. Hill, B. Patton, I. Dimitrov, N.N. Kuzma, I.J. Dmochowski, *Designing ^{129}Xe NMR biosensors for matrix metalloproteinase detection*, **J. Am. Chem. Soc.** (128) 13274-13283, 2006.
16. X. Tang, I.J. Dmochowski, *Regulating gene expression with light-activated oligonucleotides*, **Mol. BioSystems** (3) 100-110, 2007. Recognized for being one of the three most cited papers in **Mol. Biosystems** in 2007.
17. X. Tang, I.J. Dmochowski, *Probing expression*, **Chemical Biology**, invited feature highlighting **Mol. Biosystems** article, (2) B15, 2007.
18. X. Tang, I.J. Dmochowski, *Synthesis of light-activated antisense oligodeoxynucleotide*, **Nature Protocols** (1) 3041-3048, 2007.
19. P.A. Hill, Q. Wei, R. Eckenhoff, I.J. Dmochowski, *Thermodynamics of xenon binding to cryptophane in water and human plasma*, **J. Am. Chem. Soc.** (129) 9262-9263, 2007.
20. I.J. Dmochowski, X. Tang, *Taking control of gene expression with light-activated oligonucleotides*, **Biotechniques** (43) 161-171, 2007.
21. L. Zhang, J. Swift, C. Butts, V. Yerubandi, I.J. Dmochowski, *Structure and activity of apoferritin-stabilized gold nanoparticles*, **J. Inorg. Biochem.**, Ed Stiefel Special Issue (11) 1719-1729, 2007.
22. X. Tang, S. Maegawa, E.S. Weinberg, I.J. Dmochowski, *Regulating gene expression in zebrafish embryos using light-activated, negatively charged peptide nucleic acids*, **J. Am. Chem. Soc.** (129) 11000-11001, 2007.
23. X. Tang, J. Swaminathin, A.M. Gewirtz, I.J. Dmochowski, *Regulating gene expression in human leukemia cells using light-activated oligodeoxynucleotides*, **Nucl. Acids Res.** (36) 559-569, 2008.
24. J.A. Aaron, J.M. Chambers, K.M. Jude, L. Di Costanzo, I.J. Dmochowski, D.W. Christianson, *Structure of a ^{129}Xe -cryptophane biosensor complexed with human carbonic anhydrase II*, **J. Am. Chem. Soc.** (130) 6942-6943, 2008.
25. G.K. Seward, Q. Wei, I.J. Dmochowski, *Peptide-mediated cellular uptake of cryptophane*, **Bioconjug. Chem.** (19) 2129-2135, 2008.
26. J.L. Richards, X. Tang, A. Turetsky, I.J. Dmochowski, *RNA bandages for photomodulating in vitro protein synthesis*, **Bioorg. Med. Chem. Lett.** (18) 6255-6258, 2008.
27. C. Butts, J. Swift, S.-G. Kang, L. Di Costanzo, D.W. Christianson, J.G. Saven, I.J. Dmochowski, *Directing noble metal ion chemistry within a designed ferritin protein*, **Biochemistry** (47) 12729-12739, 2008.
28. J.L. Chambers, P.A. Hill, J.A. Aaron, Z. Han, D.W. Christianson, N.N. Kuzma, I.J. Dmochowski, *Cryptophane xenon-129 nuclear magnetic resonance biosensors targeting human carbonic anhydrase*, **J. Am. Chem. Soc.** (131) 563-569, 2009.
29. P.A. Hill, Q. Wei, T. Troxler, I.J. Dmochowski, *Substituent effects on xenon binding affinity and solution behavior of water-soluble cryptophanes*, **J. Am. Chem. Soc.** (131) 3069-3077, 2009.

30. G.P. Robbins, M. Jimbo, J. Swift, M.J. Therien, D.A. Hammer, I.J. Dmochowski, *Photo-initiated destruction of composite porphyrin-protein polymersomes*, **J. Am. Chem. Soc.**, (131) 3872-3874, 2009.
31. J. Swift, C.A. Butts, J. Cheung-Lau, V. Yerubandi, I.J. Dmochowski, *Efficient self-assembly of Archaeoglobus fulgidus ferritin around metallic cores*, **Langmuir**, (25) 5219-5225, 2009.
32. C.A. Butts, J. Xi, G. Brannigan, M.L. Klein, R.G. Eckenhoff, I.J. Dmochowski, *Identification of a fluorescent general anesthetic, 1-aminoanthracene*, **Proc. Natl. Acad. Sci. U.S.A.** (106) 6501-6506, 2009.
33. I.J. Dmochowski, *Xenon out of its shell*, **Nature Chemistry**, 'In Your Element' invited feature article, vol. 1, 250, June 2009.
34. O. Taratula, I.J. Dmochowski, *Functionalized ¹²⁹Xe contrast agents for magnetic resonance imaging*, **Curr. Opin. Chem. Biol.** (14) 97-104, 2010.
35. J.L. Richards, G.K. Seward, Y. Huang, I.J. Dmochowski, *Turning DNazymes on and off with light*, **ChemBioChem** (11) 320-324, 2010.
36. J. Lampe, Z. Liao, I.J. Dmochowski, P.S. Ayyaswamy, D.M. Eckmann, *Imaging macromolecular interactions at an interface*, **Langmuir** (26) 2452-2459, 2010.
37. N.P. Kamat, G.P. Robbins, M.J. Therien, I.J. Dmochowski, D.A. Hammer, *A generalized system for photo-responsive membrane rupture in polymersomes*, **Adv. Funct. Mater.** (20) 2588-2596, 2010.
38. O. Taratula, P.A. Hill, N.S. Khan, P.J. Carroll, I.J. Dmochowski, *Crystallographic observation of 'induced fit' in a cryptophane host-guest model system*, **Nat. Commun.**, 1:148, doi:10.1038/ncomms1151, 2010.
39. N.S. Khan, J.M. Perez-Aguilar, T. Kaufmann, P.A. Hill, O. Taratula, O.-S. Lee, P.J. Carroll, J.G. Saven, I.J. Dmochowski, *Multiple hindered rotators in a gyroscope-inspired tribenzylamine hemicryptophane*, **J. Org. Chem.**, 76 (5) 1418-1424, 2011.
40. O. Taratula, P.A. Hill, Y. Bai, N.S. Khan, I.J. Dmochowski, *Shorter synthesis of trifunctionalized cryptophane-A derivatives*, **Org. Lett.**, 13 (6), 1414-1417, 2011.
41. G.K. Seward, Y. Bai, N.S. Khan, I.J. Dmochowski, *Cell-compatible, integrin-targeted cryptophane-¹²⁹Xe NMR biosensors*, **Chem. Sci.**, 2 (6) 1103-1110, 2011.
42. D.R. Jacobson, N.S. Khan, R. Collé, R. Fitzgerald, L. Laureano-Pérez, Y. Bai, I.J. Dmochowski, *Measurement of radon and xenon binding to a cryptophane molecular host*, **Proc. Natl. Acad. Sci. U.S.A.**, 108 (27) 10969-10973, 2011. PMID: PMC3131335
43. N.P. Kamat, Z. Liao, L.E. Moses, J. Rawson, M.J. Therien, I.J. Dmochowski, D.A. Hammer, *Sensing membrane stress with near-IR emissive porphyrins*, **Proc. Natl. Acad. Sci., U.S.A.**, 108 (34) 13984-13989, 2011.
44. Z. Liao, J. Lampe, P.S. Ayyaswamy, D.M. Eckmann, I.J. Dmochowski, *Protein assembly at the air-water interface studied by fluorescence microscopy*, **Langmuir**, 27 (21) 12775-12781, 2011.

45. B. Ruble, J.L. Richards, J.C. Cheung-Lau, I.J. Dmochowski, *Mismatch discrimination and efficient photomodulation with split 10-23 DNazymes*, invited article, Young Investigator Special Issue, **Inorg. Chim. Acta**, 380 (0) 386-391, 2012.
46. D.J. Emerson, Z. Liao, R.G. Eckenhoff, I.J. Dmochowski, *A novel fluorescent general anesthetic enables imaging of the in vivo sites of action*, **Anesthesiology**, 116 (6) 1363, 2012.
47. R. Liu, W. Bu, J. Xi, J. C. Cheung-Lau, I. J. Dmochowski, P. J. Loll, *Beyond the detergent effect: A specific binding site for sodium dodecyl sulfate (SDS) in mammalian apoferritin*, **Acta Cryst. Sect. D.**, 68 (5) 497-504, 2012.
48. W. Bu, R. Liu, J.C. Cheung-Lau, I.J. Dmochowski, P.J. Loll, R.G. Eckenhoff, *Ferritin links iron and fatty acid metabolism*, **FASEB J.**, 26 (6) 2394-2400, 2012.
49. L. Laureano-Pérez, R. Collé, D.R. Jacobson, R. Fitzgerald, N. S. Khan, I. J. Dmochowski, *A novel application for ²²²Rn emanation standards: Radon-cryptophane host chemistry*, **Appl. Rad. Isotopes**, 70 (9) 1997-2001, 2012. PMID: PMC3674027
50. O. Taratula, M.P. Kim, Y. Bai, J.P. Philbin, B.A. Riggle, D.N. Haase, I.J. Dmochowski, *Synthesis of enantiopure, trisubstituted cryptophane-A derivatives*, **Org. Lett.**, 14 (14) 3580-3583, 2012. PMID: PMC3484212
51. Y. Bai, A.P. Hill, I.J. Dmochowski, *Utilizing a water-soluble cryptophane of high xenon exchange rates for picomolar sensitivity ¹²⁹Xe Hyper-CEST NMR*, **Anal. Chem.**, 84 (22) 9935-9941, 2012. PMID: PMC3503247
52. D.J. Emerson, B.P. Weiser, J. Psonis, Z. Liao, O. Taratula, A. Fiamengo, X. Wang, K. Sugawara, A.B. Smith III, R.G. Eckenhoff, I.J. Dmochowski, *Direct modulation of microtubule stability contributes to anthracene general anesthesia*, **J. Am. Chem. Soc.**, 135 (14) 5389-5398, 2013. PMID: PMC3671381
53. J.C. Gripenburg, B.K. Ruble, I.J. Dmochowski, *Caged oligonucleotides for bidirectional photomodulation of let-7 miRNA in zebrafish embryos*, **Bioorg. Med. Chem.**, 21 (20) 6198-6204, 2013.
54. Z. Liao, W.-T. Hsieh, T. Baumgart, I.J. Dmochowski, *Measuring interactions between polydimethylsiloxane and serum proteins at the air-water interface*, **Langmuir**, 29 (30) 9420-9427, 2013.
55. J.C. Cheung-Lau, D. Liu, K.W. Pulsipher, W. Liu, I.J. Dmochowski, *Engineering a well-ordered, functional protein-gold nanoparticle assembly*, **J. Inorg. Biochem.**, 130 (1) 59-68, 2014.
56. D. Lovatt, B.K. Ruble, J. Lee, H. Dueck, T.K. Kim, S. Fisher, C. Francis, J.M. Spaethling, J.A. Wolf, M.S. Grady, A.V. Ulyanova, S.B. Yeldell, J.C. Gripenburg, P.T. Buckley, J. Kim, J.-Y. Sul, I.J. Dmochowski and J. Eberwine, *Transcriptome In Vivo Analysis (TIVA) of spatially defined single cells in intact live mouse and human brain tissue*, **Nat. Meth.**, 11,190-196, 2014.

57. Y. Bai, Y. Wang, A. Driks, M. Goulian, I.J. Dmochowski, *Bacterial spore detection and analysis using hyperpolarized ^{129}Xe chemical exchange saturation transfer (Hyper-CEST) NMR*, **Chem Sci.**, 5 (8) 3197-3203, 2014.
58. O. Taratula, Y. Bai, E.L. D'Antonio, I.J. Dmochowski, *Enantiopure ^{129}Xe -Cryptophane nuclear magnetic resonance biosensors targeting carbonic anhydrase*, **Supramol. Chem.**, 27 (1-2) 65-71, 2015.
59. N.S. Khan, B.A. Riggle, G.K. Seward, Y. Bai, I.J. Dmochowski, *A cryptophane-folate biosensor for ^{129}Xe NMR*, **Bioconjugate Chem.**, 26 (1) 101-109, 2015.
60. J.C. Griepenburg, N. Sood, K. Vargo, D. Williams, J. Rawson, M.J. Therien, D.A. Hammer, I.J. Dmochowski, *Caging metal ions with visible light-responsive nanopolymersomes*, **Langmuir**, 31 (2) 799-807, 2015.
61. J.C. Griepenburg, T.L. Rapp, P.J. Carroll, J. Eberwine, I.J. Dmochowski, *Ruthenium-caged antisense morpholinos for regulating gene expression in zebrafish embryos*, **Chem. Sci.**, (6) 2342-2346, 2015.
62. R.E. Shannon, W.J. Levy, I.J. Dmochowski, R.G. Eckenhoff, R.M. Speck, *Taxane modulation of anesthetic sensitivity in surgery for nonmetastatic breast cancer*, **J. Clin. Anesthesia**, 27 (6) 481-485, 2015.
63. B.K. Ruble, S. Yeldell, I.J. Dmochowski, *Light-activated oligonucleotides for biological applications*, **J. Inorg. Biochem.**, 150, 182-188, 2015.
64. B.A. Riggle, Y. Wang, I.J. Dmochowski, *"Smart" ^{129}Xe NMR biosensor for pH-dependent cell labeling*, **J. Am. Chem. Soc.**, 137 (16) 5542-5548, 2015.
65. Y. Wang, I.J. Dmochowski, *Cucurbit[6]uril is an ultrasensitive ^{129}Xe NMR contrast agent*, **Chem. Comm.**, (51) 8982-8985, 2015.
66. L. Gao, O.-S. Lee, I.J. Dmochowski, J.G. Saven, *Xe affinities of water-soluble cryptophanes and the role of confined water*, **Chem. Sci.**, (6) 7238-7248, 2015.
67. Y. Wang, B.W. Roose, J.P. Philbin, J.L. Doman, I.J. Dmochowski, *Programming a molecular relay for ultrasensitive biodetection through ^{129}Xe NMR*, **Angew. Chem.**, 55 (5) 1733-1736, 2016.
68. M. Khoshnejad, V.V. Shuvaev, K.W. Pulsipher, C. Dai, E.D. Hood, E. Arguiri, M. Christofidou-Solomidou, I.J. Dmochowski, C.F. Greineder, V.R. Muzykantov, *Targeted delivery of ferritin nanoparticles to the vascular endothelium*, **Bioconjug. Chem.**, 27 (3) 628-637, 2016.
69. K.W. Pulsipher, I.J. Dmochowski, *Ferritin: versatile host, nanoreactor, and delivery agent*, **Isr. J. Chem., Special Harry Gray Issue**, 56 (9-10) 660-670, 2016.
70. Y. Wang, B.W. Roose, E.V. Carnevale, I.J. Dmochowski, *A genetically encoded β -lactamase reporter for ultrasensitive ^{129}Xe NMR in mammalian cells*, **Angew. Chem.**, 55 (31), 8984-8987, 2016.
71. Y. Wang, I.J. Dmochowski, *An expanded palette of xenon biosensors*, **Acc. Chem. Res.**, ASAP, 2016.

72. T.L. Rapp, S.R. Phillips, I.J. Dmochowski, *Kinetics and photochemistry of ruthenium bisbipyridine diacetonitrile complexes – An interdisciplinary inorganic and physical chemistry laboratory exercise*, **J. Chem. Ed.**, in press.

Invited Book Chapters

M.I. Arnone, I.J. Dmochowski, C. Gache, *Using reporter genes to study cis-regulatory elements*, **Meth. Cell Biol.** (74) 621-652, 2004.

K.W. Pulsipher, I.J. Dmochowski, *Ferritin encapsulation and templated synthesis of inorganic nanoparticles*, chapter in **Meth. Mol. Biol.** (1252) 27-37, 2015.

B.A. Riggle, B.W. Roose, Y. Wang, I.J. Dmochowski, *Cryptophane-based ¹²⁹Xe NMR biosensors*, chapter in *Hyperpolarized Xenon-129 Magnetic Resonance: Concepts, Production, Techniques, and Applications*, Thomas Meersman and Eike Brunner, Eds., Royal Society of Chemistry, 484 pp, 2015.

Patents (4 issued, 5 pending)

I.J. Dmochowski, B.R. Crane, A.R. Dunn, H.B. Gray, J.J. Wilker, J.R. Winkler, *Detection of biomolecules by sensitizer-linked substrates*, serial number 10/031,532; patent number 7,105,310, issued 9/12/06.

I.J. Dmochowski, P.A. Hill, Q. Wei, N.N. Kuzma, *¹²⁹Xe biosensors and their use*, P-9049-USP, provisional filed 08/27/06, U.S. patent application filed 8/6/07 as 12/376,323, published 5/5/11 as #2011/0104075

I.J. Dmochowski, X. Tang, *Photocleavable oligonucleotide and uses thereof*, filed 12/04/06, provisional filed 11/27/07, U.S. patent application filed 11/08, issued 6/21/16 as U.S. patent #11/987,128

I.J. Dmochowski, P.A. Hill, Q. Wei, J.L. Chambers, *Tri-functionalized cryptophanes and their use*, provisional filed 07/07/08, U.S. patent application 12/498,858 filed 7/07/09, issued 7/17/12 as U.S. patent #8,222,022.

M. Jimbo, G. Robbins, N. Kamat, I.J. Dmochowski, M.J. Therien, D. Hammer, *Polymer vesicles for selective electromagnetic energy-induced delivery*, U.S. patent application #12/548,801 filed 8/27/09, issued 2/10/15 as U.S. patent #8,951,571.

J. Eberwine, I.J. Dmochowski, D. Lovatt, B.K. Ruble, J.L. Richards, *Transcriptome in vivo analysis*. PCT International Patent Application No. 61/352,199 filed 6/07/11.

J. Eberwine, I.J. Dmochowski, S.B. Yeldell, J.C. Gripenburg, T.L. Rapp, J.M. Singh, J.-Y. Sul, Lee, J. *Transcriptome In Vivo Analysis (TIVA) and Transcriptome In Situ Analysis (TISA)*. PCT Patent Application No. PCT/US15/43581 filed 8/4/15.

I.J. Dmochowski, J.C. Gripenburg, T.L. Rapp, *Ruthenium-based photolinkers and methods of use*, PCT Patent Application No. PCT/US15/43548 filed 8/4/15.

I.J. Dmochowski, Y. Wang, B.W. Roose, *A genetically encoded β -lactamase reporter for ultrasensitive ^{129}Xe NMR*, U.S. Provisional Patent Application No. 62/306,926, filed March 11, 2016.

Prominent Citations of Research

Many popular science articles discussing ref. 56, Jan-April, 2014

One example from the *Scientist*, <http://www.the-scientist.com/?articles.view/articleNo/39491/title/Molecular-Multitasker/>

University of Pennsylvania *SAS Frontiers*, September 29, 2011, featuring ref. 42

Cover story, *C&EN*, August 22, 2011, featuring fluorescent anesthetic project on NIGMS home page, August 2011, featuring ref. 43

in *Nature Chemistry*, July 2011 "Research Highlight" featuring ref. 42

University of Pennsylvania *Gazette*, highlight featuring annual research accomplishments at UPenn, citing fluorescent anesthetic studies, ref. 32.

In *Science Daily*, April 8, 2009,

<http://www.sciencedaily.com/releases/2009/04/090403181505.htm> "New model for drug discovery with fluorescent anesthetic demonstrated" featuring ref. 32.

in *Nature Chemistry*, Jan. 2009 "Research Highlight" on homepage, "Biosensors: The Xe-Factor", article by Gavin Armstrong featuring ref. 28.

On ACS home page, "News and Research" during week of Nov. 1, 2008, highlighted work on xenon biosensors published in ref. 25.

in *ACS Chemical Biology*, 2, 646-648, Oct. 2007 "Point of View" titled "Yin-Yang Ways of Controlling Gene Expression Are Now in Our Hands" by Hitoshi Okamoto featuring ref. 22.

Faculty of 1000 Biology recognition from Edward Stiefel, June 2006, featuring ref. 13.

Research Support

Current Financial Support, Extramural (annual direct costs listed)

NSF PD 09-6885 (Co-PI, with Jeffery Saven) 7/1/15- 6/30/18

National Science Foundation

"Computationally designed synergistic protein-nanoparticle assemblies"

Dmochowski lab will design, synthesize, and characterize ferritin-plasmonic nanoparticle assemblies with significance to nanoparticle separations, nanoparticle functionalization, nanoparticle growth, and catalysis.

R01 GM083030 (Dmochowski) 8/1/14-7/31/18

National Institute of General Medical Sciences

"Light-activated oligonucleotides for biological applications"

This funds the development of Transcriptome *In Vivo* Analysis (TIVA) technology, which will allow harvesting of RNA from neurons in brain tissue using light-activated oligonucleotides.

R01 GM097478 (Dmochowski)	8/1/15-7/31/19
National Institute of General Medical Sciences	
"Structure-Based Design of Xe-129 NMR Biosensors for Multiplexed Cancer Detection"	
This funds the development of cryptophane-, cucurbituril-, and protein-based biosensors that report specific Xe-129 NMR chemical shifts for cancer biomarkers.	
P01 GM055876 (PI, Eckenhoff, Dmochowski Sig Contributor)	10/01/13-9/30/18
National Institutes of Health	
"Interaction of inhalational anesthetics with macromolecules"	
Dmochowski consults on the design of "clickable" anesthetic probes for isolating rare protein targets.	
<u>Current Financial Support, Intramural</u> (annual direct costs listed)	
Faculty Working Group award from SAS Dean	3/1/16-2/28/17
establishes "General Chemistry Faculty Working Group"	\$5000
<u>Completed Funding, Extramural</u> (total direct costs listed)	
Supplement to NIH R-01 GM097478	9/01/14-8/30/15
National Institute of General Medical Sciences	\$55,800
This supplement funded the purchase of a laser for the xenon polarizer.	
DOD, Lung Cancer Research Program,	10/1/14-9/30/15
Concept Award (Dmochowski)	\$77,000
Department of the Army	
"Ultra-sensitive, genetically encoded contrast agents for lung cancer diagnosis"	
This supports studies of a genetically encoded reporter for Hyper-CEST NMR.	
McKnight Technology Innovation Award (Co-PI with J. Eberwine)	8/1/12-7/31/14
McKnight Endowment Fund for Neuroscience	\$25,000
"TIVA-tag enables true neuronal systems genomics"	
NIH S10 DO016260 (PI, Dmochowski)	6/01/13-5/30/14
Office of the Director, National Institutes of Health	\$129,060
"Multi-User, Isothermal Titration Microcalorimeter"	
R01 GM083030 (PI, Dmochowski)	2/01/08-1/31/14
National Institute of General Medical Sciences	\$1,450,000
"Oligonucleotides for turning genes on and off with light"	
R01 EB010208 (PI, Rizi)	4/1/10-3/31/14

National Institutes of Health "Comprehensive assessment of pulmonary disorders using polarized ¹³ C technology"	\$10,000
Camille and Henry Dreyfus Teacher-Scholar Award (PI) "Laser-activated oligos for regulating genes in neurons and Zebrafish"	9/01/07-9/1/12 \$75,000
NSF CAREER Award, CHE 0548188, Inorganic Chemistry (PI) "Protein templates for controlling inorganic nanoparticle formation and assembly"	3/01/06-2/28/11 \$560,000
1R33CA110104-01, NCI/NIBIB (PI) "Multi-modal ¹²⁹ Xe probes for tumor detection"	7/1/08-6/30/10 \$630,000
Leukemia and Lymphoma Society, Translational Research Grant (Gewirtz, PI; IJD, Co-PI) "RNA-targeted therapeutics for hemonologic malignancies"	2/1/07-1/31/10 \$45,000
BC061527, DOD, Breast Cancer Research Program, Idea Award (PI) "Molecular imaging of breast cancer with Xe-129 biosensors"	5/1/07-4/31/10 \$300,000
CHE-0820996, NSF instrumentation proposal (PI) "MRI: Acquisition of tri-institutional, cyber-enabled chemistry MALDI-TOF mass spectrometer"	10/1/08-9/30/09 \$435,264
NIH, 5 T32 GM071339-04 (Marmorstein) "Predoctoral Training at the Chemistry-Biology Interface"	7/01/05-6/30/10 \$1,046,684
1S10RR023444-01, NCRR Shared Instrumentation (PI) "Time-of-flight instrument with complementary ionization..."	6/1/07-5/31/09 \$307,604
1S10RR021113-01, NCRR Shared Instrumentation (PI) "Leica TCS SP2 AOBS UV confocal system"	4/1/05-3/31/08 \$497,326
1R21CA110104-01, NCI/NIBIB (PI) "Multi-modal ¹²⁹ Xe probes for tumor detection"	7/1/05-6/30/07 \$233,102
1R21CA110104-01S1, NCI/NIBIB (PI) "Multi-modal ¹²⁹ Xe probes for tumor detection"	7/1/05-6/30/07 \$76,172
Camille and Henry Dreyfus New Faculty Award (PI) "Molecules, methods, and microscopes..."	6/1/03-6/1/07 \$40,000
ACS, Petroleum Research Fund, Type G (PI) "Getting a charge out of ferritin"	7/1/04-6/30/06 \$35,000

DOD Breast Cancer Research Program (PI) "129Xe MRI biosensors for multiplexed imaging of breast cancer markers"	7/1/04-6/30/05 \$75,000
<u>Completed Funding, Intramural</u> (total direct costs listed)	
UPenn LRSM (Co-PI with Feng Gai, Amos Smith)	11/1/14-6/30/16 \$8,000
Provost Conference Support (Co-PI with Ravinder Reddy) supported Penn-CEST meeting, Oct. 24-27, 2015	7/1/15-6/30/16 \$10,000
UPenn SAIL Proposal (PI, Dmochowski, D. Berry, S. Phillips) UPenn Center for Teaching and Learning (CTL) "Flipping Chemistry 101"	2014 \$5,000
University Research Foundation Typhoon 9000 Imaging System for Enhancing Penn Education and Research Across the Chemical, Biological, and Biomedical Sciences	03/01/12-02/28/13 \$40,000
ITMAT Center for Targeted Therapeutics and Translational Nanomedicine, Pilot Grant (PI) Targeted xenon diagnostic agents	1/01/11-12/31/11 \$15,000
Translational Bio-Imaging Center (TBIC) UPenn, Pilot Grant (Co-PI) Imaging and functional studies with fluorescent anesthetic probes	2/01/11-1/31/12 \$25,000 (50%)
NSF MRSEC DMR-0520020, IRG-3 Seed Grant (PI) Synthetic programmable membranes	8/01/06-9/30/11 \$250,000
NSF MRSEC, Seed Grant (Co-PI, Baumgart) DNA programmable assemblies	10/1/09-9/30/10 \$30,000 (50%)
ITMAT Transl. Biomed Imaging Ctr, Pilot Grant (Co-PI, Greenberg) Validation of targeted xenon SPECT agents for <i>in vivo</i> molecular imaging	10/1/08-9/30/09 \$50,000 (50%)
UPenn Comprehensive Neuroscience Center (Co-PI, Eberwine) Light-activated oligos for spatiotemporal gene regulation....	10/1/07-10/1/08 \$65,000 (50%)
UPenn NanoBio Interface Center (NBIC) Pilot Grant (PI) RNA templates for nanobiotechnology	9/1/07-9/1/08 \$50,000
UPenn Institute Med. and Eng. Seed Grant (Co-PI, Eckenhoff) Probing mechanisms for anesthetic toxicity with ferritin	1/01/06-12/31/06 \$30,000 (50%)

UPenn, Univ. Res. Foundation Grant (PI) Using fluorescence microscopy to develop new MRI contrast agents....	3/1/05-3/1/06 \$25,000
UPenn Genomics Institute Seed Grant (PI) Laser-activated spatiotemporal gene regulation	1/1/04-12/31/05 \$100,000
UPenn IME Pilot Grant (Co-PI) Reporter molecules for gene detection....	3/1/04-3/1/05 \$15,000
UPenn, Univ. Res. Foundation Grant (PI) <i>In vivo</i> control and characterization of protein interactions....	3/1/03-3/1/04 \$18,000

Invited Research Lectures (organized by year)

2003	October: UPenn Chemistry Club October: Temple U., Department of Chemistry October: Institute for Medicine and Engineering (IME), UPenn
2004	August: National ACS meeting, Philadelphia, PA October: Wistar Institute October: Bryn Mawr College, Department of Chemistry November: Villanova Graduate Fair November: St. Joseph's U., Department of Chemistry
2005	January: UPenn, Department of Anesthesiology June: DOD Era of Hope Meeting, Philadelphia, PA November: Jefferson U., Department of Biochemistry November: Richard Stockton College, NJ, Department of Chemistry December: New York Academy of Sciences, <i>Frontiers in Science</i> December: Rutgers U., New Brunswick, NJ, Department of Chemistry
2006	March: UPenn, Center Molecular Studies March: Natl. ACS Meeting, Atlanta, GA, two talks August: Society of Molecular Imaging, Hawaii September: Natl. ACS Meeting, San Francisco, CA (2 talks) November: Shippensburg U., Department of Chemistry November: Temple U., Undergraduate Chemistry Symposium December: Drexel U., Department of Chemistry
2007	February: Scripps Research Institute February: Caltech, Department of Chemistry

March: UPenn lecture to adult science teachers
May: U.C. San Diego., Department of Chemistry
May: U.C. Santa Barbara, Department of Chemistry
May: U.C. Irvine, Department of Chemistry
May: MARM undergraduate lecture, Ursinus
May: Drexel U., Materials Science Department
June: UPenn Genomics Institute, Chemistry and Genomics Symposium
August: ACS National Meeting, Boston, Inorganic Chemistry
September: Purdue U., Department of Chemistry
September: U. Illinois, Urbana Champaign, Department of Chemistry
September: Indiana U., Bloomington, Department of Chemistry
September: NSF Workshop in Physical Organic Chemistry, Vermont
September: U. California, Berkeley, Department of Chemistry
September: Symposium on Molecular and Cellular Imaging, Yale, Dept. of Radiology, declined
October: U. of the Sciences in Philadelphia, Department of Chemistry
October: UPenn, SAS Imaging Symposium
November: U. of Chicago, Department of Chemistry
November: M.I.T. and Harvard, Departments of Chemistry
November: Millersville State U., Department of Chemistry

2008

February: U. North Carolina, Chapel Hill, Department of Chemistry
March: North Carolina State U., Department of Chemistry
April: Haverford, Department of Chemistry, undergraduate club
May: Washington U., Department of Chemistry
June: National Medicinal Chemistry Symposium, Pittsburgh
June: DOD BCRP Meeting, Baltimore
August: American Chemical Society Meeting, Philadelphia, "Metals in Biochemistry" symposium honoring Elizabeth Theil
October: UPenn, Cancer and Metabolism Seminar series
December: U. Rhode Island, Department of Chemistry

2009

February: U. South Carolina, Department of Chemistry
March: John's Hopkins U., Department of Chemistry
July: UPenn, School of Medicine, NMR symposium hyperpolarized nuclei
September: Rensselaer Polytechnic Institute, Bio-Constellation Lecture
September: Society Molecular Imaging annual meeting, Montreal (2 talks)
October: Frontiers in NMR Spec., Leibniz Institute, Berlin, Germany

- December: Multifunctional Organic Materials and Devices, First International Symposium, Toho U., Tokyo, Japan
- 2010 April: National Institutes of Health (NHLBI), Bethesda, MD
 August: American Chemical Society Meeting, Boston (3 talks)
 October: UPenn, Targeted Therapeutics Seminar Series
 November: The College of New Jersey, Department of Chemistry
- 2011 March: Brigham Young University, Department of Chemistry
 June: UPenn, REU student lecture
 September: Chemical Heritage Foundation, Innovation Day
 September: UPenn, Department of Biochemistry and Biophysics
 October: Ohio State University, Department of Chemistry
 November: St. Joseph's University, McGroddy Frontiers in Science Seminar series
- 2012 March: U.C. Berkeley, Department of Chemistry (Pines Lab)
 March: American Chemical Society Meeting, San Diego (2 invited talks)
 April: UPenn, Frontiers at the Chemistry-Biology Interface Symposium
 June: XeMat 2012, Dublin, Ireland
 July: UPenn, School of Medicine, NMR symposium hyperpolarized nuclei
 August: **keynote lecture**, Ninth IUPAC International Symposium Biomolecular Chemistry, Beijing, China
 August: Peking University, School of Pharmaceutical Sciences
 December: Tulane University, Department of Chemistry
- 2013 Feb: St. John's University, Queens, NYC, ACS chapter, student invitation
 May: UPenn, SOM, International NMR symposium lung imaging
 June: McKnight Neuroscience Annual Meeting, Aspen, CO
 July: 12th International Conference on Calixarenes, Newfoundland, CAN
 September: Georgetown University, Department of Chemistry
- 2014 May: Fourth CEST NMR Workshop, Giacosa, Italy
 May: **keynote lecture**, Japan Society for Analytical Chemistry, Koriyama, Japan
 May: Tohoku University, Department of Chemistry, Sendai, Japan
 June: McKnight Neuroscience Annual Meeting, Aspen, CO
 June: Euromar 2014 Conference, special session on 'sensitivity enhancement', ETH, Zurich, Switzerland
 July: ETH, Zurich, Department of Chemistry
 September: Univ. Maryland, College Park, Department of Chemistry

- 2015
- October: Stower's Institute, Kansas City, MO
 - November: Rochester Institute of Technology, Department of Chemistry
 - June: McKnight Neuroscience Annual Meeting, Aspen, CO
 - June: Penn-Blumberg Symposium
 - August: Summer School, Konstanz, Germany
 - August: Amgen, Thousand Oaks, CA
 - September: XeMat Symposium 2015, Dresden, Germany
 - November: UPenn CT3N Symposium, School of Medicine
 - November: Villanova, Department of Chemistry
 - November: UCLA, Department of Chemistry
 - December: Technion-Israel Institute of Technology, Harry Gray 80th Birthday Symposium, Haifa, Israel
- 2016
- February: Univ. Frankfurt, Department of Chemistry (Vidyo lecture)
 - March: ACS Meeting, San Diego, Eric Schelter-Harry Gray Symposium
 - March: UPenn Biochemistry seminar program
 - April: Crano Award Lecture, Akron, Ohio (two lectures)
 - May: Univ. Puerto Rico
 - July: Peking University, Beijing, China
 - July: Wuhan University, Wuhan, China
 - August: Nagoya University, School of Pharmacy, Nagoya, Japan
 - September: LRSM Science Café, World Café Live, Philadelphia
- 2017
- March: UPenn Pulmonary Imaging Meeting

Selected Contributed External Presentations (past 5 years, organized by year)

- 2010
- June: Bioorganic Gordon Conference, Ivan Dmochowski
 - August: ACS meeting (Boston), Brittani Ruble (grad student)
 - November: NAFKI meeting (LA), Ivan Dmochowski
- 2011
- January: Bioinorganic Gordon Conference, Jasmina Cheung-Lau (grad student)
 - August: ACS meeting (Denver), Zhengzheng Liao (grad student)
 - November: Society for Neuroscience meeting (D.C.), Brian Weiser (Eckenhoff grad student)
- 2012
- August: ACS meeting (Phil), Yubin Bai (grad student)
 - August: ACS meeting (Phil), Jasmina Cheung-Lau (grad student)
 - August: ACS meeting (Phil), Julie Gripenburg (grad student)

- August: ACS meeting (Phil), Lu Gao (Saven grad student)
 March: ACS meeting (San Diego), Neha Kamat (Hammer grad student)
 January: Biophysical Society Meeting, Hammer
- 2013 June: Bioorganic Gordon Conference, Brittany Riggle (grad student)
- 2014 July: MASIS Conference, Temple U., Brittany Riggle (grad student)
 August: ACS meeting (SF), Teresa Rapp (grad student)
- 2015 April: Experimental Nuclear Magnetic Resonance Conference (ENC), Yanfei Wang (grad student)
 July: CBI Symposium, Villanova, Teresa Rapp (talk), Ben Roose (poster, 2nd place)
 October: PENN-CEST symposium, Yanfei Wang (talk)
 October: UPenn Nano Day, Katie Pulsipher (poster, 1st place)
 November: UPenn NBIC Research Symposium with Mildred Dresselhaus, Yanfei Wang (talk)
 November: Puerto Rico-Penn joint symposium, Katie Pulsipher (grad student, poster)
- 2016 February: Metals in Biology GRC, Katie Pulsipher (poster)
 March: ACS meeting San Diego, Ben Roose (talk)
 June: CBI Symposium, Bryn Mawr College, Katie Pulsipher (talk), Ben Roose (poster, 1st place)
 August: ACS meeting Philadelphia, Ben Roose (talk), Teresa Rapp (talk, poster), Katie Pulsipher (talk), Sean Yeldell (talk)

Teaching and Advising, UPenn Chemistry

Teaching

Professor, Chemistry 567, "Bioinorganic Chemistry", fall semesters 2008-2010, spring and fall semesters 2012, fall 2013, spring semesters 2015-2017

Professor, "General Chemistry 101," spring semesters 2003-2006, 2009; fall semester 2006; summers 2012, 2013, 2014

Professor, co-taught Chemistry 559, "Biomolecular Imaging" or "Topics in Biophysical Chemistry", spring semesters 2005 –2011, fall semester 2011

Professor, Chemistry 012-LPS, "Environmental Chemistry", spring 2012, 2013

Professor, Chemistry 455, "Biophysical Chemistry", fall 2012, 2013

Co-creator of 2-day course for high school Chemistry teachers, "Teaching Difficult Chemistry Concepts with Fun and Easy Demos", supported by Dreyfus Foundation, August 3 – 4, 2007 and August 15 – 16, 2008; course received 4.9/5.0 rating

Academic Advising

Academic advisor to 50 UPenn Freshmen and Sophomores, 2003 – Present

Member of 15-20 Ph.D. thesis committees in Chemistry, annually

Member, 6 thesis committees for graduate students in Biochemistry and Molecular Biophysics Graduate Group, and Pharmacology, UPenn School of Medicine, 2007 – Present, currently Kellie Woll, Bryan Fry, Chris Bialas

Research Advising

Currently research advisor to 7 graduate students, 4 undergraduates

Undergraduate Students Supervised (34 total, current location provided, if known)

deMauri Mackie, Josh Strauss (Albert Einstein Medical School), Igar Fuki (Ph.D. program, UPenn Statistics), Matthew Kofke³ (medical school), Brenna Kelly, Stephanie Topp (Ph.D. program, Cornell Biochemistry), Chris Gorman, Carolyn Wei (Ph.D. program, UIUC Chemistry), Laura Spece[•] (Penn State Medical School), Vijay Yerubandi[•] (Columbia Medical School), Matthew Bessette (M.D./Ph.D. program, Univ. Virginia, Charlottesville), Tara Kaufmann[•] (M.D./Ph.D. program, UCSF), Masaya Jimbo[•] (M.D./Ph.D. program, Jefferson), Anna Turetsky (Ph.D. program, Harvard Biophysics), Chris Pollock[#] (Ph.D. program, Cornell Chemistry), Frances Rodriguez^{*} (Ph.D. program, U.C. Berkeley Chemistry), David Jacobson (Ph.D. program, UCSB Physics), Weiren Liu (Ph.D. program, J. Hopkins, Biology), Michael Kim["] (MS, Stanford, Comp. Sci.), Myra Eckenhoff (postbac, UPenn), David Hao (Robert Wood Johnson Medical School, NJ), John Psonis (M.D./Ph.D. program, SUNY Stony Brook), Elizabeth O'Brien (Ph.D. program, Caltech Chemistry), Amaris Borges^{*} (Ph.D. program, SUNY Buffalo Chemistry), John Philbin (undergrad, will enter Ph.D. program at U.C. Berkeley in Chemistry, 2015), Stephanie Cornell[%] (undergrad), Braden Amundsen (undergrad), Stephanie Honig (undergrad), Neil Zhao (undergrad), Maranda Fordham (undergrad), Mara Greenberg (undergrad), Jordan Doman (undergrad), Tacey Hicks (REU from Montana State U.), Kelsey Farenhem (undergrad)

³from Carnegie Mellon

[#]from Clemson University

^{*}REU student from University of Puerto Rico at Cayey

["]from Stanford University

[%]from Texas A&M University

[•]earned Masters degree in Chemistry or Biochemistry while in the lab

High School Students Supervised

Kara Thompson, student at Motivation High School, Philadelphia, PA, summer 2009

Jerusha Yun, student at Agnes Irwin School, Rosemont, PA, academic year 2009-10
Isabel Kronenberg, student at Horace Mann School, New York City, August-Sept. 2015
Xavier Carroll, Senior at Science Leadership Academy, Philadelphia, PA, fall 2015 - Present

High School Teachers Supervised

Max Geisler, local high school science teacher, NBIC summer program, 2005
James LeNoir, local high school science teacher, NBIC summer program, 2008

Graduate Students Supervised (24 total, year of joining lab, undergraduate institution, field of training in parentheses)

Joe Swift (2004, Imperial College, London, Physical Chemistry), Aru Hill (2004, Denison U., Inorganic Chemistry), Chris Butts (2005, Hamilton College, Biological Chemistry), Julia Richards (2005, Vanderbilt U., Biological Chemistry), Garry Seward (2005, U. Virginia, Charlottesville, Biological Chemistry), Lei Zhang (2005/2006, Nankei U., transfer from Caltech Chemistry graduate program, Inorganic Chemistry), Jenny Chambers (2006, James Madison U., Organic Chemistry), Najat Khan (2007, Colgate U., Organic Chemistry), Julie Gripenburg (2007, Seton Hall U., Inorganic Chemistry), Jasmina Cheung-Lau (2008, Amherst College, Inorganic Chemistry), Brittani Ruble (2008, Emory U., Biological Chemistry), Yubin Bai (2009, U.S.T.C., Physical Chemistry), Zhengzheng Liao (2009, Peking U., Physical Chemistry), Brittany Riggle (2010, U. Virginia, Charlottesville, Biological Chemistry), Daniel Emerson (2011, U. Florida, Physical Chemistry), Yanfei Wang (2012, U.S.T.C., Physical Chemistry), Katie Pulsipher (2012, Brigham Young U., Inorganic Chemistry), Sean Yeldell (2013, Case Western Reserve U., Biological Chemistry), Teresa Rapp (2013, California Polytechnic State Univ., Inorganic Chemistry), Ben Roose (2013, Johns Hopkins U., Inorganic Chemistry), Serge Zemerov (2015, The College of New Jersey, Physical Chemistry), Linlin Yang (2015, U.S.T.C., Physical Chemistry), Yannan Lin (2016, Master's student)

Ph.D. Degrees Awarded (14 total)

Aru Hill, defended thesis in Oct., 2008 (postdoc with Ken Raymond, U.C. Berkeley; now Teacher, Schmahl Science Workshop)
Joe Swift, defended thesis in Nov., 2008 (postdoc with Dennis Discher, Univ. Penn., Aug, 2014 became Group Leader at Univ. Manchester, U.K., Dept. Life Sciences)
Chris Butts, defended thesis in Feb., 2009 (graduated from Philadelphia College of Osteopathic Medicine in 2012, now surgical intern)
Julia Richards, defended thesis in June, 2010 (postdoc with John Murray, Univ. Penn., now Senior Research Scientist at Johnson & Johnson)
Garry Seward, defended thesis in August, 2010 (Scientist, Alfa Aesar)
Lei Zhang, defended thesis in April, 2011 (Lecturer, Nankei Univ., China)
Najat Khan, defended thesis in May, 2011 (Consultant, Boston Consulting Group)

Brittani Ruble, defended thesis in July, 2012 (homemaker and adjunct Chemistry faculty, UPenn)

Jasmina Cheung-Lau, defended thesis in February, 2013 (Manager, Lampe Berger)

Zhengzheng Liao, defended thesis in May, 2013 (Scientist, Unilever)

Yubin Bai, defended thesis in Jan., 2014 (computer programmer, Facebook)

Julianne Gripenburg, defended thesis in August, 2014 (lecturer-postdoc, Rutgers Univ., Camden)

Brittany Riggle, defended thesis in September, 2015 (postdoc, Dr. Susan Pierce, NIH)

Yanfei Wang, defended thesis in June, 2016 (postdoc, Dr. Dan Kohane, Harvard Med)

Master's Degrees Awarded (2 total)

Jenny Chambers (nee Muth), June 2008 (earned Ph.D. in Chemistry in Melbourne, Australia, currently postdoc with Brent Stockwell, Columbia)

Daniel Emerson, February, 2013 (currently lab technician, Neurobiology, UPenn)

Other Students Mentored

Jennifer Yoon (2016, Syracuse Univ., Biological Chemistry)

Sunbin Deng (2016, Biological Chemistry rotation student)

Postdoctoral Scholars Supervised (8 total)

Danniebelle Haase, Ph.D. in Organic Chemistry, Univ. Florida, Gainesville, currently Senior Chemist, Dow Chemical

Ashley Fiamengo, Ph.D. in Radiological Sciences, Washington University, St. Louis, currently Chemistry Teacher, Texas Military Institute, San Antonio

Olena Taratula, Ph.D. in Organic Chemistry, Rutgers, The State University of New Jersey, Newark, Research Assistant Professor, Oregon State Univ. in Dept. of Pharmacology

XinJing Tang, Ph.D. in Organic Chemistry, Chinese Academy of Sciences, Photochemistry, currently Associate Professor, State Key Laboratory of Natural and Biomimetic Drugs, Health Science Center, Peking University, Beijing, P.R. China

Dage Liu, Doctor of Engineering in Materials Science, School of Materials Science and Engineering, Harbin Institute of Technology, Harbin, P.R. China, current employment unknown.

Qian Wei, Ph.D., Rutgers U., Newark, Organic Chemistry, currently Senior Research Scientist, Analytical Department, R&D, International Specialty Product, Inc.

Luqin Yang, Ph.D., Nankai U., Inorganic Chemistry, currently Research Scientist at AstaTech, NJ

William Wehbi, Ph.D., Caltech, Bioinorganic Chemistry, Chemistry lecturer, current employment unknown.

Departmental Service, UPenn Chemistry

Undergraduate Chair, Jan. 2015 – Present

Highlights include successful nomination of several colleagues for teaching awards:

Prof. Jeffrey Winkler for Ira Abrams teaching award (2016)

Prof. Patrick Walsh for Undergraduate Research Mentoring award (2016)

Prof. Jeffery Saven for Dean's Teaching Innovation award (2015)

Yitao Zhang, Jake Nagy (2015) and Mike Noss (2016), Graduate Student Dean's teaching awardees

Other highlights as Undergraduate Chair include creating Faculty Working Group for General Chemistry, performing the first assessment of the UPenn Chemistry major using ACS diagnostic test for current chemistry majors, restarting the undergraduate chemistry club, PUCS, and initiating active-learning recitations and peer-led instruction in Chem101/102.

Member, Executive Director search committee, fall 2016

Lecturer, department ethics seminar, "Conflicts of Interest", Feb. 2013 and Jan. 2015

Member, UPenn Chemistry Laser Resource Advisory Board (RLBL), 2014 – Present

Primary author of 8 NIH and NSF shared instrumentation proposals, 2006 – Present

This includes NIH S10 grant submissions in 2014 and 2015 for new NMR console.

Chair, Undergraduate Committee, Chemistry Dept., 2003-2006, 2012 – Present

Faculty Director, UPenn Chemistry Mass Spectrometry Facility, 2007 – Present

Faculty Co-Director, UPenn Chemistry Optical Microscopy Facility, 2006 – Present

Member, Inorganic Search Committee, 2014-2015 – this led to successful recruitment of Neil Tomson to UPenn

Recruitment of Liz Rhoades to UPenn (from Yale), 2014 - 2015

Member, Vagelos Energy Chair Search Committee, 2014 – 2015

Member, Graduate Committee, Chemistry Dept., 2003-2009, 2012 – 2015

Chair, Major Instrumentation Committee in Chemistry, tasked with identifying large instrumentation needs in Chemistry, 2009 – 2014

Member, Energy Cluster Search Committee, 2013-2014

Member, Five-Year Planning Committee (Chair, Kozlowski), 2012-2013

Co-Chair, General Chemistry Laboratory Committee, tasked with reviewing and overhauling undergraduate general chemistry laboratory, 2010 – 2013

Interim Vice Chair, Oct. 2011-March 2012

Member, Chemistry Chair's Advisory Committee, 2010 – 2012

Chair, General Chemistry Education Committee, tasked with reviewing and overhauling undergraduate general chemistry curriculum, 2009 – 2012

Member, "Target of Opportunity" Faculty Search Committee, 2009 – 2013

Co-organizer for Chemistry Department Biological Seminar Program, 2006 – 2012

Chair, committee tasked with reviewing performance of director of General Chemistry laboratories, 2011

Member of New Chair Search Committee, fall 2008

Member of Search Committee, Junior Faculty in Chemistry (ad hoc member), fall 2004

Member of Inorganic Search Committee, Junior and Senior Faculty in Chemistry, spring 2008 – 2009 – this led to successful recruitment of Eric Schelter

Member of Biological Search Committee, Junior Faculty in Chemistry, fall 2007 – this led to successful recruitment of James Petersson

Graduate student recruiter, Biological Chemistry Division, 2003 – 2009

Implementation of wireless feedback technology for "General Chemistry 101," \$3500 SAS Instructional Technology Grant to purchase new equipment, 2005

Member of Chemistry Department Web Design Committee, 2005 – 2007

Member of Chemistry Department Nanoscience Building Committee, 2006 – 2008

Organizer for Chemistry Department Inorganic Seminar Program, 2004 – 2006

Head of General Chemistry Textbook Committee, 2007

Service to University of Pennsylvania

Participant, Penn Pathways panel on "Lessons about Effective Leadership", Oct. 2015 and 2016

Participant, webcast to freshman parents with Dean Dennis DeTurck, Oct. 2015

Member, Faculty Council on Access and Academic Support, Jan. 2012 – Present

UPenn representative for AAU meeting at Washington University, Oct. 2015

UPenn representative for AAU grant meeting at Brown University, June 2015

UPenn representative for NSF-sponsored LRSM collaboration with Univ. Puerto Rico at Humacao and Cayey; visits to Puerto Rico in Nov., 2014 and May, 2016

Participant, CTL “Teaching Science” lunch-seminar series, Sept. 2014-May 2015

Participant, ISAC Faculty Workshop, May 2015. *I co-mentored (with Saven) an undergraduate, Riad Hamade, in summer 2015 for 8 weeks as part of this program.*

Reviewer of several ITMAT proposals, Jan. 2015

Committee member for students in UPenn SOM BMB program, currently 3 Ph.D. students (Christopher Bialas, Brian Fry, Kellie Woll), 2008 – Present

Steering Committee Member, HHMI/NIBIB Biomedical Training Grant, 2006 – Present

Advisory Board Member, Chemical Biology NIH Training Grant, 2006 – Present

Chair, Faculty Senate Committee on Students and Educational Policy, Jan. 2012 – May 2014

Member, Faculty Senate Committee on Students and Educational Policy, 2011– 2014

Member, SAS Natural Sciences committee tasked with hiring cluster in Energy, Jan. 2012 – April 2014

Member, Senate Executive Committee, 2010 – 2012

Chemistry representative to Imaging Committee tasked with identifying large instrumentation needs at UPenn, 2009 – 2012

Member, SAS Curriculum Committee, 2009 – 2011

Member, Hearing Boards for Student Disciplinary System and Code of Academic Integrity, 2007 – 2011

I served as Chair of the Hearing Board for a student disciplinary case in Oct, 2008. I wrote the formal report summarizing the findings and recommendations of the committee. I served on a second case in 2009, and third case in March, 2011.

Member, UPenn SAS Committee, website for NSF outreach materials, 2008 – 2010

Member, UPenn SAS Committee on Undergraduate Education (CUE), 2006 – 2008

Member, UPenn SAS Learning and Technology Committee, 2007 – 2009

Co-Chair, SAS Imaging Symposium, 1-day event held October 16, 2007

Presentations, “Encouraging Participation in Large Science Classes,” UPenn Faculty Teaching Forum, May, 2004 and March, 2005

General Service to Chemistry

Ad hoc reviewer, NIH SBCA study section, June 2014 and Oct 2016

NIH reviewer, BTRR study section (P41), July 2016

Chair, Xe-MAT 2018 Meeting, ~100 international participants will spend 3 days at UPenn in 2018.

ACS National Awards—Chair of Selection Committee, 2014 – Present

NIH reviewer, EBIT study section, February, 2016

NSF, ad hoc reviewer, September, 2015 and March, 2016

Co-Organizer (with Ravinder Reddy, UPenn SOM, Radiology) of PENN-CEST 2015 NMR meeting, held at Penn Oct. 24-27, 2015. This was an international meeting with roughly 200 participants who employ chemical exchange saturation transfer (CEST) NMR/MRI methods.

NSF, Chemical Measurement and Imaging (CMI) Program, review panelist, April 2015

NIH G77/BRAIN grant reviewer, study section, July 2014 and 2015

Journal reviewer (~40 reviews provided annually)

Chem. Sci., Science, Proc. Natl. Acad. Sci. USA, J. Am. Chem. Soc., Nano Lett., ACS Nano, Small, Nat. Meth., Nat. Nanotechn., Nat. Chem. Biol., ACS Chem. Biol., J. Phys. Chem., J. Med. Chem., Biochemistry, J. Org. Chem., Org. Lett., Nucleic Acids Res., Bioconj. Chem., Bioorg. Med. Chem. Lett., Biotechniques, RNA, J. Inorg. Biochem., Mol. Biosyst., Photochem. Photobiol. Sci., Coord. Chem. Rev., Biomacromolecules, Magn. Reson. Med., Inorg. Chem.

Proposal reviewer, American Association for the Advancement of Science (AAAS) Research Competitiveness Program, April 2014

Proposal reviewer, NIH Director’s New Innovator Award (DP2) applications, February 2014

Proposal reviewer, INSERM (France), Physics, Mathematics and Engineering Sciences Program, January and August 2013

Proposal reviewer, NIH Biological Chemistry and Macromolecular Biophysics study section (ZRG1 BCMB-R 02 M), November 2012

Proposal reviewer, NIH SBIR, Cell, Computational, and Molecular Biology IMST – J (15) Small Business Editorial Board Review Panel, June 2012

Proposal reviewer, Doctoral Fellowships in Imaging Technology for Biology and Medicine, EPFL (Swiss Federal Institute of Technology, Lausanne), September 2011

Proposal reviewer, South Carolina Experimental Program to Stimulate Competitive Research and Institutional Development Awards (EPSCoR/IDeA), Columbia, South Carolina, April 2011

Proposal reviewer, Evaluation Committee of the Blanc SIMI 7 2011 program of the French National Research Agency (ANR), March 2011

Proposal reviewer, NIH SBIR, NCI Topic 281 “Biosensors for Early Cancer Detection and Risk Assessment”, March 2010

Proposal reviewer, European Research Council (ERC), panel LS7 "Diagnostic Tools, Therapies and Public Health", 2009-2013

Proposal reviewer, NIH Challenge grants, June 2009

Proposal reviewer, National Science Foundation (NSF), Inorganic Chemistry, May, 2007 and December, 2008; Biological Chemistry, September, 2009

Proposal reviewer, U.S. Civilian Research & Development Foundation (CRDF), 2008

Proposal reviewer, Deutsche Forschungsgemeinschaft/ERA-Chemistry consortium, 2008

NIH ad hoc study section member, National Institute of Environmental Health Sciences (NIEHS), reviewer of P-42 proposals for the Superfund Basic Research Program, September, 2007

NIH ad hoc study section member, National Institute of Environmental Health Sciences (NIEHS), reviewer of proposals for two RFAs, ES-06-012, "Biological Response Indicators of Environmental Stress Centers (U54)" and ES-06-013, "Biological Response Indicators of Environmental Stress (U01)", March, 2007

NIH ad hoc study section member, Minority Biomedical Research Support Program, National Institute of General Medical Sciences (NIGMS), October, 2006 and July, 2007

Proposal reviewer for Cancer Research, UK, 2006 and 2008

Proposal reviewer, American Chemical Society, Petroleum Research Fund, 2005, 2013

Session chair for American Chemical Society national meetings: Inorganic Chemistry Division at Atlanta (2006), San Francisco (2006), and Boston (2007); Metals in Biochemistry symposium honoring Liz Theil, Philadelphia (2008)

Chair, Materials Session, Bioorganic Gordon Conference, August 2008

Other Experience and Professional Memberships

2006 - Member, Society for Molecular Imaging (SMI)

- 2006 - Member, Institute for Translational Medicine and Therapeutics, UPenn
- 2006 - Expert Witness, Scientific Consultant, Philadelphia and New York law firms and start-up companies
- 2005 - Member, New York Academy of Sciences (NYAS)
- 2003 - Member, Institute for Medicine and Engineering (IME), UPenn
- 2003 - Consultant, chemistry teaching materials for Houghton Mifflin Company
- 2002-03 Editor, science textbooks for Pearson Learning Group
- 2001-02 Consultant in biotechnology, Los Angeles law firm
- 2000- Member, Society of Biological Inorganic Chemistry (SBIC)
- 1995 - Member, American Chemical Society

Collaborators (Past Four Years)

UPenn: Tobias Baumgart, David Christianson, Patrick Carroll, Feng Gai, Chris Murray, Jeffery Saven, Amos Smith, Tom Troxler (Chemistry), Roderic Eckenhoff, David Eckmann, Renyu Liu (Anesthesiology, SOM), Joel Greenberg (Neurology, SOM), Jason Burdick, Dan Hammer (Bio- and Chemical Engineering), Jim Eberwine (Pharmacology, SOM), Jerry Glickson, Rahim Rizi (Radiology, SOM), Mark Goulian (Biology), Vladimir Muzykantov (Institute for Environmental Medicine)

Temple: Mike Klein, Vincenzo Carnevale (MD simulations of protein-xenon interactions)

NIST: Ron Colle (Radon generation, radiological sciences)

Duke: Michael Therien (conjugated, fluorescent porphyrin sensors)

Loyola University Chicago: Adam Driks (spore samples)

TIVA Collaborators (*since March 2014, my laboratory has provided TIVA oligonucleotide probes for capturing mRNA in cells and tissues to many laboratories world-wide.*)

Stower's Institute: Dr. Paul Kulesa (TIVA in live, intact chick embryo)

Univ. Melbourne (Australia): Dr. Angela Connelly/Prof. Andrew Allen (TIVA in neurons in cardiovascular system)

Univ. Osaka (Japan): Asst. Prof. Junichi Kikuta/Prof. Masaru Ishii (TIVA in inflammation and bone remodeling)

Rockefeller Institute: Dr. Margaret Scull/Prof. Charlie Rice (TIVA in lung epithelium)

Univ. S. California: Prof. Scott Fraser (TIVA in live, intact bob squid)

Allen Brain Institute: Dr. Sean Kim (TIVA in live brain slices)

Amgen: Dr. OhKyu Yoon (TIVA in fixed human tissue)

European Molecular Biology Laboratory (EMBL, Heidelberg, Germany): Vegesna Naga Venkata Gayathri/Dr. Rainer Pepperkok (TIVA in single cells, Golgi biogenesis)

RIKEN Center for Molecular Biology (Kobe-shi, Japan): Dr. Yu-Chiun Wang (TIVA in *Drosophila melanogaster*, molecular mechanisms of epithelial morphogenesis)

Research Mentors

Postdoctoral Advisor (2000-02): Prof. Scott E. Fraser, Beckman Imaging Center, Caltech. He is now Director of Science Initiatives at Univ. Southern California.

Graduate Advisor (1995-2000): Prof. Harry B. Gray, Chemistry Department, Caltech

Laboratory Advisor (1994-95): Prof. Helmut Ringsdorf, J. Gutenberg Universität, Chemistry Department, Mainz, DE

Undergraduate Advisor (1993-94): Prof. George M. Whitesides, Department of Chemistry and Chemical Biology, Harvard University