

TM Iverson, PhD

Professor

Departments of Pharmacology and Biochemistry, Center for Structural Biology, and Vanderbilt Institute of Chemical Biology

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EDUCATION

Imperial College London, London, UK

Postdoctoral training, Department of Biomedical Sciences, 2002-2004; *Advisor*: Prof. So Iwata

Brandeis University, Waltham, Massachusetts

Postdoctoral training, Department of Physiology, 2001-2002; *Advisor*: Prof. Christopher Miller

California Institute of Technology, Pasadena, California

Ph. D., Biochemistry, 2000; *Advisor*: Prof. Douglas C. Rees

St. John's University, Jamaica, New York

B.S., Chemistry, Physics minor, *Summa cum laude*, 1995

ACADEMIC APPOINTMENTS

2018 – present	Professor, Departments of Pharmacology and Biochemistry
2010 – 2018	Associate Professor with tenure, Departments of Pharmacology and Biochemistry
2005 – 2010	Assistant Professor, Departments of Pharmacology (2005) and Biochemistry (2006)

AWARDS

2008 – 2010	NARSAD Young Investigator
2006 – 2010	Ellison Medical Foundation New Scholar in Aging
2003 – 2005	EMBO Long-Term Postdoctoral Fellowship
2003 – 2004	Ruth L. Kirschstein National Research Service Award Individual Fellowship
2002 – 2003	Life Sciences Research Foundation Postdoctoral Fellowship
2000 – 2002	Howard Hughes Medical Institute Postdoctoral Associate
1999 – 2000	Howard Hughes Medical Institute Graduate Research Assistantship
1995 – 1999	NIH Training Grant in Neurobiology
1998	American Crystallographic Society Student Travel Grant

PUBLICATIONS

(a) Peer-reviewed articles in referenced journals

58. McCulloch, K.M., Yamakawa, I., Shifrin, D.A., McConnell, R.E., Foegeding, N.J., Singh, P.K., Mao, S., Tyska, M.J., and **Iverson**, T.M. (2019) An Alternative N-terminal Fold of the Intestine-specific Annexin A13a Induces Dimerization and Regulates Membrane-binding. *J Biol Chem*, in press. [PMCID in process.](#)
57. Perry N.A., Kaoud, T.S., Ortega, O.O. Kaya, A.I., Marcus, D.J., Pleinis, J.M., Berndt, S., Chen, Q., Zhan, X., Dalby, K.N., Lopez, C.F., **Iverson**, T.M. and Gurevich, V.V. (2019) Arrestin-3 scaffolding of the JNK3 cascade suggests a mechanism for signal amplification. *Proc Natl Acad Sci USA*, **116**(3):810-815. [PMCID in process.](#)

56. Starbird, CA, Perry, N. A., Chen, Q Berndt, S Yamakawa, I. Loukachevitch, L. V., Limbrick, E.M., Bachmann, B.O., **Iverson**, T.M., McCulloch, K M. (2018) Structure of the bifunctional everninomicin biosynthetic enzyme EvdMO1 suggests independent activity of the fused methyltransferase-oxidase domains. *Biochemistry*, **57**: 6827-6837. [PMCID in process.](#)
55. Maklashina, E., Rajagukguk, S., **Iverson**, T.M., Cecchini, G. (2018) The unassembled flavoprotein subunits of human and bacterial complex II have impaired catalytic activity and generate only minor amounts of ROS, *J. Biol Chem*, **293**(20): 7754 –7765. [PMCID in process.](#)
Highlighted: recommended in Faculty of 1000 as being of special significance in its field
54. Chen, Q., **Iverson**, T.M., and Gurevich, V.V. (2018) Structural basis of arrestin-dependent signal transduction *Trends in Biological Sci*, **43**(6):412-423 [PMCID5959776](#)
53. Sharma, P., Maklashina, E., Cecchini, G., and **Iverson**, TM. (2018) Crystal structure of an assembly intermediate of respiratory Complex II *Nature Communications* **9**(1):274. [doi: 10.1038/s41467-017-02713-8.](#)
[PMCID5773532](#)
52. Starbird, C.A., Tomasiak, T.M., Singh, P.K., Eisenbach, M. Cecchini, G., and **Iverson**, T.M. (2018) New crystal forms of the integral membrane *Escherichia coli* quinol:fumarate reductase suggest that ligands control domain movement. *J. Struct. Biol.*, **202**(1):100-104. [PMCID in process.](#)
51. Tso, S, Chen, Q, Vishnivetskiy, SA, Gurevich, VV, **Iverson**, TM and Brautigam, CA. (2018) Using two-site binding models to analyze microscale thermophoresis data. *Anal Biochem* **540-541**:64-75. [PMCID5906060](#)
50. Chen, Q, Perry, N.A., Vishnivetskiy, S.A., Gilbert, N.C., Zhuo, Y., Berndt, S., Singh, P.K., Tholen, J., Ohi, M.D., Gurevich, E.V., Brautigam, C.A., Klug, C.S., Gurevich, V.V., **Iverson**, T.M. (2017) Structural basis for arrestin-3 activation and signaling. *Nature Communications*, **8**:1427. [doi: 10.1038/s41467-017-01218-8.](#) [PMC5681653.](#)
49. Starbird, C.A., Maklashina, E., Sharma, P., Qualls-Histed, S., Cecchini, G., and **Iverson**, T.M. (2017) Investigations of covalent flavinylation in the *Escherichia coli* complex II homolog quinol:fumarate reductase. *J. Biol. Chem.*, **292**(31): 12921-12933. [PMCID in process.](#)
48. Prokop, S., Vishnivetskiy, SA, Perry, NA, **Iverson**, TM, Hunyadi, L and Gurevich, VV. (2017) Differential Manipulation of Basal and Agonist-induced Arrestin-3 Binding to GPCRs *Cell Signal.*, **36**:98-107. [PMCID5797668](#)
47. Loukachevitch, LV, Bensing, BA, Yu, H. Jie, Z, Chen, X; Sullam, PM, **Iverson**, TM. (2016) Structures of the *Streptococcus sanguinis* SrpA Binding Region with Human Sialoglycans Suggest Features of the Physiological Ligand. *Biochemistry*, **55**(42): 5927–5937. [PMCID5388602](#)
46. Kaya, A.I., Lokits, A.D., Gilbert, J.A., **Iverson**, T.M. Meiler, J., and Hamm, H.E. (2016) A conserved hydrophobic core in G α i1 regulates G protein activation and release from activated receptor. *J. Biol. Chem.* **291**(37): 19674-19686. [PMCID 5016700](#)
Highlighted: By the GPCR consortium.
45. Bensing, BA, Loukachevitch, LV, McCulloch, KM, Yu, H, Wawrzak, Z, Anderson, SA, Vann, KR, Chen, X., Sullam, PM, **Iverson**, TM (2016) Structural basis for sialoglycan binding by the *Streptococcus sanguinis* SrpA adhesin. *J. Biol. Chem.* **291**(14): 7230-7240. [PMCID 4817157](#)
Highlighted: On the cover, Paper of the Week and First Authors selected for author profiles. http://www.jbc.org/content/291/14/7230/suppl/DCAuthor_profile_LVL and http://www.jbc.org/content/291/14/7230/suppl/DCAuthor_profile_KMM
Commentary in: *J. Biol. Chem.* (2016) **291**: 7241. doi: 10.1074/jbc.P115.701425
44. Bensing, BA, Deng, L, Khedri, Z, Prakobphol, A, **Iverson**, TM, Fisher SJ, Varki A and Sullam, PM (2016) Novel aspects of sialoglycan recognition by the Siglec-like SRR glycoproteins of streptococci *Glycobiology* **26**(11) 1221-1233 [PMCID in process](#)

43. Zhan, X, Stoy, H, Kaoud, TS, Perry, NA, Chen, Q, Perez, A, Els-Heindl, S, Slagis, JV, **Iverson**, TM, Beck-Sickinger, AG, Gurevich, EV, Dalby, KN, Gurevich, VV. (2016) Peptide mini-scaffold facilitates JNK3 activation in cells. *Sci Reports*, **6**: 20125. [PMCID: 4751492](#)
42. Maklashina, E., Rajagukguk, S., Starbird, C.A., McDonald, W.H., Koganitsky, A., Eisenbach, M. **Iverson**, T.M., and Cecchini, G. (2016) Interaction of the Covalent Flavin Assembly Factor and Complex II Flavoprotein Subunit. *J. Biol. Chem.* **291**(6): 2904-2916. [PMCID 4742753](#)
41. McCulloch, K.M., McCranie, E.K., Smith, J.A., Sarwar, M. Mathieu, J.L., Gitschlag, B., Du, Y., Bachmann, B.O., and **Iverson**, T.M. (2015) Oxidative cyclizations in orthosomycin biosynthesis expand the known chemistry of oxygenase superfamily. *Proc. Natl. Acad. Sci. USA* **112**(37):11547-52. [PMCID 4577193](#)
Commentary in: Boal, A.K., Bollinger, J.M., and Chang, W. (2015) Assembly of the unusual oxacycles in the orthosomycin antibiotics *Proc. Natl Acad. Sci USA* **112**(39):11989-90
40. Kaya, A.I., Lockits, A.D., Gilbert, J., **Iverson**, T.M., Meiler, J., Hamm, H.E. (2014) A Conserved Phenylalanine as Relay Between the $\alpha 5$ helix and the GDP Binding Region of Heterotrimeric G protein α_{11} subunit. *J. Biol. Chem.* **289**(35):24475-87. [PMCID 4148873](#)
39. Thaker, T.M., Preininger, A.M., Sarwar, M., Hamm, H.E., and **Iverson**, T.M. (2014) A Transient Interaction Between the P-loop and Switch I Contributes to the Allosteric Network Between Receptor and Nucleotide in $G\alpha_{11}$. *J. Biol. Chem.* **289**(16): 11331-41. [PMCID 4036270](#)
38. Birmingham, W.R., Nannemann, D.P., Starbird, C.A., Panosian, T.D., **Iverson**, T.M., and Bachmann, B.O. (2014) Bioretrosynthetic Construction of a Didanosine Biosynthetic Pathway. *Nat. Chem. Biol.* **10**(5): 392-399. [PMCID: 4017637](#)
Highlighted: by popular news media and in Faculty of 1000.
37. Seo, H.S., Misanov, G., Seepersaud, R., Doran, K.S., Dubrovskaya, I., Shuvalova, L., Anderson, W.F., **Iverson**, T.M. and Sullam, P.M. (2013) Characterization of Fibrinogen Binding by Glycoproteins Srr1 and Srr2 of *Streptococcus agalactiae*. *J. Biol. Chem.* **288**(50): 35982–3599. [PMCID: 3861647](#)
36. Singh, P.K., Sarwar, M., Maklashina, E., Tomasiak, T.M., Kotlyar, V., Rajagukguk, S., Cecchini, G., and **Iverson**, T.M. (2013) Plasticity of the Quinone-Binding Site of the Complex II Homolog Quinol:Fumarate Reductase. *J. Biol. Chem.* **288**(34): 24923-24931. [PMCID: 3750132](#)
35. Vishnivetskiy, S.A., Chen, Q., Palazzo, M.C., Brooks, E.K., Altenbach, C., **Iverson**, T.M. Hubbell, W.L., and Gurevich, V.V. (2013) Engineering Visual Arrestin-1 with Special Functional Characteristics. *J. Biol. Chem.* **288**: 3394-3405. [PMCID: 3561558](#)
34. Zhuang, T., Chen, Q., Cho, M., Vishnivetskiy, S.A., **Iverson**, T.M., Gurevich, V.V., and Sanders, C.R. (2013) Involvement of Distinct Arrestin-1 Elements in Binding to Different Functional Forms of Rhodopsin. *Proc Natl Acad Sci USA* **110**(3): 942-947. [PMCID: 3549108](#)
33. Thaker, T.M., Tanabe, M., Fowler, M.L., Preininger, A.M., Ingram-Smith, C., Smith, K.S., and **Iverson**, T.M. (2013) Crystal Structures of Acetate Kinases from the Eukaryotic Pathogens *Entamoeba histolytica* and *Cryptococcus neoformans*. *J. Struct. Biol.* **181**: 185-189. [PMCID: 3565045](#)
32. **Iverson**, T.M. (2013) Catalytic Mechanisms of Complex II Enzymes: A Structural Perspective. *Biochim Biophys Acta.* **1827**(5): 648-657 [PMCID: 3537904](#)
Highlighted: on the cover.
31. **Iverson**, T.M., Maklashina, E., and Cecchini, G. (2012) Structural Basis for Malfunction in Complex II. *J. Biol. Chem.* **287**(42): 35430-35438. [PMCID: 3471735](#)
30. **Iverson**, T.M., Panosian, T.D., Birmingham, W., Nannemann, D. P., and Bachmann, B.O. (2012) Molecular Differences Between a Mutase and a Phosphatase: Investigations of the Activation Step in *Bacillus cereus* Phosphopentomutase. *Biochemistry* **51**(9): 1964-1975. [PMCID: 3302354](#)
Highlighted: Paper of the Week.

29. Pyburn, T.M., Bensing, B.A., Xiong, Y.Q., Melancon, B.J., Tomasiak, T.M., Yankovskaya, V., Oliver, K., Ward, N.J., Sulikowski, G.A., Cecchini, G., Tyska, M.J., Sullam, P.M., and **Iverson**, T.M. (2011) A Structural Model for Binding of the Serine-Rich Repeat Adhesin GspB to Host Carbohydrate Receptors. *PLoS Pathog.* **7**(7): e1002112. [PMCID: 3131266](#)
28. Kaya, A.I., Thaker, T.M., Preininger, A.M., **Iverson**, T.M., and Hamm, H.E. (2011) Coupling Efficiency of Rhodopsin and Transducin in Bicelles. *Biochemistry*, **50**(15): 3193-3203. [PMCID: 3119548](#)
27. Kuchtey, J., Olson, L.M., Rinkoski, T., MacKay, E.O., **Iverson**, T.M. Gelatt, K.N., Haines, J.L. and Kuchtey, R.W. (2011) Mutation in *ADAMTS10* in a Canine Model of Primary Open Angle Glaucoma. *PLoS Genetics* **7**(2): e1001306 [PMCID: 3040645](#)
26. Panosian, T.D., Nannemann, D.P., Watkins, G., Phelen, V.V., McDonald, W.H., Wadzinski, B., Bachmann, B.O., and **Iverson**, T.M. (2011) *Bacillus cereus* Phosphopentomutase is an Alkaline Phosphatase Family Member That Exhibits an Altered Entry Point into the Catalytic Cycle. *J. Biol. Chem.* **286**(10): 8043-8054. [PMCID: 3048691](#)
25. Tomasiak, T.M., Archuleta, T.L., Andréll, J., Luna-Chavez, C., Davis, T., Sarwar, M., Ham, A.J., McDonald, W.H., Yankovskaya, V., Stern, H.A., Johnston, J.N., Maklashina, E., Cecchini, G., and **Iverson**, T.M. (2011) Geometric Restraints Drive On- and Off-pathway Catalysis by the *Escherichia coli* Menaquinol:fumarate Reductase. *J. Biol. Chem.* **286**(4): 3047-3056. [PMCID: 3024798](#)
24. Pyburn, T., Bensing, B., Yankovskaya, V., Sullam, P.M., and **Iverson**, T.M. (2010) Purification, Crystallization, and Preliminary X-ray Diffraction Analysis of the Carbohydrate Binding Region of the *Streptococcus gordonii* Adhesin GspB. *Acta crystallogr.* **F66**(11): 1503-1507. [PMCID: 3001660](#)
23. Vey, J.L., Al-Mestarihi, A., Yunfeng, H., Funk, M.A., Bachmann, B.O., and **Iverson**, T.M. (2010) Structure and Mechanism of ORF36, an Amino Sugar Oxidizing Enzyme in Everninomicin Biosynthesis. *Biochemistry*. **49**(43): 9306-9317. [PMCID: 2964426](#)
22. Panosian, T.D., Nannemann, D.P., Bachmann, B.O., and **Iverson**, T.M. (2010) Crystallization and Preliminary X-ray Analysis of a Phosphopentomutase from *Bacillus cereus*. *Acta Crystallogr.* **F66**(7): 811-814. [PMCID: 2898468](#)
21. Tanabe, M., Nimigean, C.M. and **Iverson**, T.M. (2010) Structural Basis for Solute Transport, Nucleotide Regulation, and Immunological Recognition of *Neisseria meningitidis* PorB. *Proc. Natl. Acad. Sci. USA* **107**(15): 6811-6816. [PMCID: 2872391](#)
20. Thompson, A., Kim, I., Panosian, T.D., **Iverson**, T.M., Allen, T.W., and Nimigean, C.M. (2009) Mechanism of Potassium-Channel Selectivity Revealed by Na⁺ and Li⁺ Binding Sites within the KcsA Pore. *Nat. Struct. Molec. Biol.* **16**(12): 1317-1326. [PMCID: 2825899](#)
19. Tanabe, M. and **Iverson**, T.M. (2009) Expression, Purification and Preliminary X-ray Analysis of the *Neisseria meningitidis* Outer Membrane Protein PorB. *Acta Crystallogr.* **F65**(10): 996-1000. [PMCID: 2765884](#)
18. Adler, D.H., Phillips, J.A., Cogan, J.D., **Iverson**, T.M., Stein, J.A., Brenner, D.A., Morrow, J.D., Boutaud, O., and Oates, J.A. (2009) The Enteropathy of Prostaglandin Deficiency. *J. Gastroenterol.* **44**(Suppl 19): 1-7. [PMCID: 2799331](#)
17. Preininger, A.M., Funk, M.A., Oldham, W.M., Meier, S.M., Johnston, C.A., Adhikary, S., Siderovski, D.P., Hamm, H.E., and **Iverson**, T.M. (2009) Helix Dipole Movement and Conformational Variability Contribute to Allosteric GDP Release in G α_i Subunits. *Biochemistry* **48**(12): 2630-2642. [PMCID: 2736342](#)
16. Tomasiak, T.M., Maklashina, E., Cecchini, G., and **Iverson**, T.M. (2008) A Threonine on the Active Site Loop Controls Transition State Formation in *Escherichia coli* Respiratory Complex II. *J. Biol. Chem.* **283**(22): 15460-15468. [PMCID: 2397489](#)
15. Adler, D.H., Cogan, J.D., Phillips, J.A., Schnetz-Boutaud, N., **Iverson**, T.M., Stein, J.A., Brenner, D.A., Morrow, J.D., Boutaud, O., and Oates, J.A. (2008) Inherited Cytosolic Phospholipase A₂- α Deficiency Associated with

- Impaired Eicosanoid Biosynthesis, Small Intestinal Ulceration and Platelet Dysfunction. *J. Clin. Invest.* **118**: 2121-2131. [PMCID: 2350426](#)
14. **Iverson**, T.M. (2006) Evolution and Unique Bioenergetic Mechanisms in Oxygenic Photosynthesis. *Curr. Op. Chem. Biol.* **10**(2): 91-100.
 13. Maklashina E., **Iverson** T.M., Sher Y., Kotlyar V., Andréll J., Mirza O., Hudson J.M., Armstrong F.A., Rothery R.A., Weiner J.H., Cecchini G. (2006) Fumarate Reductase and Succinate Oxidase Activity of *Escherichia coli* Complex II Homologs are Perturbed Differently by Mutation of the Flavin Binding Domain. *J. Biol. Chem.* **281**(16): 11357-11365.
 12. Ferreira, K.N., **Iverson**, T.M., Maghaloui, K., Barber, J., and Iwata, S. (2004) Architecture of the Photosynthetic Oxygen-Evolving Center. *Science* **303**(5665): 1821-1838.
Highlighted: in the popular press, including CNN and MSNBC.
 11. Cecchini, G., Makalashina, E., Yankovskaya, V., **Iverson**, T.M., Iwata, S. (2003) Variation in Proton Donor/Acceptor Pathways in Complex II. *FEBS Lett.* **545**(1): 31-38.
 10. Doukov, T.I., **Iverson**, T.M., Seravalli, J., Ragsdale, S.W., and Drennan, C.L. (2002) A Ni-Fe-Cu Center in a Bifunctional Carbon Monoxide Dehydrogenase/Acetyl-CoA Synthase. *Science* **298**(5593): 567-572.
Perspectives in: Peters, J.W. (2002) A Trio of Transition Metals in Anaerobic CO₂ Fixation. *Science* **298**(5593) 552-553
 9. Iyer, R., **Iverson**, T.M., Accardi, A., Miller, C. (2002) A Biological Role for Prokaryotic ClC Chloride Channels. *Nature* **415**(6908): 715-718.
 8. **Iverson**, T.M., Luna-Chavez, C., Croal, L.R., Cecchini, G., and Rees, D. C. (2002) Crystallographic Studies of the *Escherichia coli* Quinol-Fumarate Reductase with Inhibitors Bound to the Quinol-Binding Sites. *J. Biol. Chem.* **277**(18): 16124-16130.
 7. **Iverson**, T. M., Arciero, D.M., Hooper, A.B., and Rees, D.C. (2001) High Resolution structures of the Oxidized and Reduced States of Cytochrome c554 from *Nitrosomonas europaea*. *J. Biol. Inorg. Chem.* **6**(4): 390-397.
 6. Strop, P., Smith, K.S., **Iverson**, T.M., Ferry, J.G., and Rees, D.C. (2001) Crystal Structure of the 'cab' Type Beta Carbonic Anhydrase from *Methanobacterium thermoautotrophicum*. *J. Biol. Chem.* **276**(13): 10299-10305.
 5. **Iverson**, T.M., Luna-Chavez, C., Cecchini, G., and Rees, D. C. (2000) Analyzing Your Complexes: Structure of the Quinol-Fumarate Reductase Respiratory Complex. *Curr. Op. Str. Biol.* **10**(4): 448-455.
 4. **Iverson**, T. M., Alber, B.E., Kisker, C., Ferry, J.G., and Rees, D.C. (2000) A Closer Look at the Active Site of γ -Class Carbonic Anhydrases: High-Resolution Crystallographic Studies of the Carbonic Anhydrase from *Methanosarcina thermophila*. *Biochemistry* **39**(31): 9222-9231.
 3. Luna-Chavez, C. **Iverson**, T.M., Rees, D.C., and Cecchini, G. (2000) Overexpression, Purification, and Crystallization of the Membrane-Bound Fumarate Reductase from *Escherichia coli*. *Protein Expression Pur.* **19**(1): 188-196.
 2. **Iverson**, T. M., Luna-Chavez, C., Cecchini, G., and Rees, D. C. (1999) Structure of the *Escherichia coli* Fumarate Reductase Respiratory Complex. *Science* **284**(5422): 1961-1966.
Perspectives in: Hederstedt, L. (1999) Respiration without O₂. **284**(5422) 1941-1942
 1. **Iverson**, T. M., Arciero, D. M., Hsu, B. T., Logan, M. S. P., Hooper, A. T., and Rees, D. C. (1998) Heme Packing Motifs Revealed by the Crystal Structure of the Tetra-heme Cytochrome c554 from *Nitrosomonas europaea*. *Nat. Struct. Biol.* **5**(11): 1005-1012.

(b) Manuscripts Submitted or In Revision

5. Bensing, BA, Li, L, Yakovenko, O, Wong, M, Barnard, KN, Iverson, TM, Lebrilla, CB, Parrish, CR, Thomas, WE, Xiong, Y, Sullam, PM. Recognition of specific sialoglycan structures by oral streptococci impacts the severity of endocardial infection (*PLoS Pathogens*, submitted).
4. Sammons, R, Perry, NA; Li, Y, Cho, E, Piserchio, A, Zamora-Olivares, D Ghose, R, Kaoud, T, Debevec, G, Bartholomeusz, C, Gurevich, VV, **Iverson**, TM, Giulianotti, MA.; Houghten, R, Dalby, KN A Novel Class of Common Docking Domain Inhibitors That Prevent ERK2 Activation and Substrate Phosphorylation (*ACS Chemical Biology*, submitted)
3. Berndt, S., Gurevich, V.V., **Iverson**, T.M. Crystal structure of the SH3 domain of human Lyn non-receptor tyrosine kinase (*PLoS ONE*, submitted).
2. Bensing, BA, Loukachevitch LV, Agarwal, R., Yamakawa, I., Luong, K., Hadadianpour, A., Yu, H, Fialkowski, K., Castro, M.A., Wawrzak, Z, Chen, X, Baudry, J., Smith, J.C., Sullam, PM, **Iverson**, TM. Selectivity and engineering of the sialoglycan-binding spectrum in Siglec-like adhesins (*Proc Natl Acad Sci USA*, in revision).
1. Limbrick, E., Derewacz, D., Spraggins, J., McCulloch, K.M., **Iverson**, T.M. Bachmann, B.O. Everninomicin biosynthetic pathway: functional analysis and synthetic diversification (*Chem Biochem*, in revision)

(c) Manuscripts in Preparation – details upon request

(d) Book Chapters & Invited Review Articles

14. Sharma, P., Maklashina, E., Cecchini, G., and **Iverson**, T.M. Maturation of the respiratory complex II flavoprotein. *Curr Op Struct Biol* (2019) in press.
13. Perry, N.A., Zhan, X., **Iverson**, T.M., Gurevich, E.V., and Gurevich, V.V. Using in vitro pull-down and in cell overexpression assays to study protein interactions with arrestins. In: *Methods in Molecular Biology*, S. Laport, Ed. Springer-Verlag, Berlin-Heidelberg (2019) in press.
12. Perry, N.A., Zhan, X., **Iverson**, T.M. and Gurevich, V.V. Monofunctional elements of multi-functional arrestin proteins. in Gurevich VV (ed) *Subcellular Biochemistry - Structural basis of arrestin functions*. Springer, New York (2017) Chapter 18, pp 255-272.
11. Starbird, C.A. Maklashina, E., Cecchini, G., and **Iverson**, T.M. Flavoenzymes: Covalent versus Noncovalent, in eLS. John Wiley & Sons, Ltd: Chichester. (2015) [doi: 10.1002/9780470015902.a002607](https://doi.org/10.1002/9780470015902.a002607)
10. Kaya, A.I., **Iverson**, T.M., and Hamm, H.E. Functional Stability of Rhodopsin in a Bicelle System: Evaluating G protein Activation by Rhodopsin in Bicelles, in Jastrzebk, B. (ed.) *Methods in Molecular Biology - Rhodopsin: Methods and Protocols*, Humana Press, New York, NY. (2015) Part III, Chapter 6, pp 77-95. [PMCID in process.](#)
9. Chen, Q., Vishnivetskiy, S.A. Zhuang, T., Cho, M. Thaker, T.M., Sanders, C.R., Gurevich, V.V., and **Iverson**, T.M. The Rhodopsin-Arrestin-1 Interaction in Bicelles, in Jastrzebk, B. (ed.) *Methods in Molecular Biology - Rhodopsin: Methods and Protocols*, Humana Press, New York, NY. (2015) Part III, Chapter 5, pp. 67-76. [PMCID 4520306](#)
8. Vishnivetskiy, S.A., Zhan, X., Chen, Q., **Iverson** T.M., Gurevich, V.V. (2014) Arrestin expression in *E. coli* and Purification. *Curr. Protoc. Pharmacol.* **67**:2.11.1-2.11.19. [PMCID 4260927](#)
7. Cecchini, G., Maklashina, E., and **Iverson**, T.M. Succinate dehydrogenase (Complex II) and fumarate reductase, in Hille, R., Miller, S., and Palfey, B. (eds.) *Handbook of Flavoproteins*, Walter de Gruyter, Berlin (2013) Vol 2, pp. 141-164.
6. Thaker, T.M., Kaya, A.I., Preininger, A.M., Hamm, H.E., and **Iverson**, T.M., Allosteric Mechanisms of G protein Coupled Receptor Signaling: A Structural Perspective, in A. Fenton (ed.) *Methods in Molecular Biology - Allostery: Methods and Protocols*, Humana Press, New York, NY. (2012) Part II, Chapter 8, pp. 133-174. [PMCID: 3549666](#)

5. Tanabe, M. and **Iverson**, T.M., A Practical Guide to X-ray Crystallography of β -barrel Membrane Proteins: Expression, Purification, Detergent Selection & Crystallization, in L. DeLucas (ed.) Current Topics in Membranes, Academic Press, San Diego, CA. (2009) Vol. 63, Chap. 10. pp. 229-267.
4. Cecchini, G., Maklashina, E., Tomasiak, T.M., and **Iverson** T.M., Conformational Changes at the Dicarboxylate Binding Site of Succinate Dehydrogenase (Complex II) and Fumarate Reductase, in S. Frago, C. Gómez-Moeno, and M. Medina (eds.) Flavins and Flavoproteins, Prensas Universitarias de Zaragoza (2008) pp. 17-26.
3. Tomasiak, T.M., Cecchini, G., and **Iverson**, T.M. Succinate as Donor; Fumarate as Acceptor, in A. Böck, R. Curtiss III, J. B. Kaper, F. C. Neidhardt, T. Nyström, J. M. Schlauch, and C. L. Squires (ed.), EcoSal—*Escherichia coli* and *Salmonella*: cellular and molecular biology. <http://www.ecosal.org>. ASM Press, Washington, D.C. (2007) 13 August 2007, posting date, Chapter 3.2.6.
2. Kisker, C. and **Iverson**, T.M., γ -Class Carbonic Anhydrases, in K. Wieghardt, R. Huber, T. L. Poulos, and A. Messerschmidt (eds.) Handbook of Metalloproteins, John Wiley & Sons Ltd., London (2004) Vol. 3 pp. 270-282.
1. **Iverson**, T.M., Hendrich, M.P., Arciero, D.M., Hooper, A.B., and Rees, D.C., Cytochrome c554, in K. Wieghardt, R. Huber, T. L. Poulos, and A. Messerschmidt (eds.) Handbook of Metalloproteins, John Wiley & Sons Ltd., London (2001) pp. 136-146.

INVENTIONS

2009 β -mem sparse matrix screening kit for β -barrel membrane proteins

EXTRAMURAL RESEARCH SUPPORT

(a) Ongoing Extramural Research Support

5. R01DE019807 Ruhl (PI) 07/01/2018–06/30/22
 NIH/NIDCR \$50,000 direct/year (Iverson lab)
Microbial Recognition of Sialic Acid Diversity in the Oral Cavity
 This application investigates how bacterial adhesins differentiate between two forms of sialic acid: Neu5Ac and Neu5Gc. The role of the Iverson laboratory is to determine structures of select adhesins alone and in complex with sialic acid ligands in order to reveal the molecular basis for this difference.
 Role: co-Investigator/Collaborator
4. R01GM120569 Iverson (PI) 08/01/16-06/30/20
 NIH/NIGMS \$197,500 direct/year
Molecular basis for arrestin-mediated signaling
 This application evaluates receptor-independent arrestin signaling from a structural perspective. Aim 1 identifies how the active form of arrestin is stabilized during receptor-independent signaling. Aim 2 identifies the allosteric connections between the activation sites and the effector-binding sites. Aim 3 determines structure with effectors or effector peptides.
3. R01 AI106987 Sullam, Iverson, Thomas (mPI) 07/01/14–06/30/19
 NIH/NIAID \$400,000 direct/year (\$111,287 Iverson lab)
Receptor Binding Promiscuity in Serine-Rich Repeat Adhesins
 The experiments detailed in this application will evaluate the molecular basis for promiscuous binding of the unique domain of serine-rich repeat adhesins of Gram-positive bacteria and will relate binding promiscuity to virulence in rat models of endocarditis. Aim 1 will explore the structural basis for substrate affinity and selectivity in three adhesins, GspB, Hsa, and SrpA. Aim 2 will investigate the role of force dependent bonds in the pathogen-host interaction. Aim 3 will test the role of both selectivity and force-dependence in virulence.
2. R21 DA043680 Iverson, Gurevich (corresponding mPI) 04/01/17–03/31/19
 NIH/NIDA \$125,000 direct/year
Mechanisms of signal bias in arrestins

This R21 application develops peptide tools and chimeric proteins to assess how the receptor-arrestin interaction biases signaling toward cell proliferation or cell death.

1. R01 GM061606 Iverson, Cecchini (mPI) 04/01/01–12/31/22
NIH/NIGMS \$459,216 direct/year (\$185,587 Iverson lab)
Structure/function of Complex II oxidoreductases
This is a renewal application that investigates mechanisms of complex II assembly, cofactor insertion and attachment, and physiological changes during ischemia reperfusion injury. GM079419 (see completed support) was merged with this grant in 2013.
SUPPLEMENT: PA-15-322. Research Supplements to Promote Diversity in Health-Related Research
\$35,564 direct/year (Iverson lab) 07/01/16-03/31/18
SUPPLEMENT: PA-16-134. Supplements for Cryo-Electron Microscopy Technology Transfer
\$89,071 direct/year (Iverson lab) 07/01/16-03/31/18

(b) Completed Extramural Research Support

13. 14GRNT20390021 Iverson (PI) 07/01/14-06/30/16
American Heart Association \$75,000 direct/year
Molecular basis for streptococcal platelet attachment mediated by phage lysin
This AHA application evaluates the molecular basis for conversion of commensal *Streptococcus mitis* to a pathogen by bacteriophage SM1 proteins. Aim 1 uses a mutagenesis approach to delineate the binding site while Aim 2 uses a structural approach.
12. 1R01 GM095633 Iverson (PI) 09/01/10–08/30/14
NIH/NIGMS/Roadmap \$192,376 direct/year
Stabilization of Membrane Protein Signaling Complexes
This application is in response to RFA-RM-09-012 for membrane protein production and structure determination. The goal of the proposal is to identify mimics of the biological membrane that stabilize transmembrane signaling complexes and are amenable to current structural techniques.
11. 12GRNT11920011 Iverson (PI) 07/01/12–06/30/14
American Heart Association \$75,000 direct/year
Structural Basis for Orthoester Bond Formation in Everninomicin
This application has two aims that focuses on the orthoester linkages of everninomicin. The goal of this research is to determine the structure and substrate selectivity of (Aim 1) ORF18 and (Aim 2) ORF26 products of the everninomicin gene cluster.
10. 1R01 GM079419 (renewed as GM06106) Iverson (PI) 04/01/07–02/28/13
NIH/NIGMS \$171,600 direct/year
Complexities of Complex II: A Versatile Architecture for Respiration
The goal of this project is to look at the physiological function of complex II. Details of the catalytic mechanism and its inhibition are investigated. The aims of the proposal are to 1) identify the chemical details of dicarboxylate oxidoreduction, which we will do by stabilization and crystallization of the complex in various states of catalysis; 2) establish how conformational rearrangements correlate with catalytic activity, which we will do by EPR; and 3) determine the selectivity of quinone inhibitors and their effects of reactive oxygen species generation.
9. 1R21AI079558 Iverson (PI) 09/01/10–08/30/12
NIH/NIAID \$150,000 direct/year
The Interaction Between Outer Membrane Porins and Toll-Like Receptors
The aims of this proposal are to: 1) Identify the structure of the TLR2-PorB complex using electron microscopy; 2) Investigate the contribution of electrostatics to complex formation; and 3) Identify additional combinations of TLRs that bind to OMPs *in vitro*.
8. 1R21EY018435 Iverson (PI) 10/01/09–09/30/11
NIH/NEI \$125,000 direct/year
Transition States in G Protein Coupled Receptor Signaling

The aims of this proposal were to use 1) cross-linking of the rhodopsin-transducin complex and 2) mutagenesis of the $G\alpha_i$ subunit (in the context of a $G\alpha_i\beta_1\gamma_1$ artificial heterotrimer) to stabilize the rhodopsin-transducin complex.

7. 09GRNT2220122 Iverson (PI) 07/01/09–06/30/11
 American Heart Association \$75,000 direct/year
The Molecular Basis for Platelet Attachment by Streptococcal Adhesins
 The goal of this research was to determine the molecular basis for carbohydrate selectivity for the serine-rich adhesin GspB from *Streptococcus gordonii*. The aims of the proposal were to: 1) map the precise carbohydrate-binding site by site-directed mutagenesis, 2) determine the x-ray crystal structure of GspB_{BR} alone and in complex with receptor carbohydrate.
6. S10RR026915 Iverson (PI) 07/01/10–06/30/11
 NIH/NCRR \$490,000 direct/year
Crystallographic Automation
 The goal of this proposal was to provide funds to expand the crystallographic automation into newly available robotics specific to membrane proteins as well as to improve the opportunities for outreach and collaboration across the campus.
5. 1R01 GM081816 Sanders (PI) 10/01/07–09/30/10
 NIH/NIGMS/Roadmap \$212,000 direct/year
Overcoming the Barrier to Structural Analysis of GPCRs
 This application was in response to an RFA. The goal of this research was to develop techniques to improve the determination of membrane protein structures and focuses on ligand-activated G protein coupled receptors.
 Role: co-PI
4. AG-NS-0325-06 Iverson (PI) 07/01/06–07/01/10
 The Ellison Medical Foundation \$46,296 direct/year
The Molecular Contribution of Mitochondrial Complex II to the Aging Process
 We wanted to look at ROS formation by complex II
3. 30652 Iverson (PI) 07/01/08–06/30/10
 NARSAD \$30,000 direct/year
Allosteric Nucleotide Exchange in $G\alpha_{i1}$
 The goal of the research was to characterize transition states in G-protein mediated signaling.
2. Research Grant Iverson (PI) 01/01/06–12/31/07
 Epilepsy Foundation \$50,000 direct/year
Fighting Against the Cause: The HCN Channel and Structure-Based Drug Design
 The goal of this study was to determine the structure of a cyclic nucleotide gated cation channel.
1. F32 GM06834-01 Iverson (postdoctoral) 07/10/03–01/09/05
 NIH/NIGMS Ruth L. Kirschstein National Research Service Award
Molecular Mechanisms of Transport by MFS Proteins
 I proposed to determine the structure of a major facilitator superfamily transporter using x-ray crystallography.

(c) Trainee Extramural Fellowships

6. 19POST34450093 P. Sharma (postdoctoral) 01/01/19 – 12/31/20
 American Heart Association
Role of assembly factors in maturation of the catalytic subunit of human respiratory complex II
 Role: Mentor
5. 18PRE34030017 N.A. Perry (predoctoral) 07/01/18 – 06/30/19
 American Heart Association
Arrestin-interaction with the ASK1-MKK4/7-JNK3 cascade
 Role: Mentor
4. 16PRE30180007 N.A. Perry (predoctoral) 07/01/16 – 06/30/18
 American Heart Association

Arrestin-3 scaffolding of the JNK3 activation cascade as a model of arrestin-dependent signaling

Role: Mentor

- | | | | |
|----|--|-----------------------------|---------------------|
| 3. | DGE:0909667
National Science Foundation
<i>Mechanisms of covalent flavinylation in complex II</i>
Role: Mentor | C.A. Starbird (predoctoral) | 09/01/13 – 05/30/16 |
| 2. | 13POST16910057
American Heart Association
<i>Mechanisms of basal activity in the prostaglandin EP₃ receptor</i>
Role: Mentor | N.C. Gilbert (postdoctoral) | 07/01/13 – 06/30/15 |
| 1. | Individual fellowship
Uehara Medical Foundation
<i>[Innate immunity and Toll like receptors] (Japanese)</i>
Role: Mentor | M. Tanabe (postdoctoral) | 01/01/06 – 12/31/07 |

(d) Mentored Training Grant Support

- | | | | |
|----|--|-------------------------------|---------------------|
| 9. | 5T32GM008320-35
National Institutes of Health
<i>Molecular Biophysics Training Grant</i>
Role: Mentor | H. Stubbs (predoctoral) | 07/01/18 – 06/30/20 |
| 8. | 2T32GM007628-36
National Institutes of Health
<i>Training Program in Pharmacological Sciences</i>
Role: Mentor | N.A. Perry (predoctoral) | 07/01/15 – 06/30/16 |
| 7. | 5T32HL007751-19
National Institutes of Health
<i>Training Grant in Mechanism of Vascular Disease</i>
Role: Mentor | K.M. McCulloch (postdoctoral) | 06/01/12 – 05/31/15 |
| 6. | 5T32GM008320-30
National Institutes of Health
<i>Molecular Biophysics Training Grant</i>
Role: Mentor | C.A. Starbird (predoctoral) | 06/01/12 – 05/31/13 |
| 5. | 5T32DK007569-23
National Institutes of Health
<i>Renal Biology and Disease Training Program</i>
Role: Mentor | N.C. Gilbert (postdoctoral) | 01/01/12 – 12/31/13 |
| 4. | 5T32GM008320-30
National Institutes of Health
<i>Molecular Biophysics Training Grant</i>
Role: Mentor | K. R. Vann (predoctoral) | 06/01/11 – 05/31/13 |
| 3. | 5T32GM008320-25
National Institutes of Health
<i>Molecular Biophysics Training Grant</i>
Role: Mentor | T.M. Panosian (predoctoral) | 06/01/07 – 05/31/08 |
| 2. | 5T32NS007491-13
National Institutes of Health
<i>Training Program in Ion Channel and Transporter Biology</i>
Role: Mentor | T.M. Panosian (predoctoral) | 06/01/06 – 05/31/07 |
| 1. | 5T32GM065086-1 | T.M. Tomasiak (predoctoral) | 06/01/05 – 05/31/07 |

	NIH Study section ZGM1 CBB-0–Consortia for High-throughput Enabled Structural Biology Partnerships (PSI: Biology)
	NIH study section ZRG1 BCMB-D - Biological Chemistry and Macromolecular Biophysics NSF Division of Molecular and Cellular Biosciences
2009 – 2010	NIH Study section ZGM1 CBB-0–Consortia for High-throughput Enabled Structural Biology Partnerships (PSI: Biology)
2008 – 2009	North Carolina Biotechnology Institute Development Grants
2004 – 2005	EMBO Grants

External PhD Thesis Examiner

2011 Quang Minh Tran, University of Alberta, Alberta, Canada

(b) National and RegionalExternal Letters for Tenure and Promotion

2018	University of California, San Francisco, Department of Medicine
2017	University of California, San Francisco, Department of Medicine
2014	Northwestern University, Department of Molecular Biosciences

Presentations

2007 – 2009 Tennessee Women In Science, Technology, Engineering, and Research (TWISTER) program for high school girls (15-18). Adventure Science Center, Nashville, TN

(c) Intramural**(i) University leadership positions**

2006 – present	Founder and Scientific Director, High-throughput biomolecular crystallization facility (CSB)
2012 – 2016	Scientific Director, X-ray Crystallography (CSB)

(ii) University committees

2016 – 2018	Vanderbilt University Research Council (VURC; Provost's office)
2015 – 2016	Biomedical Sciences Committee (Chancellor's office)
2015	Reviewer, Vanderbilt Transinstitutional Proposals (TIPs) initiative
2015 – 2016	Vanderbilt International Scholars Program advisory committee

(iii) Departmental and Center Committees

2014 – present	Molecular Biophysics Training Program Recruiting committee (CSB)
2013 – present	Pharmacology Training Advisory Group (Pharmacology)
2006 – present	Chemical Biology Interface Training Grant Executive Committee (CBI/VICB)
2016 – 2016	Phase I qualifying examination committee (Pharmacology)
2006 – 2014	Center for Structural Biology Executive Committee (CSB)
2009 – 2013	Chair, Karpay Award Committee (CSB)
2009 – 2011	Phase I qualifying examination committee (Pharmacology)
2011	Chemistry Faculty Search Committee in Chemical Biology (Chemistry)
2009 – 2010	Biochemistry Faculty Search Committee in DNA Repair (Biochemistry)
2007 – 2008	Molecular Biophysics Training Grant Seminar coordinator (CSB)
2006 – 2007	Liaison to the Pharmacology Graduate Student Association (Pharmacology)

(iv) Graduate Student Thesis Committees

Years	Student	Department	PI	Degree	Chair?
26. 2018 –	Michael Doyle	PMI	Jim Crowe		
25. 2018 –	Nicole Kendrick	Biochemistry	Adrian Olivares		
24. 2018 –	Manuel Castro	Biochemistry	Chuck Sanders		
23. 2017 –	Corey Seacrist	Pharmacology	Ray Blind		Yes
22. 2017 –	Kelsey Pilewski	PMI	Ivelin Georgiev		
21. 2017 –	Diego de Alamo	Chem & Phys Biol	Jens Meiler		Yes

20.	2016 –	Zach Lonergan	PMI	Eric Skaar		
19.	2015 – 2018	Brian Bender	Pharmacology	Jens Meiler		
18.	2014 – 2017	Erin Breland	Pharmacology	Maria Hadjifrangiskou	PhD, 2017	Yes
17.	2014 – 2017	Cassie Retzlaff	Neuroscience	Randy Blakely	PhD, 2017	
16.	2012 – 2015	Emilianne McCranie	Chemistry	Brian Bachmann	Ph.D. 2015	
15.	2012 – 2015	Kathleen Mittendorf	Biochemistry	Chuck Sanders	Ph.D. 2015	
14.	2011 – 2014	Cierra Spencer	Pharmacology	Alex Brown	Ph.D. 2014	Yes
13.	2010 – 2013	William Birmingham	Biochemistry	Brian Bachmann	Ph.D. 2013	
12.	2010 – 2014	Tara Archuleta	Chem. & Phys. Biol.	Ben Spiller	Ph.D. 2014	Yes
11.	2010 – 2014	Robert Lavieri	Pharmacology	Alex Brown	Ph.D. 2014	Yes
10.	2009 – 2009	Kelli Richardson	Pathology	Paul Bock	M.S. 2009	
9.	2008 – 2012	Ahmad Al-Mestarihi	Chemistry	Brian Bachmann	Ph.D. 2012	
8.	2008 – 2009	Kevin Oliver	Chemistry	Gary Sulikowski	M.S. 2009	
7.	2008 – 2012	Nathan Alexander	Chemistry	Jens Meiler	Ph.D. 2012	
6.	2007 – 2010	Yuxiang Zheng	Pharmacology	Alan Brash	Ph.D. 2010	Yes
5.	2007 – 2010	Scott Meier	Masters Lab. Invest.	Heidi Hamm	MS. 2010	
4.	2007 – 2011	Paige E. Selvy	Pharmacology	Alex Brown	Ph.D. 2011	
3.	2006 – 2009	Juan Xing	Pharmacology	Kevin Strange	Ph.D. 2009	
2.	2006 – 2011	Kyle Nordquist	Biochemistry	Walter Chazin	Ph.D. 2011	
1.	2005 – 2009	Anne Karpay	Biochemistry	Chuck Sanders	Ph.D. 2009	

(v) Other Departmental and Center Service

2008 – 2009	Co-organizer, Karpay Memorial Symposium (CSB)
2005 – 2006	Pharmacology students club faculty liaison (Pharmacology)
2005 – 2006	Interface with several robotics companies to develop a strategic partnership (CSB)

(vi) Other University Service

June 2, 2009	Small Group Discussion Leader: "Preparing Research Team Leaders." Directed a discussion of laboratory-oriented case studies (BRET)
Sept. 11, 2012	Responsible Conduct in Research "A discussion of responsible authorship". Co-moderated with Melanie Ohi (CSB)

CONSULTING

2017 –	<i>DeNovX company</i>
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TEACHING

(a) Graduate School Courses

2015 – present	IGB300B	Membrane Protein Structure & Function	1 contact hour	Developed section
2014 – present	PHR332B	Scientific Communications II (Reader)	2 contact hours	
2011 – present	IGP300B	Enzyme Kinetics & Receptor Theory	6 contact hours	Developed section.
2007 – 2011	PHR322A	Scientific Communications	46 contact hours	
2006 – 2010	PHR324	Receptor Theory & Signal Transduction	8 contact hours	Developed section.
2006 – 2007	BCHM303	Biomolecular x-ray crystallography	6 contact hours	Developed section.

(b) Journal Club Supervision

2014 – 2016		Pharmacology Journal Club	20 contact hours
2006 – present	BCHM349	Structural Biology Journal Club	2 contact hours
2006, -08, -09		IGP Flex time	4 contact hours

(c) Training and Supervision of Laboratory Personnel

(i) High School students

The Iverson laboratory has hosted 3 high school researchers. Details upon request.

(ii) Undergraduates

The Iverson laboratory has hosted 18 undergraduate researchers. Most have gone on graduate school or medical school. One is currently an associate editor at *Science*. Details upon request.

(iii) Staff

Dates	Staff	Position	Subsequent position
3. 2017 –	Prashant Singh	Laboratory Manager	
7. 2014 –	Izumi Yamakawa.	Research Assistant I	
6. 2014 –	Liouda Loukachevitch	Laboratory Manager	
5. 2011 – 2014	Maruf Sarwar	Research Assistant I	Med Schl, Georgetown
4. 2010 – 2013	Beth Thorneycroft	Research Assistant II	NashTrash manager
3. 2009 – 2013	Prashant Singh	Research Assistant I	Facilities manager, CSB
2. 2005 – 2011	Tasia Pyburn	Research Assistant I-III	Grad school, Vanderbilt
1. 2005 – 2005	Richard Kephart	Research Assistant I	

(iv) Rotation Students

Dates	Student	Program
37. Winter 2018	Melaine Sebastian	Interdisciplinary Graduate Program, Vanderbilt University
36. Fall 2017	Katherine Amidon	Interdisciplinary Graduate Program, Vanderbilt University
34. Winter 2017	Kelvin Luong	Interdisciplinary Graduate Program, Vanderbilt University
33. Winter 2017	Manuel (Mac) Castro	Interdisciplinary Graduate Program, Vanderbilt University
32. Fall 2016	Azadeh Hadidanpour	Interdisciplinary Graduate Program, Vanderbilt University
31. Fall 2016	Nicole Kendrick	Interdisciplinary Graduate Program, Vanderbilt University
30. Winter 2015	David Marcus	Interdisciplinary Graduate Program, Vanderbilt University
29. Fall 2014	Susan Qualls	Interdisciplinary Graduate Program, Vanderbilt University
28. Fall 2014	Bryan Gitschlag	Interdisciplinary Graduate Program, Vanderbilt University
27. Spring 2014	Nora Foegeding	Interdisciplinary Graduate Program, Vanderbilt University
26. Winter 2012	Andrea Belovich	Interdisciplinary Graduate Program, Vanderbilt University
25. Fall 2011	Dennis Kuo	Chemical & Physical Biology, Vanderbilt University
24. Winter 2011	Shalanda Satchell	Pharmacology direct admit, VUMC
23. Winter 2010	Rebecca McRae	Interdisciplinary Graduate Program, Vanderbilt University
22. Fall 2010	Kathleen Mittendorf	Interdisciplinary Graduate Program, Vanderbilt University
21. Spring 2010	Allyson McLeod	Interdisciplinary Graduate Program, Vanderbilt University
20. Winter 2010	Qi Sun	Interdisciplinary Graduate Program, Vanderbilt University
19. Winter 2009	Dan Goetheus	Interdisciplinary Graduate Program, Vanderbilt University
18. Fall 2009	Nicholas Ward	Interdisciplinary Graduate Program, Vanderbilt University
17. Spring 2009	Odaine Gordon	Initiative for Minority Student Diversity, Vanderbilt University
16. Winter 2009	Tara Archuleta	Interdisciplinary Graduate Program, Vanderbilt University
15. Fall 2008	Scott Collier	Chemical & Physical Biology, Vanderbilt University
14. Fall 2007	Suraj Adhikary	Interdisciplinary Graduate Program, Vanderbilt University
13. Summ 2007	Chris Cummings	Interdisciplinary Graduate Program, Vanderbilt University
12. Winter 2007	Don Becker	Chemical & Physical Biology, Vanderbilt University
11. Winter 2007	Chris Browne	Interdisciplinary Graduate Program, Vanderbilt University
10. Fall 2006	Rhonda Richmond	Chemical & Physical Biology, Vanderbilt University
9. Fall 2006	Kelsey Duggan	Interdisciplinary Graduate Program, Vanderbilt University
8. Summ 2005	Heidi Wenger	Chemical & Physical Biology, Vanderbilt University
7. Spring 2005	Matthew Mazalouskas	Interdisciplinary Graduate Program, Vanderbilt University
6. Fall 2003	Karim Maghlaoui	Biochemistry, Imperial College, London
5. Winter 2002	Tim Vogels	Neurobiology, Brandeis University
4. Fall 2001	James Foti	Molecular and Cell Biology, Brandeis University
3. Fall 2000	Eun Jung Choi	Biology, California Institute of Technology
2. Fall 1999	Laura R. Croal	Biochemistry, California Institute of Technology

1. Spring 1999 Anthony Gianetti Biochemistry, California Institute of Technology

(v) MD Students

Dates	Student	University
1. Summ 2009	Gabriel Valle	Case Western Reserve University

(vi) PhD Students

Dates	Student	Department	Degree
8. 2018 –	Haley E. Stubbs	Chem & Phys Biol, Vanderbilt University	
7. 2015 –	Nicole A. Perry	Pharmacology, Vanderbilt University	
6. 2012 – 2017	Chrystal A. Starbird	Chem & Phys Biol, Vanderbilt University	PhD Jul 17, 2017 Current position: Postdoctoral associate with Katherine Ferguson, Yale.
5. 2011 – 2016	Qiuyan Chen	Pharmacology, Vanderbilt University	PhD Oct. 1, 2015 Current position: Postdoctoral associate with John Tesmer, Purdue.
4. 2010 – 2013	Kendra Vann	Biochemistry, Vanderbilt University	PhD Mar 11, 2016 Subsequent position: Graduate studies in Neil Osherhoff laboratory. Current position: Postdoctoral associate University of Texas, Southwestern
3. 2008 – 2013	Tarjani M. Thaker	Biochemistry, Vanderbilt University	PhD Aug. 23, 2013 Subsequent position: Postdoctoral associate with Natalia Jura, UCSF. Current position: University of Arizona, Tucson, AZ
2. 2006 – 2011	Timothy D. Panosian	Pharmacology, Vanderbilt University	PhD Nov. 12, 2010 Subsequent position: Research scientist, Monsanto Company, St. Louis, MO. Current position: Engagement manager, CiBO Technologies, MA.
1. 2005 – 2010	Thomas M. Tomasiak	Pharmacology, Vanderbilt University	PhD Nov. 23, 2010 Subsequent position: Postdoctoral associate with Robert Stroud, UCSF. Current position: Assistant Professor (tenure-track), University of Arizona, Tucson, AZ.

(vii) Postdoctoral Associates

Dates	Postdoc	Degree & Institution
9. 2016 –	Pankaj Sharma	PhD, 2015, Institute of Microbial Technology, Chandigarh, India
8. 2015 –	Sandra Berndt	PhD, 2013, University of Leipzig
7. 2010 – 2016	Kathryn McCulloch	PhD, 2010, Cornell University Current position: Assistant Professor (tenure-track), Department of Chemistry & Biochemistry, California State Polytechnic University, Pomona, CA.
6. 2012 – 2015	Nathan Gilbert	Ph.D., 2011, Louisiana State University Subsequent position: Applied Research Scientist, Molecular Sensing, Inc., Nashville, TN Current position: X-ray facilities manager, Louisiana State University
5. 2011 – 2012	Seoungmin Bong	Ph.D., 2011, Korea University Subsequent position: Postdoctoral researcher, South Korea.
4. 2008 – 2011	Jessica L. Vey	PhD, 2007, MIT Subsequent position: Assistant professor, Department of Chemistry & Biochemistry, California State University, Northridge (Northridge, CA). Current position: Associate professor (with tenure), Department of Chemistry & Biochemistry, California State University, Northridge (Northridge, CA).
3. 2009 – 2010	César Luna-Chavez	PhD 2006, UIUC Subsequent position: Postdoctoral researcher, Vanderbilt Current position: Staff scientist, Arizona State University, Phoenix, AZ.
2. 2006 – 2009	Mikio Tanabe	PhD, 2006, Imperial College, London Subsequent position: Junior group leader HaloMEM, Martin Luther Universität, Institut für Biochemie und Biotechnologie, Halle (Saale) Germany. Current position: Associate Professor, Institute of Materials Structure Science, KEK Photon Factory, Japan.
1. 2005 – 2006	Yi-Lun Lin	PhD, 2006, UIUC

Subsequent position: Postdoctoral researcher, Vanderbilt

(vii) Research faculty

Dates	Faculty, Title	Degree & Institution
1. 2017 –	Ali Kaya, Research Asst Prof.	PhD, 2009, Ankara University Biotechnology Institute

INVITED PRESENTATIONS

***32 of these 74 invited presentations were at international conferences or universities.**

74. Nov. 12, 2018 Structure and assembly of complex II: new insights on an ancient respiratory enzyme, Department of Biochemistry and Molecular Biology, Eberly College of Science, Pennsylvania State University, College Park, PA. (invited)
73. June 18, 2018 Engineering the sialoglycan-binding spectrum in serine-rich repeat adhesins, FASEB meeting in Microbial Glycobiology, Scottsdale, AZ
72. May 16, 2018 Arrestin-dependent signaling: a matter of life and death. Department of Pharmacology. Case Western University, Cleveland, OH.
71. Nov. 14, 2017 Understanding how proteins encode information: a matter of life and death. Biochemistry and Molecular Biology, Belmont University, Nashville, TN.
70. April, 4 2017 Identifying new interaction partners for an ancient respiratory protein. Redox biology center. University of Nebraska, Lincoln, NE.
69. Mar 3, 2017 Protein conformations in arrestin-dependent signaling: a matter of life and death. Department of Chemistry. Tennessee Tech University, Cookeville, TN.
68. Feb. 21, 2017 Protein conformations in arrestin-dependent signaling: a matter of life and death. Department of Chemistry and Biochemistry. University of Arizona, Tucson, AZ.
67. Aug. 12, 2015 Understanding the role of arrestin in G protein coupled receptor signaling. Department of Pharmaceutical and Biomedical Sciences. University of Georgia, Athens, GA.
66. May 4, 2014 Membrane Protein Structures are Getting a Little More Complex. NIH Roadmap meeting "Biomolecular Structure, Dynamics, and Function: Membrane Proteins." Nashville, TN.
65. May 3, 2014 Structure-Facilitated Bioengineering of Antivirals and Antibiotics to Combat Global Health Threats. **Keynote Speaker.** New York American Chemical Society Undergraduate Research Symposium. Queens, NY.
64. May 2, 2014 Time Management and Strategies for Work-Life Balance: Applying the Theory of Marginal Gains to the Particular Challenges of Women in Science. St. John's University Women in Science Society. Queens, NY.
63. Oct. 19, 2012 Mechanisms of Pathogen-Host Recognition. Rees Group Alumni Symposium, California Institution of Technology, Pasadena, CA.
62. Oct 28, 2011 Structure- and Biochemistry-Based Identification of Drug Targets: Case Studies of Pathogen-Host Interactions. Department of Pharmacy, Lipscomb University, Nashville, TN.

61. Jul 26, 2011 The Outer Membrane Protein PorB from *Neisseria meningitidis*: from Structure to Function to Disease. Department of Biochemistry, University of Alberta, Alberta, Canada.
60. Mar 8, 2011 The Outer Membrane Protein PorB from *Neisseria meningitidis*: from Structure to Function to Disease. **Symposium:** "25 Years of Membrane Protein Structure." Biophysical Society Annual Meeting, Baltimore, MD.
59. Feb 25, 2011 An Engineered Biosynthetic Pathway for the Production of the HIV-I Reverse Transcriptase Inhibitor Didanosine. Department of Chemistry and Biochemistry, Arizona State University, Tempe, AZ.
58. Jun 7, 2010 The Outer Membrane Protein PorB from *Neisseria meningitidis*: from Structure to Function to Disease. Department of Physiology, Biophysics, and Systems Biology (PBSB), Weill Cornell Medical College, NY, NY.
57. May 10, 2010 The Outer Membrane Protein PorB from *Neisseria meningitidis*: from Structure to Function to Disease. Joint Seminar, Center for Women's Infectious Disease Research and Center for the Investigation of Membrane Excitability Disorders, Washington University in St. Louis School of Medicine, St. Louis, MO.
56. Apr 21, 2010 The Outer Membrane Protein PorB from *Neisseria meningitidis*: from Structure to Function to Disease. Department of Biochemistry & Biophysics, School of Medicine & Dentistry, University of Rochester, Rochester, NY.
55. Mar 23, 2010 Methods in β -barrel Membrane Protein Crystallization and the Structure of PorB from *Neisseria meningitidis*. BIT Life Sciences 3rd Annual Protein and Peptide Conference, March 21 - 23, 2010, Beijing, China.
54. Mar 20, 2010 The Outer Membrane Protein PorB from *Neisseria meningitidis*: from Structure to Function to Disease. School of Life Sciences, University of Science and Technology of China (USTC), Hefei, Anhui province, China.
53. Mar 19, 2010 The Outer Membrane Protein PorB from *Neisseria meningitidis*: from Structure to Function to Disease. School of Life Sciences, Nankai University, Tianjin, China.
52. Mar 18, 2010 The Outer Membrane Protein PorB from *Neisseria meningitidis*: from Structure to Function to Disease. Institute of Biophysics, Chinese Academy of Sciences, Beijing, China.
51. Mar 17, 2010 The Outer Membrane Protein PorB from *Neisseria meningitidis*: from Structure to Function to Disease. School of Life Sciences, Tsinghua University, Beijing, China.
50. Mar 8, 2010 The Outer Membrane Protein PorB from *Neisseria meningitidis*: from Structure to Function to Disease. Immune Disease Institute, Children's Hospital, Boston, and Department of Biochemistry and Molecular Pharmacology, Harvard Medical School, Boston, MA.
49. Apr 27, 2009 The Outer Membrane Protein PorB from *Neisseria meningitidis*: from Structure to Function to Disease. Department of Chemistry, Massachusetts Institute of Technology, Cambridge, MA.
48. Apr 19, 2009 Structural Studies of the *Neisseria meningitidis* PorB and the Mechanism of Recognition by Toll-like Receptor 2. American Society for Biochemistry and Molecular Biology. New Orleans, LA.
47. Apr 8, 2009 The Outer Membrane Protein PorB from *Neisseria meningitidis*: from Structure to Function to Disease. Department of Molecular Medicine. Cornell University, Ithaca, NY.

46. Mar 27, 2009 Methods in OMP Crystallization and the Structure of PorB from *Neisseria meningitidis*. NIH Roadmap meeting for High Resolution Structures of Membrane Proteins. University of California, San Francisco, UCSF Mission Bay Conference Center, San Francisco, CA.
45. Feb 2, 2009 Complexities in Complex II: A Versatile Architecture for Respiration. Center for Structural Biology, Wake Forest University, Wake Forest, NC.
44. May 23, 2008 Methods in Membrane Protein Crystallography: from Choice of Target to Refinement. Department of Chemical and Environmental Sciences, Membrane Structural Biology Group, University of Limerick, Limerick, Ireland.
43. Mar 14, 2008 Shedding Light on Photosynthesis with the Structure of Photosystem II. 4th Annual Research Initiative for Scientific Enhancement, University of Puerto Rico, Rio Piedres Campus, San Juan, PR.
42. May 11, 2007 Shedding Light on Photosynthesis with the Structure of Photosystem II. Department of Biochemistry, Ohio State University, Columbus, OH.
41. Aug 1, 2006 Methods in Membrane Protein Crystallography: from Choice of Target to Refinement. Glaxo Smith Klein, Research Triangle Park, NC.
40. Aug 1, 2006 Domain Motions in Membrane Proteins: the Case of the *E. coli* Quinol-Fumarate Reductase. Glaxo Smith Klein, Research Triangle Park, NC.
39. May 9, 2006 Domain Motions in Membrane Proteins: the Case of the *E. coli* Quinol-Fumarate Reductase. Membrane Protein Interest Group. National Institutes of Health, Bethesda, MD.
38. May 2, 2005 Shedding Light on Photosynthesis with the Structure of Photosystem II. Membrane Proteins: Folding, Assembly and Function. VIth European Symposium of the Protein Society, Barcelona, Spain.
37. May 3, 2005 Shedding Light on Photosynthesis with the Structure of Photosystem II. Parc Scientific de Barcelona, Universidad de Barcelona, Barcelona, Spain.
36. Feb 16, 2005 Shedding Light on Photosynthesis with the Structure of Photosystem II. Joint seminar, Departments of Biology and Chemistry, St. John's University, Jamaica, NY.
35. Nov 4, 2004 Structure-function Relationships in Bioenergetic Membrane Proteins. Biosciences Division, Argonne National Laboratory, Argonne, IL.
34. Sep 20, 2004 Shedding Light on Photosynthesis with the Structure of Photosystem II. Department of Chemistry, Massachusetts Institute of Technology, Cambridge, MA.
33. Aug 31, 2004 Determination of the Structures of Membrane Proteins: the Case of Photosystem II. Department of Pharmacology, Vanderbilt University, Nashville, TN.
32. Aug 24, 2004 Bioenergetic Proteins in Respiratory Processes. Department of Biochemistry and Redox Biology Center, University of Nebraska at Lincoln, Lincoln, NE.
31. Aug 17, 2004 Themes in Respiratory Processes Revealed by the Structures of Complex II and Photosystem II. Department of Biochemistry, University of Toronto, Toronto, ON, Canada.
30. Jul 27, 2004 Crystal Structures of Integral Membrane Proteins in Bioenergetic Processes: Complex II and Photosystem II. Department of Biochemistry, University of Illinois Urbana-Champaign, Urbana, IL.

29. Jul 21, 2004 Crystal Structure of Cyanobacterial Photosystem II. American Crystallographic Association. 30(1.06.05): 40. Chicago, IL.
28. Jun 20, 2004 Crystal Structure of Cyanobacterial Photosystem II. Gordon Conference: Molecular and Cellular Bioenergetics. Proctor Academy, Andover, NH.
27. May 28, 2004 Crystal Structures of Integral Membrane Proteins in Bioenergetic Processes. Department of Biochemistry, University of Cambridge, Cambridge, England.
26. May 13, 2004 The Crystal Structure of Cyanobacterial Photosystem II Reveals the Architecture of the Mn_3CaO_4 -Mn Active Site Cluster. International SFB Symposium on Protein Cofactor Interactions in Biological Processes (498), Caputh, Germany.
25. May 5, 2004 Crystal Structures of Integral Membrane Proteins in Bioenergetic Processes. Department of Biochemistry, University of Texas Health Sciences Center at San Antonio, San Antonio, TX.
24. Apr 22, 2004 Crystal Structure of Cyanobacterial Photosystem II Reveals the Architecture of the Mn_3CaO_4 -Mn Active Site Cluster. Department of Chemistry, University of Michigan, Ann Arbor, MI.
23. Apr 7, 2004 Crystal Structures of Integral Membrane Bioenergetic Processes. Department of Biomedical Sciences, University College, London, London, England.
22. Apr 1, 2004 Crystallographic Lessons from Membrane Proteins: Complex II and Photosystem II. London Structural Biology Club, Birkbeck College, London, England.
21. Feb 26, 2004 Crystal Structure of Cyanobacterial Photosystem II. European Molecular Biology Laboratories (EMBL) Heidelberg, Germany.
20. Feb 23, 2004 Crystal Structure of Photosystem II from *Thermosynechococcus elongatus*. SFB Molecular Bioenergetics Colloquium, Naurod, Germany.
19. Jan 27, 2004 Integral Membrane Proteins in Bioenergetic Processes: Complex II and Photosystem II. Department of Molecular Biophysics and Biochemistry, Yale University, New Haven, CT.
18. Jan 16, 2004 Integral Membrane Proteins in Bioenergetic Processes: Complex II and Photosystem II. Department of Biophysics, University of Michigan, Ann Arbor, MI.
17. Dec 12, 2003 The Structure of Photosystem II from a Thermophilic Cyanobacterium. University of Lund, Lund, Sweden.
16. Dec 3, 2003 Integral Membrane Proteins in Respiratory Processes: Complex II and Photosystem II. Department of Chemistry and Biochemistry, University of California, San Diego, San Diego, CA.
15. Nov 7, 2003 The Structure of Photosystem II from *Thermosynechococcus elongatus*. Molecular Mechanisms and Machines, The Bunty Plot, Imperial College, London, England.
14. Nov 3, 2003 Integral Membrane Proteins in Respiratory Processes: Complex II and Photosystem II. Cambridge MRC-LMB, Cambridge, England.
13. Dec 18, 2003 The Structure of Photosystem II from *Thermosynechococcus elongatus*. Biochemical Society Christmas Photosynthesis Meeting, University of Cambridge, Cambridge, England.
12. Oct 6, 2003 The Structure of Photosystem II from *Thermosynechococcus elongatus*. ICCG, Imperial College, London, England.

11. Sep 11, 2003 The Structure of Respiratory Complex II: Fumarate Reductase from *E. coli*. RIKEN-BBSRC Joint Symposium, Japan-UK Membrane Protein Structural Biology. Spring-8, Japan.
10. Jun 30, 2000 The Structure of Respiratory Complex II: Fumarate Reductase from *E. coli*. Imperial College, London, England.
9. Jun 24, 2000 Crystallographic Lessons from the Structure of the *E. coli* Fumarate Reductase. Current Methods in Membrane Protein Research, EMBL Heidelberg, Germany.
8. May 22, 2000 The Structure of γ -class Carbonic Anhydrases and Implications for the Proton Shuttle Mechanism. 5th International Conference on the Carbonic Anhydrases, Port Townsend, WA.
7. Dec 18, 1999 The Structure of Respiratory Complex II. Department of Chemistry, Massachusetts Institute of Technology, Cambridge, MA.
6. Oct 19, 1999 The Structure of Respiratory Complex II: Fumarate Reductase from *E. coli*. Advanced Light Source Users Meeting, Berkeley, CA.
5. Aug 24, 1999 The Structure of Respiratory Complex II: Fumarate Reductase from *E. coli*. Johnson Research Foundation, University of Pennsylvania, Philadelphia, PA.
4. Aug 20, 1999 The Structure of Respiratory Complex II: Fumarate Reductase from *E. coli*. Penn State University, State College, PA.
3. Aug 18, 1999 A Closer Look at the Active Site of γ -class Carbonic Anhydrases: High-resolution Crystallographic Studies of the Carbonic Anhydrase from *Methanosarcina thermophila*, Penn State University, State College, PA.
2. July 1, 1999 The Crystal Structure of Intact Respiratory Complex II: Fumarate Reductase from *E. coli*. Gordon Research Conference: Bioenergetics, Andover, NH.
1. May 19, 1999 The Crystal Structure of Respiratory Complex II. Pfizer Award Symposium, American Society for Biochemistry and Molecular Biology, San Francisco, CA.