



INDUSTRIAL PARTNERSHIP

FOR RESEARCH IN

INTERFACIAL AND MATERIALS ENGINEERING

Biocatalysis and Biosynthesis Program

Research Areas:

- Enzyme and pathway engineering for chemical synthesis, bioremediation, biofuels, and bioenergy.
- Protein engineering and design.
- Microbial functional genomics and metagenomics for enzyme discovery.
- Enzyme evolution for catalytic efficiency and substrate specificity.
- Enzymatic synthesis and pathway engineering for biopolymer production.
- Biocatalysis in nanoscale environments.

Applications:

- Fine and specialty chemical production
- Biofuels and biosensors
- Bioremediation
- Bioactive compounds
- Biodegradable polymers and biocoatings

Principal Investigators and their primary areas of expertise:

[Michael Sadowsky](#) (SWC, BTI, MPGI) **Program Leader** - Biotechnological applications of enzymes and enzyme technology for bioremediation. Functional and structural microbial genomics. Environmental metagenomics for discovery of novel enzymes for use in biofuels and chemical synthesis

[Mark D. Distefano](#) (Chemistry and Medicinal Chemistry) - Organic chemistry, biochemistry and recombinant DNA methods to design proteins that accelerate chemical reactions to produce chemicals either for end use or as intermediates for synthesis of value added chemicals.

[Romas Kazlauskas](#) (Biochemistry, Molecular Biology and Biophysics) - Biocatalysis synthesis of chemical intermediates and biofuels, Modification of enzymes for use in nonaqueous solvents and for new chemical reactions.

[Claudia Schmidt-Dannert](#) (Biochemistry, Molecular Biology and Biophysics) - Biosynthetic pathway engineering: Metabolic engineering of pathways for synthesis of bioactive compounds; enzymology of biosynthetic genes; gene discovery and protein engineering using rational design and in vitro evolution.

[Friedrich Srienc](#) (CEMS) - Experimental studies of the dynamics of cell populations and its relationship to the formation of useful products. Microbial synthesis of biodegradable polymers. Pathway engineering for polymer synthesis.

[Lawrence P. Wackett](#) (Biochemistry, Molecular Biology and Biophysics) - Microbial catabolic enzymology and functional genomics: enzyme evolution and applications for biotechnology. Development of microbial enzymes for use in bioremediation and the synthesis of specialty chemicals for bioenergy and other uses.

[Ping Wang](#) (Bioproducts and Biosystems Engineering) - Enzyme engineering and nanotechnology. Enzymatic synthesis of biofuels, biopolymers and speciality chemicals. Biocatalysis in nanoscale environment and structures for micro bioreactors, membrane and interfacial catalysis, bioactive materials and coatings, and biofuel cells and biosensors.

Facilities: [BioTechnology Resource Center](#) (Fermentation process development and scale-up ranging from 5L to 450L, downstream processing (centrifugation, cell breakage, tangential flow filtration, chromatography), recombinant protein expression and purification); [High-throughput Biological Analysis Facility](#); [Imaging Center](#) (Scanning and transmission electron microscopy including x-ray elemental analysis capabilities (EDAX), (hyper-spectral) fluorescence microscopy, laser scanning confocal microscopy with particular expertise in imaging living biological specimens).

Contact: To learn more about the Biocatalysis and Biosynthesis Program and IPRIME; contact Bob Lewis, Director of Technology Transfer, at 612-625-1269 or lewis@cems.umn.edu

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