

# More Faculty

## Rob Ronald

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In the Ronald group, we are concerned with the chemistry and synthesis of natural products. We are interested in the development of new synthetic methods related to process chemistry, as well as the chemistry of modified carbohydrates and anti-viral nucleosides.

- Efficacious Preparation of Oppolzer's Glycylsultam via the Delépine Reaction. *Synthesis* **2009**, in press.
- Evaluation of Low Energy CID and ECD Fragmentation Behavior of Mono-Oxidized Thio-Ether Bonds in Peptides. *J. Am. Soc. Mass Spectrom.* **2007**, 18, 493.
- Polysaccharide-based chiral phase under polar organic mode of elution in the determination of the enantiomeric purity of emtricitabine an anti-HIV analogue nucleoside. *J. Pharmaceut. Biomed. Anal.* **2003**, 33, 581.

## Don Matteson

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My major interest is in asymmetric synthesis with boronic ester intermediates. Using methodology that we have developed, syntheses of insect pheromones, amino acids, and other natural products have been achieved.

- ( $\alpha$ -haloalkyl)boronic esters in asymmetric synthesis. *Boronic Acids* **2006**, 305.
- $\alpha$ -amido boronic acids: a synthetic challenge and their properties as serine protease inhibitors. *Med. Res. Rev.* **2008**, 28, 233.
- Synthesis of a ( $\beta$ -acetamido- $\alpha$ -acetoxyethyl)boronic ester via azido boronic esters. *J. Organomet. Chem.* **2008**, 693, 2258.

## Graduate Studies in Organic Chemistry

The Department of Chemistry affords many opportunities for the study of organic chemistry at the confluence of biology and medicine. Faculty research interests and expertise include the design, synthesis, and reactivity of organic molecules, with implications for the development of new medicines. Organic chemistry also plays a key role in the department's **chemistry of biological systems** focus area, which involves the study of reactivity in biological systems, as well as the application of chemical techniques to understand and manipulate molecules in living systems. The recent addition of three new faculty members to the division (Xian in 2006, and Berkman and Garner in 2007) testifies to the continued importance of organic chemistry at WSU.

## Financial Support

All students engaged in organic and bioorganic research at WSU are financially supported with stipends. Basic stipends, together with additional fellowships and tuition waivers, are available for combined support of more than \$38,000 per year. WSU also offers health care support for its graduate students.

## Information

Visit our web site, [organic.wsu.edu](http://organic.wsu.edu), or contact

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## Graduate Studies in Organic & Bioorganic Chemistry



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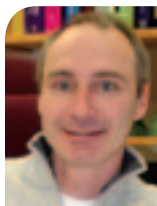
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# Faculty Profiles

## Cliff Berkman

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We are focused on developing diagnostic and therapeutic agents for cancer and heart disease. These agents are designed to target cell-surface enzymes unique to these diseases. Our designs include an enzyme targeting core linked to a diagnostic or therapeutic payload. Applications include *in vitro* and *in vivo* cell imaging, cell-capture platforms, and targeted chemotherapy. Students in my group can learn techniques in organic synthesis, cell and molecular biology, biochemistry, and computational modeling.

- Cell-Surface Labeling and Internalization by a Fluorescent Inhibitor of Prostate-Specific Membrane Antigen. *The Prostate* **2008**, 68, 955.
- Pseudoirreversible Inhibition of Prostate-Specific Membrane Antigen by Phosphoramidate Peptidomimetics. *Biochemistry* **2008**, 47, 12658.
- *In Vitro* Targeted Photodynamic Therapy with a Pyropheophorbide-a Conjugated Inhibitor of Prostate-Specific Membrane Antigen. *The Prostate* **2009**, in press.

## Philip Garner

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My group is involved in the design and synthesis of biologically active molecules and the development of new enabling chemistries. Chemical synthesis is the common thread that underlies all of our research endeavors, which can feed into collaborative efforts to develop new medicines. An example is our recent synthesis of the natural product cyanocycline A, which was based on our [C+NC+CC] coupling methodology. This synthesis produced a compound (HUK-921) that has been found to target a specific function of a multifunctional protein (galectin-3) implicated in processes such as inflammation and cancer.

- Asymmetric Multicomponent [C+NC+CC] Synthesis of Highly Functionalized Pyrrolidines Catalyzed by Silver(I). *Org. Lett.* **2006**, 8, 3647.
- The Cu<sup>I</sup> Catalyzed Exo-Selective Asymmetric Multicomponent [C+NC+CC] Reaction. *Tetrahedron Lett.* **2007**, 48, 3867.

- An Efficient Synthetic Approach to Cyanocycline A and Bioxalomyacin b2 via [C+NC+CC] Coupling. *J. Am. Chem. Soc.* **2007**, 129, 15460.
- Analogs of Tetrahydroisoquinoline Natural Products that Inhibit Cell Migration and Target Galectin-3 Outside of its Carbohydrate-Binding Site. *J. Biol. Chem.* **2008**, 283, 24534.
- Efficacious Preparation of Oppolzer's Glycylsultam via the Delépine Reaction. *Synthesis* **2009**, in press.

## Jeffery P. Jones

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Our overall goal is to develop knowledge that can be used to help in drug design.

**Project 1** Developing information on the features that affect the rates and regioselectivity of Cytochrome P450 mediated drug metabolism. This information is important in understanding the half-life of a drug and the possibility of toxicity.

**Project 2** Developing information on the features that affect binding to Cytochrome P450 enzymes. This information is important in understanding potential drug-drug interactions.

**Project 3** The mechanism of metabolism of heterocyclic amines by aldehyde oxidase.

- Kinetic isotope effects implicate the iron-oxene as the sole oxidant in P450-catalyzed N-dealkylation. *J. Am. Chem. Soc.* **2004**, 126, 8868.
- Kinetic isotope effects implicate a single oxidant for cytochrome P450-mediated O-dealkylation, N-oxygenation, and aromatic hydroxylation of 6-methoxyquinoline. *Drug Metab. Dispos.* **2006**, 34, 1288.
- Formation of the Active Species of Cytochrome P450 by Using Iodosylbenzene: A Case for Spin-Selective Reactivity. *Chemistry: A European Journal* **2007**, 13, 4103.

## Pat Meier

meiergp@wsu.edu



The focus of our research is the design and synthesis of organic molecules for applied applications. Our applications are diverse, currently including determining plant signaling pathways (flavonoids), developing lanthanide/actinide selective ligands, and the synthesis of anticancer agents (flavonoids and xanthates). Our work leads to the development of new methodologies and a better understanding of the known methodologies.

- Prodrug Modification Increases Potassium Tricyclo[5.2.1.0<sup>2,6</sup>]decan-8-yl-dithiocarbonate (D609) Chemical Stability and Cytotoxicity Against U937 Leukemia Cells. *J. Pharmacol. Exp. Therapeut.* **2004**, 309, 1051.
- Microbial Anaerobic Demethylation and Dechlorination of Chlorinated Hydroquinone Metabolites Synthesized by Basidiomycete Fungi. *Appl. Environ. Microbiol.* **2004**, 70, 385.
- Hydrogen Bond Interactions of a Series of N-Substituted TXA2 Receptor Antagonists. *Eur. J. Med. Chem.* **2003**, 38, 1015.

## Ming Xian

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Our research interests comprise the desire to combine organic synthesis with bioorganic chemistry to examine, understand, and solve problems of biological and medicinal significance. We are interested in the areas of (1) synthetic methodology development and natural product synthesis; (2) bioorthogonal reactions for protein identification; and (3) the development of bio-based new materials.

- Exploration of the traceless reductive ligation of S-nitrosothiols. *Org. Lett.* **2009**, 11, 477.
- Fast reductive ligation of S-nitrosothiols. *Angew Chem. Int. Ed.* **2008**, 47, 6598.
- Total synthesis of diospongins A and B. *Synlett* **2008**, 2651.
- Solvent Controlled C<sup>sp2</sup>→O Silyl Migration: The One-Pot Synthesis of 2,3-Disubstituted Thiophenes. *Org. Lett.* **2007**, 9, 4655.