

Michigan Tech Graduate Opportunities in Chemistry and Biochemistry

The Michigan Tech Chemistry Department has openings for qualified graduate students to work on the exciting PhD projects highlighted below as well as others posted on our web site. Application information: <http://www.chemistry.mtu.edu>.

- **Nanomedicine:** develop biomolecular-nanoparticles capable of targeted delivery of chemotherapy drugs to cancer cells. Carbohydrate and peptide-based bioconjugates of metal nanoparticles are small enough for optimal cellular uptake, targeted delivery localizes the particles specifically to cancer cells and a controlled release mechanism provides a therapeutic dose of drug to cancer cells and spares healthy cells. (Dr. M. Thompson)
- **Polymer synthesis, processing, and testing projects** in areas related to nanoparticles, nanofibers, nano-, wood- and bio-composites. (Dr. P. Heiden)
- **Solid state structural characterization, structure-property relations**, including point defect structures; using vibrational spectroscopy (IR, Raman, & inelastic neutron scattering) and *ab initio*, solid state vibrational calculations; studying Ni and Li-ion battery electrodes. (Dr. B. C. Cornilsen)
- **Biochemistry, Biophysics and Mechanistic Glycobiology:** major areas of research include: (i) Molecular basis of lectin (glycan-binding protein)-mediated immune regulation and pathogen invasion, (ii) Biomolecular thermodynamics and (iii) Nutritional aspects of plant lectins and plant lectins as glycan detection tools. (Dr. T. K. Dam).
- **Medicinal chemistry:** development of novel molecular probes for DNA sequencing analysis and disease gene discovery; development of new imaging and therapeutic agents towards cancer and cardiovascular disease; design and synthesis of novel prodrugs of peptides and peptide mimetics aimed at enhancing their bioavailability and target selectivity. (Dr. L. Bi)
- **Development of new catalysts** for the formation of carbon-carbon and carbon-hetero atom bonds; design and synthesis of chiral ligands for enantioselective catalysis; synthesis of conformationally rigid macrocyclic peptide combinatorial libraries for screening bioactive molecules; design, synthesis and biological evaluation of antisense oligonucleotides. Requires persistent enthusiasm in organic synthesis. (Dr. S. Fang)
- **Identification of transient radical compounds** in tobacco smoke. Requires careful analytical chemistry and some organic synthesis. (Dr. S. A. Green)
- **Synthesis and testing of ultrasensitive fluorescent probes** for cells and proteins based on conjugated polymers, dendrimers, and nanoparticles. Requires skills in organic synthesis and analytical chemistry. (Dr. H. Liu)
- **Bio-organic chemistry projects** including: (i) Recombinant expression of alkaline phytase. (ii) Signal transduction in plants - investigation of the metabolism of inositol phosphates by molecular biology and mass spectrometry. (iii) Monitoring phosphate concentration in cells: development of a phosphate sensor. Requires a strong chemistry background and a desire to learn biochemical techniques. (Dr. P. Murthy)
- **Atmospheric Chemistry:** The Mazzoleni research group aims to assess aerosol climate uncertainties and secondary chemical processes by understanding aerosol organic composition at the molecular level. We use advanced mass spectrometry techniques to unravel the inherent complexity of aerosol organic compounds for individual compound identification. For more information please see <http://www.chemistry.mtu.edu/~lrmazzol/>. (Dr. L. Mazzoleni)
- **Protein Chemistry** related project to study biochemical and biophysical properties of proteins involved in neurodegenerative diseases such as ALS, Alzheimer's and Prion diseases. The goal of the project is to study consequences of protein misfolding *in vitro* and how they relate to misfolding *in vivo*. A strong background in protein biochemistry and molecular biology would be an advantage. (Dr. A. Tiwari)

Our Department features a dynamic, friendly and accessible faculty, a diverse group of ≈ 35 graduate students, modern instrumentation, and a welcoming atmosphere.

Graduate Program Application Procedure

Department of Chemistry, Michigan Technological University

For qualified applicants we offer:

Teaching Assistantships: Graduate teaching assistants (GTAs) work with the faculty and conduct recitation and laboratory sections. First-year graduate students are generally supported as GTAs. A typical GTA package includes tuition, fees, and a stipend. Stipends are adjusted periodically to ensure that they are competitive.

Research Assistantships: The research conducted in the department is supported by external funds. Graduate students performing research on these projects are supported as research assistants. Research assistants are not assigned to teaching duties. The stipend and benefits are the same as those for GTAs.

Application Procedure:

All application materials **must be** submitted to the Graduate School (there is no fee). You will automatically be considered for financial aid. The general institutional application procedure, fee, forms and other information is posted on the Graduate School's website: <http://www.mtu.edu/gradschool/admissions/apply/>

Components of a complete application:

- a completed application form
- a personal statement (a brief description of your research interests and career goals)
- an updated Curriculum Vitae including the names of three references
- 3 letters of recommendations sent directly from the above references
- complete official transcripts of all previous undergraduate and graduate work
- TOEFL scores for International Applicants (minimum: 213 (CBT), 550 (PBT), or 79 (iBT))
- Graduate Record Exam (GRE) scores- Required by the Department of Chemistry

You can apply to our graduate program online *or* by printing the application forms and mailing them to the Graduate School.

Please submit all the required material for your application to the Graduate School Office as directed online, *or mail to:*

Office of the Graduate School
Michigan Technological University
1400 Townsend Drive
Houghton, Michigan 49931 USA
Phone: 906-487-2327
Fax: 906-487-2284
email: : gradadms@mtu.edu

For additional information about the chemistry department program contact:

Ms. Celine E. Grace
Graduate Programs Assistant
Department of Chemistry
Michigan Technological University
1400 Townsend Drive
Houghton, Michigan 49931 USA
Tel: 906-487-2048
Fax: 906-487-2061
email: cegrace@mtu.edu