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### **Education**

- 1995-2000 *Massachusetts Institute of Technology*  
Cambridge, MA  
Degree of Doctor of Philosophy in Organic Chemistry, 2001  
"Conformational Effects of Asparagine-Linked Glycosylation"  
under Professor Barbara Imperiali
- 1991-1995 *University of Chicago*  
Chicago, IL  
Bachelor of Science in Chemistry, 1995  
Undergraduate Research under David G. Lynn

### **Professional Experience**

- 2007-present Associate (without tenure) Professor of Chemistry  
Massachusetts Institute of Technology, Cambridge, MA.
- 2003-2007 Assistant Professor of Chemistry  
Massachusetts Institute of Technology, Cambridge, MA.
- 2000-2003 Post-doctoral Fellow in Biochemistry  
Laboratory of Professor Christopher T. Walsh  
Harvard Medical School, Boston, MA.
- 1995-2000 Graduate Student in Bioorganic Chemistry  
Laboratory of Professor Barbara Imperiali  
California Institute of Technology, Pasadena, CA.  
Massachusetts Institute of Technology, Cambridge, MA.

### **Honors and Awards**

- 2007 Arthur Neisch Young Investigator Award of the North American  
Phytochemical Society
- 2007-2009 Sloan Research Fellowship
- 2007-2010 American Cancer Society Research Scholar
- 2005-2008 Beckman Young Investigator
- 2004 3M Innovation Fund

2004- 2007	Latham Family Career Development Professor
2003	Amgen New Faculty Award
2003-2005	Smith Family Medical Foundation New Investigator
2000-2002	American Chemical Society Irving S. Sigal Postdoctoral Fellowship, Harvard Medical School
1998-1999	American Chemical Society Organic Division Graduate Fellowship, California Institute of Technology
1998	Distinguished Graduate Student Everhart Lecture Series, California Institute of Technology
1995-1996	California Institute of Technology Institute Graduate Fellowship

## Publications

*Independent (accepted, submitted and in preparation)*

- McCoy, E., O'Connor, S. E. Flux of nonnatural biosynthetic intermediates through a highly branched natural product pathway. *in preparation*.
- Friedrich, A., O'Connor, S. E. (2008) Azidotryptamine analogs for protein photoaffinity labeling. *submitted*.
- Runguphan, W., O'Connor, S. E. (2008) Genetic engineering of plant cell culture to produce unnatural alkaloids. *submitted*.
- O'Connor, S. E. peer reviewed chapter Elucidation of Natural Product Pathways in Plants" for the book "Plant-derived natural products; Synthesis, function and application" accepted.
- Maresh, J., Giddings, L. A., Friedrich, A., Loris, E. A., Panjikar, S., Stockigt, J., Peters, B., O'Connor, S. E. (2008) Strictosidine Synthase: Mechanism of a Pictet-Spengler catalyzing enzyme. *J. Amer. Chem. Soc.* 130, 710-723.
- Yerkes, N., Wu, J., McCoy, E., Galan, M. C., Chen, S., O'Connor, S. E. (2008) Substrate specificity and diastereoselectivity of strictosidine glucosidase. *Biorg. Med. Chem. Lett.* 18, 3095-3098.
- O'Connor, S. E. Alkaloid Biosynthesis. in: *Encyclopedia of Chemical Biology*. WileyBlackwell, T. Begley Ed. 2009.
- McCoy, E., O'Connor, S. E. (2007) Natural products from plant cell culture. *in press*. (invited book chapter in Natural Products as Drugs, F. Peterson, Ed. Verlag AG)
- Galan, M. C., McCoy, E., O'Connor, S. E. (2007) Chemoselective derivatization of unnatural alkaloids in periwinkle. *Chem. Comm.* 3249-3251. (*highlighted in Chemical Biology magazine, www.rsc.org/ChemBiology*)
- Bernhardt, P., McCoy, E., O'Connor, S. E. (2007) Rapid identification of enzyme variants for reengineered alkaloid biosynthesis in periwinkle. *Chem. Biol.* 14, 888-897.
- Chen, S.\*, Galan, M. C.\*, Carla Coltharp, O'Connor, S. E. Redesign of a central enzyme in alkaloid biosynthesis. (2006) *Chem. Biol.* 13, 1137-1141.
- McCoy, E., O'Connor, S. E. Precursor directed biosynthesis of alkaloids in periwinkle. (2006) *J. Amer. Chem. Soc.* 128, 14276-14277. (*highlighted in Chemical & Engineering News, 84, October 26, 2006*)
- O'Connor, S. (2006) Natural product cyclization. (2006) *Nat. Chem. Biol.* 2, 411. (invited commentary)

- O'Connor, S. E., Maresh, J. M. (2006) Chemistry and biology of terpene indole alkaloid biosynthesis. *Nat. Prod. Rep.* **23**, 532-547.
- Galan, M. C., O'Connor, S. E. (2006) Semisynthesis of secologanin derivatives. *Tetrahedron Lett.* **47**, 1563-1565.
- McCoy, E., Galan, M. C., O'Connor, S. E. (2006) Substrate specificity of strictosidine synthase. *Bioorg. Med. Chem. Lett.* **16**, 2475-2478.
- O'Connor, S. E., McCoy, E. M. (2006) Terpene indole alkaloid biosynthesis. *Rec. Adv. Phytochem.* **40**, 1-22.
- O'Connor, S. (2004) Aureolic acids: Similar antibiotics with different biosynthetic gene clusters. *Chem. Biol.* **11**, 8-10. (invited commentary)

#### *Post-doctoral and PhD*

- Hicks, L. M., O'Connor, S. E., Mazur, M. T., Walsh, C. T., Kelleher, N. L. (2004) Mass spectrometric interrogation of thioester-bound intermediates in the initial stages of epothilone biosynthesis. *Chem. Biol.* **11**, 327-335.
- Couch, R., O'Connor, S. E., Seidle, H., Walsh, C. T., Parry, R. (2004) Characterization of CmaA, an adenylation-thiolation didomain enzyme involved in the biosynthesis of coronatine. *J. Bacter.* **186**, 35-42.
- O'Connor, S. E., Walsh, C. T., Liu, F. (2003) Biosynthesis of epothilone intermediates with alternate starter units: Engineering polyketide-nonribosomal interfaces. *Angew. Chem., Inter. Ed.* **42**, 3917-3921.
- Walsh, C. T., O'Connor, S. E., Schneider, T. L. (2003) Polyketide-nonribosomal peptide epothilone antitumor agents: the EpoA, B, C subunits. *J. Indus. Microbiol. Biotech.* **30**, 448-455.
- O'Connor, S. E., Chen, H., Walsh, C. T. (2002) Enzymatic assembly of epothilones: EpoC synthase and reconstitution of the EpoA/B/C PKS/NRPS/PKS interfaces. *Biochemistry* **41**, 5685-5694.
- Schneider, T. L., Walsh, C. T., O'Connor, S. E. (2002) Utilization of alternate substrates by the first three modules of the epothilone synthetase assembly line. *J. Amer. Chem. Soc.* **124**, 11272-11273.
- Chen, H., Hubbard, B. K., O'Connor, S. E., Walsh, C. T. (2002) Formation of beta-hydroxy histidine in the biosynthesis of nikkomycin antibiotics. *Chem. Biol.* **9**, 103-112.
- Chen, H., O'Connor, S., Cane, D. E., Walsh, C. T. (2001) Epothilone biosynthesis: assembly of the methylthiazolylcarboxy starter unit on the EpoB subunit. *Chem. Biol.* **8**, 899-912.
- Chen, H., Thomas, M. G., O'Connor, S. E., Hubbard, B. K., Burkart, M. D., Walsh, C. T. (2001) Aminoacyl-S-enzyme intermediates in  $\beta$ -hydroxylations and  $\alpha\beta$ -desaturations of amino acids in peptide antibiotics. *Biochemistry* **40**, 11651-11659.
- O'Connor, S. E., Pohlmann, J., Imperiali, B., Saskiawan, I., Yamamoto, K. (2001) Probing the effect of the outer saccharide residues of N-Linked glycans on peptide conformation. *J. Amer. Chem. Soc.* **123**, 6187-6188.
- Imperiali, B., O'Connor, S. E., Hendrickson, T., L., Kellenberger, C. (1999) Chemistry and biology of asparagine-linked glycosylation. *Pure Appl. Chem.* **71**, 777-787.
- Imperiali B., O'Connor, S. E. (1999) Effect of N-linked glycosylation on glycopeptide and glycoprotein structure. *Curr. Opin. Chem. Biol.* **3**, 643-649.
- Imperiali, B., O'Connor S. E. (1998) The conformational basis of asparagine-linked glycosylation. *Pure Appl. Chem.* **70**, 33-40.
- O'Connor, S. E., Imperiali B. (1998) A molecular basis for glycosylation-induced conformational switching. *Chem. Biol.* **5**, 427-437.
- O'Connor, S. E., Imperiali, B. (1997) Conformational switching by asparagine-linked glycosylation. *J. Amer. Chem. Soc.* **119**, 2295-2296.

- O'Connor, S. E., Imperiali, B. (1996) Modulation of protein structure by asparagine-linked glycosylation. *Chem. Biol.* **3**, 803-812.
- Opila, R. L., Konstadinidis, K., O'Connor, S. (1997) X-ray photoelectron spectroscopic study of the reactions between metals (Cr, Ti, Al) and polymers (triazine and polyimide). *Polymer Surfaces and Interfaces: Characterization, Modification and Application* 179-187.

### **Current Research Support**

NIH (RO1-GM074820-01)

Early Steps in Alkaloid Biosynthesis

This project describes the use of biosynthetic pathways to make new natural products by precursor directed biosynthesis.

American Cancer Society (RSG-07-025-01)

Production of Vinblastine Analogues in Madagascar Periwinkle

This project describes the chemoenzymatic synthesis and biological assay of anhydrovinblastine and vinblastine analogues.

NSF (MCB-0719120)

Combinatorial Biosynthesis of New Alkaloids in Periwinkle

This project describes transformation of new enzymes into periwinkle to generate genetically engineered plant cell cultures that make new natural products.

David Koch Research Fund (2740198)

Harnessing the Production of Anti-Cancer Agents from Plants

This project describes synthesis of new alkaloid biosynthesis starting materials.

Alfred P. Sloan Foundation

This project is unrestricted.

### **Invited Presentations**

- Eli Lilly, Indianapolis, IN, 8/08
- Scripps Research Institute, La Jolla, CA, 8/08
- 2008 Transatlantic Frontiers of Chemistry Conference, 8/08
- 2008 Gordon Research Conference on Enzymes, Coenzymes and Metabolic Pathways, 7/08
- 2008 Northeast Regional Meeting of the American Chemical Society, Burlington, VT, 7/08
- 2008 Gordon Research Conference on Natural Products Chemistry, 7/08
- Engineering Foundation Conference, Whistler, BC, 6/08
- 2008 Gordon Research Conference on Bioorganic Chemistry, 6/08
- Harvard Medical School, BCMP Department, Boston, MA, 6/08
- University of Pittsburgh Paul Dowd Lecturer, Department of Chemistry, Pittsburgh, PA, 5/08
- Johns Hopkins University School of Medicine, Department of Pharmacology, Baltimore, MD, 5/08
- 91st Canadian Chemistry Conference, 5/08
- Cornell University, Department of Chemistry, Ithaca, NY, 4/08
- University of Massachusetts Amherst, Molecular Cell Biology Program, Amherst, MA, 4/08

- American Chemical Society, for “Optimizing Nature's Privileged Structures: Biosynthesis and Semisynthetic Advances”, Division of Medicinal Chemistry, New Orleans, LA, 4/08
- Vanderbilt University, Department of Chemistry, Nashville, TN, 3/08
- University of Wisconsin, Chemical Biology Program, Madison, WI, 2/08
- Harry and Elsa Jiler American Cancer Society Meeting (invited poster presentation), Naples, FL, 11/07
- University of Rochester, Chemistry Department, Rochester, NY, 11/07
- Brown University, Chemistry Department, 10/07
- 2007 Phytochemical Society of North America Annual meeting, St. Louis, MO, 7/07
- NSF Workshop on Organic Synthesis, Estes Park, CO, 6/07
- US-China Early Career Workshop on Chemical Biology, Shanghai, China, 5/07
- Washington University, Department of Chemistry, St. Louis, MO, 1/07
- Danforth Plant Science Center, St. Louis, MO, 1/07
- University of California, Department of Pharmaceutical Chemistry, San Francisco, CA, 11/06
- University of Mainz, Department of Pharmacy, Mainz, Germany, 10/06
- Oxford University, Department of Chemistry, Oxford, UK, 10/06
- Cambridge University, Department of Chemistry, Cambridge, UK, 10/06
- University of Bristol, Department of Chemistry, Bristol, UK, 10/06
- University of Manchester, Department of Chemistry, Manchester, UK, 10/06
- University of East Anglia, Department of Chemistry, Norwich, UK, 10/06
- John Innes Center, Norwich, UK, 10/06
- Society for Industrial Microbiology, Annual Meeting, Baltimore, MD, 8/06
- European Symposium on Bio-Organic Chemistry, Gregynog, Wales 5/06
- 2005 Phytochemical Society of North America, Annual meeting, La Jolla, CA, 7/05