JEFFREY P. OSBORNE

Department of Chemistry
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TEACHING

Program Director of Global Health, Manchester University 8/18-present
Program Director of Biology-Chemistry, Manchester University 7/17-present
Program Director of Medical Practicum, Manchester University 8/16-present
Professor of Chemistry, Manchester University 5/18-present
Associate Professor of Chemistry (tenured), Manchester University 5/10-4/18
Assistant Professor of Chemistry, Manchester University (formerly Manchester College) 8/04-4/10

Courses: Chemical Science, Introduction to Organic Chemistry Lab, General Chemistry I and Lab, General Chemistry II and Lab, Environmental Chemistry, Organic Chemistry I and Lab, Physical Chemistry II and Lab, Biochemistry I and Lab, Biochemistry II and Lab, Instrumental Analysis Lab, Internship, Special Problems, Medical Practicum, Intensive Studies in Spanish, Health Science Practicum.

RESEARCH

Principal Investigator, Manchester University

Process Oriented Guided Inquiry Learning activities. 8/11-present
Health care development in indigenous, rural, Central America (MedicalPracticum.org). 6/07-present
Compiling biocatalysis/biodegradation database pathways. 4/05-present
Biodegradation of persistent hydrocarbons and pharmaceuticals. 2/05-present
Converting cafeteria waste vegetable oil to biodiesel for campus vehicles. 9/05-6/07

Postdoctoral Research Associate, University of Minnesota

Laboratory of Lawrence P. Wackett. Biodegradation of pollutants using naturally occurring and genetically modified bacteria. 7/00-6/04

Graduate Research Assistant, University of Illinois at Urbana-Champaign

Laboratory of Robert B. Gennis. Structure and function relationships of cytochrome oxidase membrane proteins in respiratory chain. 1/92-12/98

EDUCATION

Ph.D.	Biochemistry	University of Illinois at Urbana-Champaign	1999
B.A.	Chemistry, Biology	Goshen College	1992
A.A.	Liberal Arts	Hesston College	1988

CERTIFICATION

Pharmacogenomics	RxGenomix Training Program	2018

GRANTS

16. *Manchester University Peace Studies/Conflict Resolution Grant* $1500 2017
"Improving Relationships and Cooperation between the Medical Practicum and the Alto Wangki-Bocay Mayangna"

15. *H.C. Gemmer Family Christian Foundation* $3000 2016
"Medicines and Medical/Dental Supplies for the 2017 Manchester University Medical Practicum"

14. *H.C. Gemmer Family Christian Foundation* $2600 2014
"Medicines and Medical Supplies for the 2015 Manchester University Medical Practicum"

13. *Manchester University Peace Studies/Conflict Resolution Secrist Funds* $1500 2014
"Improving Relationships and Cooperation between the Medical Practicum

and the Alto Wangki/Bocay People"

12. *Manchester College Peace Studies/Conflict Resolution Secrist Funds* $1500 2012
"Relationship Building and Multilateral Organization in Río Coco, Nicaragua Communities for January 2013 Medical Practicum"
11. *Manchester College Peace Studies/Conflict Resolution Secrist Funds* $1500 2010
"Relationship Building and Multilateral Organization in Río Coco, Nicaragua Communities for January 2011 Medical Practicum"
10. *Manchester College Faculty Research and Artistic Endeavor* $750 2009
"Researching the January 2010 Medical Practicum Site in Nicaragua"
9. *H.C. Gemmer Family Christian Foundation* $1500 2008
"Medicines for Manchester College Medical Practicum"
8. *Plowshares* $2500 2008
"Spanish Language Study and Visiting Potential Medical Practicum Sites in Nicaragua"
7. *Plowshares* $1325 2007
"Language Study and Medical Practicum Site Selection in Nicaragua"
6. *Manchester College Summer Research Program* $8600 2007
"Characterization of Styrene Oligomer, Ritalinic Acid and other Novel Biodegradation Pathways"
5. *Indiana Academy of Science Senior Grant* $3000 2006
"Biodegradation of Styrene Oligomers"
4. *Manchester College Summer Research Program* $9475 2006
"Identification of Novel Biodegradation Pathways"
3. *Chartwells Education Dining Services* $600 2005
"Biodiesel from Waste Vegetable Oil"
2. *Plowshares Faculty Development* $2000 2005
"Production of Methane from Biomass"
1. *The Dorothy and Moses Passer Education Fund* $600 2004
"Attend Conference on Chemistry for Non-Science Majors"

DISTINCTIONS

6. Swiss Federal Institute of Aquatic Science and Technology (EAWAG) Biocatalysis/Biodegradation Database International Scientific Advisory Board 7/14 - present
5. Recognition by the Municipal Government of Wiwilí, Nicaragua for "Su honorable y valioso y humanitario apoyo a la salud de nuestras comunidades indígenas con el fin de mejorar las condiciones de vida y restitución de derechos" ["Your honorable and valuable and humanitarian support to the health of our indigenous communities with the goal of improving the conditions of life and restitution of rights."] 1/14
4. University of Minnesota Biocatalysis/Biodegradation Database International Scientific Advisory Board 5/12 - 6/14
3. Honorary Member of Alpha Mu Gamma Honor Society (Foreign Language) 10/10
2. Dean's Award for Excellence 5/09
1. Recognition by the Sistema Local de Atención Integral en Salud [System of Locally Integrated Health Service] of Nueva Segovia department, Nicaragua for "Su labor humanitaria de llevar la salud y bienestar social al pueblo de Ciudad Antigua, Nicaragua y apoyar los programas de nuestro gobierno." ["Your humanitarian work to bring health and social welfare to the people of Ciudad Antigua, Nicaragua and support the programs of our government."] 1/08

SCIENTIFIC WEB PUBLICATIONS

7. Osborne, J. P. and Planer, J. (2012) "Nitrate (Anaerobic) Pathway Map." Available from EAWAG Biocatalysis/Biodegradation Database: http://eawag-bbd.ethz.ch/nit/nit_map.html.

6. Sanchez, E., Cullen, M., and Osborne, J. P. (2012) "Iminodisuccinate Pathway Map." Available from EAWAG Biocatalysis/Biodegradation Database: http://eawag-bbd.ethz.ch/ids/ids_map.html.
5. Burkett, A., and Osborne, J. P. (2012) "1,5-Anhydrofructose (Fungal) Pathway Map." Available from EAWAG Biocatalysis/Biodegradation Database: http://eawag-bbd.ethz.ch/stc2/stc2_map.html.
4. Burkett, A., and Osborne, J. P. (2012) "Starch Oligomer Pathway Map." Available from EAWAG Biocatalysis/Biodegradation Database: http://eawag-bbd.ethz.ch/stc/stc_map.html.
3. Collins, L., and Osborne, J. P. (2012) "Cocaine Pathway Map." Available from EAWAG Biocatalysis/Biodegradation Database: http://eawag-bbd.ethz.ch/coc/coc_map.html.
2. Mills-Groninger, F., Carpenter, M., and Osborne, J. P. (2011) "Cypermethrin Pathway Map." Available from EAWAG Biocatalysis/Biodegradation Database: http://eawag-bbd.ethz.ch/cyp/cyp_map.html.
1. Johnson, W., and Osborne, J. P. (2011) "Permethrin Pathway Map." Available from EAWAG Biocatalysis/Biodegradation Database: http://eawag-bbd.ethz.ch/per/per_map.html.

BOOKS AND CHAPTERS

2. Osborne, J. P., (1999) *Structure and Function Relationships in Cytochrome* bo_3 *Oxidase and Cytochrome* bd-*I Oxidase from* Escherichia coli. Ph.D. Dissertation, University of Illinois at Urbana-Champaign. UMI, Ann Arbor (AAT 9944956).
1. Osborne, J. P., Musser, S. M., Schultz, B. E., Edmondson, D. E., Chan, S. I., and Gennis, R. B. (1998) "Rapid Formation of a Ubisemiquinone Species Upon Oxidation of Quinol by the Cytochrome bo_3 from *Escherichia coli*" in *Oxygen Homeostasis and Its Dynamics* (Ishimura, Y., Shimada, H., & Suematsu, M., Eds.) pp 33-39, Springer-Verlag, Tokyo.

PEER-REVIEWED ARTICLES

18. Seffernick, J. L., Aleem, A., Osborne, J. P., Johnson, G., Sadowsky, M. J., and Wackett, L. P. (2007) "Hydroxyatrazine N-ethylaminohydrolase (AtzB): an amidohydrolase superfamily enzyme catalyzing deamination and dechlorination" Journal of Bacteriology, 189(19), 6989-6997.
17. Yang, K., Zhang, J., Vakkasoglu, A., Hielscheer, R., Osborne, J. P., Hemp, J., Miyoshi, M., Hellwig, P. and Gennis, R. (2007) "Glutamate 107 in Subunit I of the Cytochrome *bd* Quinol Oxidase from *Escherichia coli* is Protonated and is Near the Heme d/Heme b_{595} Binuclear Center" Biochemistry, 46(11), 3270-3278.
16. Brim, H., Osborne, J. P., Kostandarithes, H. M., Fredrickson, J. K., Wackett, L. P. and Daly, M. J. (2006) "*Deinococcus radiodurans* Engineered for Complete Toluene Degradation Facilitates Cr(VI) Reduction" Microbiology 152(8), 2469-2477.
15. Zhang, J., Hellwig, P., Osborne, J. P., Gennis R. B. (2004). "Arginine-391 in Subunit I of the Cytochrome *bd* Quinol Oxidase from *E. coli* Stabilizes the Reduced Form of the Hemes and Is Essential for Quinol Oxidase Activity." Journal of Biological Chemistry, 279(52), 53980-53987.
14. Zhang, J, Osborne, J. P., Gennis, R. B., Wang, X. (2004) "Proton NMR Study of the Heme Environment in Bacterial Quinol Oxidases." Archives of Biochemistry and Biophysics, 421(2), 186-191.
13. Seffernick, J. L., McTavish, H., Osborne, J. P., de Souza, M. L., Sadowsky, M. J., Wackett, L. P. (2002) "Atrazine Chlorohydrolase from *Pseudomonas* Sp. Strain ADP Is a Metalloenzyme." Biochemistry, 41, 14430-14437.
12. Shapir, N., Osborne, J. P., Johnson, G., Sadowsky, M. J., and Wackett, L. P. (2002) "Purification, Substrate Range, and Metal Center of AtzC: the N-Isopropylammelide Aminohydrolase Involved in Bacterial Atrazine Metabolism." Journal of Bacteriology, 184, 5376-5384.
11. Zhang, J., Hellwig, P., Osborne, J. P., Huang, H., Moeenne-Loccoz, P., Konstantinov, A. A., Gennis, R. B. (2001) "Site-Directed Mutation of the Highly Conserved Region near the Q-Loop of the Cytochrome *bd* Quinol Oxidase from *Escherichia coli* Specifically Perturbs Heme b_{595}." Biochemistry, 40, 8548-8556.
10. Veselov, A. V., Osborne, J. P., Gennis, R. B., Scholes, C. P. (2000) "Q-Band ENDOR (Electron Nuclear Double Resonance) of the Heme o_3 Liganding Environment at the Binuclear Center in Cytochrome bo_3 from *Escherichia coli*." Journal of the American Chemical Society, 122, 8712-8716.
9. Veselov, A. V., Osborne, J. P., Gennis, R. B. and Scholes, C. P. (2000) "Q-Band ENDOR (Electron Nuclear Double Resonance) of the High-Affinity Ubisemiquinone Center in Cytochrome bo_3 from *Escherichia coli*." Biochemistry, 39, 3169-3175.

8. Musatov, A., Ortega-Lopez, J., Demler, B., Osborne, J. P., Gennis, R. B., Robinson, N. C. (1999) "Detergent-Solubilized *Escherichia coli* Cytochrome bo_3 Ubiquinol Oxidase: A Monomeric, Not a Dimeric Complex." FEBS Letters, 457(1), 153-156.
7. Osborne, J. P., Cosper, N. J., Stålhandske, C. M. V., Scott, R. A., Alben, J. O. and Gennis, R. B. (1999) "Cu XAS Shows a Change in Ligation of Cu_B Upon Reduction of Cytochrome bo_3 Oxidase from *Escherichia coli*." Biochemistry, 38, 4526-4532.
6. Osborne, J. P. and Gennis, R. B. (1999) "Sequence Analysis of Cytochrome *bd* Oxidase Suggests a Revised Topology for Subunit I." Biochimica et Biophysica Acta, 1410, 32-50.
5. Borisov, V., Arutyunyan, A. M., Osborne, J. P., Gennis, R. B. and Konstantinov, A. A. (1999) "Magnetic Circular Dichroism Used to Examine the Interaction of *Escherichia coli* Cytochrome *bd* with Ligands." Biochemistry, 38, 740-750.
4. Larsen, R. W., Osborne, J., Langley, T., and Gennis, R. B. (1998) "Volume Changes Associated with CO Photodissociation from Fully Reduced Cytochrome bo_3 from *Escherichia coli*." Journal of the American Chemical Society, 120, 8887-8888.
3. Watmough, N. J., Katsonouri, A., Little, R. H., Osborne, J. P., Furlong-Nickels, E., Gennis, R. B., Brittain, T., and Greenwood, C. (1997) "A Conserved Glutamic Acid in Helix VI of Cytochrome bo_3 Influences a Key Step in Oxygen Reduction." Biochemistry, 36, 13736-13742.
2. Sun, J., Kahlow, M. A., Kaysser, T. M., Osborne, J. P., Hill, J. J., Rohlfs, R. J., Hille, R., Gennis, R. B., and Loehr, T. M. (1996) "Resonance Raman Spectroscopic Identification of a Histidine Ligand of b_{595} and the Nature of the Ligation of Chlorin *d* in the Fully Reduced *Escherichia coli* Cytochrome bd Oxidase." Biochemistry, 35, 2403-2412.
1. Sun, J., Osborne, J. P., Kahlow, M. A., Kaysser, T. M., Hill, J. J., Gennis, R. B., and Loehr, T. M. (1995) "Resonance Raman Studies of *Escherichia coli* Cytochrome *bd* Oxidase. Selective Enhancement of the Three Heme Chromophores of the 'As-Isolated' Enzyme and Characterization of the Cyanide Adduct." Biochemistry, 34, 12144-12151. Correction: Biochemistry 35, 666 (1996).

STUDENT RESEARCH

35. Stephanie Wheeler. Fall 2016 - Spring 2017 (no credit). "2-Chloro-4-Nitrophenol Biodegradation Pathway Map".
34. Matthew Jordan. Spring 2017 (1 credit hour). "Synthesis of Styrene Dimer and Trimer Using Wolff-Kishner Reduction".
33. Alex Figueroa. Spring 2017 (no credit). "PCR of Catechol 2,3-dioxygenase Genes from Polystyrene Degrading Mealworm Gut".
32. Meaghan Adams. Spring 2016 (2 credit hours). "Optimization of Styrene Dimer and Styrene Trimer Synthesis by Clemmensen Reduction".
31. Jessica Noll. Fall 2015 (1 credit hour). "Three Mealworm Species Detection of Polystyrene Biodegradation by Mass".
30. Kaitlyn McDermitt. Fall 2015 (no credit). "Detection of Polystyrene Biodegradation by Mass Change in Mealworms".
29. Giang Hong. Spring and Summer 2015 (no credit). "2-Chloro-4-Nitrophenol Biodegradation Pathway Map".
28. Allison Weber. Spring 2015 (2 credit hours). "Synthesis of Styrene Dimer Using Revised Clemmensen Reduction".
27. Kyle Miller. Spring 2015 (2 credit hours). "Synthesis of Styrene Trimer by Clemmensen Reduction of 1,3,5-Triphenylpentane".
26. Jessica Noll (with Kristen Short). Fall and Spring 2014 (no credit). "Assessment of prevalence of chronic *T. cruzi* infection and diagnostic test use in the Alto Wangki-Bocay region of Nicaragua".
25. Michael Stocker. Spring 2014 (2 credit hours). "Ritalinic Acid Assay and Biodegradation".
24. Loughlin Wylie. Spring 2014 (1 credit hour). "Bacteria Degradation of Styrene and Synthesis of 1,3-diphenylpropene".
23. Loughlin Wylie. Fall 2013 (1 credit hour). "Synthesis of Styrene Dimer".
22. Lucas Shelly. Spring 2013 (2 credit hours). "Styrene Oligomer Synthesis".
21. Sara Barker. Spring 2013 (2 credit hours). "Synthesis and Analysis of Styrene Dimer and Trimer through Beta Zeolite Catalysis".

20. Nicolas Salupo (with Michelle Shelly, M.D.). Fall 2012 – January 2013 (no credit). "Evaluation of the Prevalence of *Helicobacter Pylori* Infection in Symptomatic Patients in the Upper Rio Coco Region of Nicaragua".
19. Lucas Shelly (with Michelle Shelly, M.D.). Fall 2011-Fall 2012 (no credit). "A cross-sectional observation of diabetes in an indigenous Nicaraguan population".
18. Erin Cole. 2010-2011. Senior Research Thesis. "Inhibiting Cancer-Associated PCNA: The Potential to Target Malignant Cell Division while Leaving Healthy Cells Untouched".
17. A.J. Herbel. Spring 2011 (2 credit hours). "The Purification and Separation of Polystyrene".
16. Kaitlin Johnson. Fall 2010 (2 credit hours). "The Use of a Zeolite Catalyst to Synthesize Styrene Oligomers".
15. Tony Herber. Fall 2007 (1 credit hour). "Synthesis, Separation, and Identification of Styrene Trimer for further Study in Bacterial Degradation Pathways".
14. Kelli Gates. Fall 2007 (1 credit hour). "Kinetic Analysis of Ritalinic Acid Biodegradation".
13. Kelli Gates. Summer 2007 (10 weeks). "Kinetic Analysis of Ritalinic Acid Biodegradation".
12. Tony Herber. Summer 2007 (10 weeks). "Styrene Oligomer Synthesis and Characterization"
11. Jordan Walberry. Summer 2007 (10 weeks). "Styrene Oligomer Synthesis and Characterization and Ritalinic Acid Assays"
10. Levi Haupert. 2006-2007. Senior Research Thesis. "Potential for Large Scale Photovoltaics in Indiana."
9. Taylor Vice. Spring 2007 (2 credit hours). "Selective Synthesis of Styrene Trimer".
8. Amanda Patch. Fall 2006. (1 credit hour). "Biodiesel Production and Analysis".
7. Will Patch. Fall 2006 (1 credit hour). "Degradation Kinetics of Ritalinic Acid and Alendronate Sodium".
6. Levi Haupert. Fall 2006 (2 credit hours). "Biodegradation of Styrene Oligomers".
5. Jason DeWispeleare. Fall 2006 (1 credit hour). "Biodegradation of Large, Polyaromatic Hydrocarbons".
4. Nicole Swoverland. Summer 2006 (10 weeks). "Biodegradation Studies on Styrene Trimer and Pentadecafluorooctanoic Acid".
3. Will Patch. Summer 2006 (10 weeks). "Novel Biodegradation of Alendronate Sodium and Ritalinic Acid".
2. Jason DeWispeleare. Spring 2006 (1 credit hour). "Biodegradation of Environmental Pollutants".
1. Will Patch. Spring 2006 (1 credit hour). "Synthesis and pH Dependent Chelation Properties of Alendronate Sodium".

UNIVERSITY COMMITTEES

13. Global Health Council, 2018-present, (Chair 2018-present)
12. Undergraduate Academic Program Task Force (Institutional Vitality and Sustainability Initiative), 2018-present
11. Academic Governance Council, 2017-present
10. Task Force on Nursing (*Ad Hoc*), 2017-present
9. Biology-Chemistry Council, 2005-present, (Chair 2017-present)
8. Environmental Studies Council, 2006-2018
7. Accreditation Steering Committee (*Ad Hoc*), 2016-2017
6. Post-Bacc, Pre-Pharm, Implementation Committee (*Ad Hoc*), 2013-2016
5. Discussion Day Committee, 2012-2013
4. Honors Committee, 2009-2011
3. Technology Committee, 2008-2009
2. Faculty Executive Committee, 2007-2008
1. Campus Safety Committee, 2004-2007

INTERNATIONAL EXPERIENCE

5. Nicaragua 44 weeks since 2007
4. Costa Rica 1/12-7/12
3. Chile 8/11-1/12
2. The Netherlands 8/88-7/89
1. Costa Rica 7/82-7/83

LANGUAGES

3. Spanish
2. Dutch
1. English