Department of

Chemistry

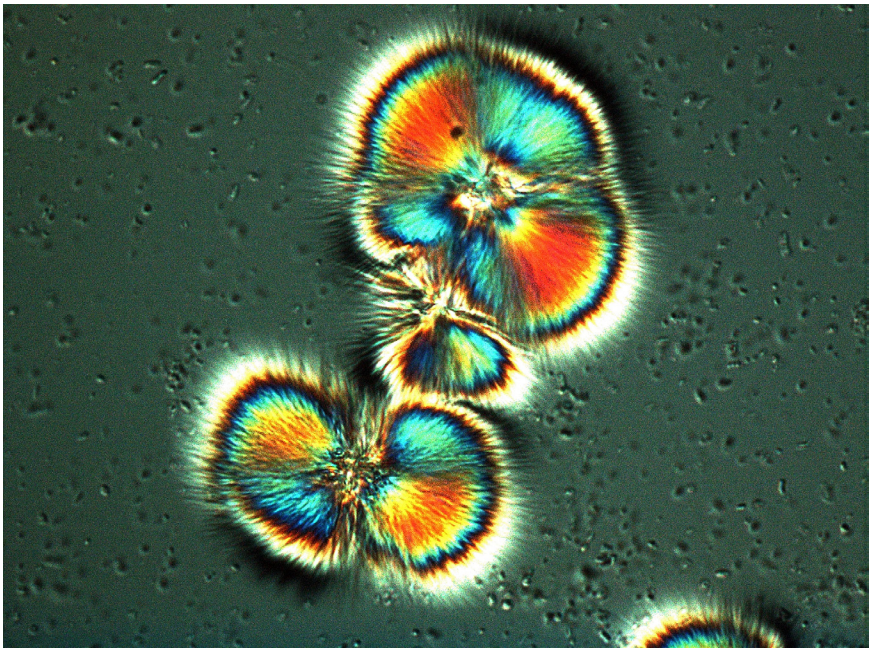

Photo: Microbe vs. Mineral; published in Science, Vol. 327, p. 955

University of Wisconsin-Stevens Point

College of Letters & Science

Mission Statement

The Mission of the Department of Chemistry is "to encourage students to become independent, life-long learners by developing essential background, skills, and attitudes of scientific objectivity and inquiry in order to become contributing members of an informed citizenry and as preparation for careers in science, medicine, and related disciplines".

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Message from the Chair

Welcome to the Department of Chemistry at UWSP.

Students pursuing a degree in chemistry or biochemistry in our department experience a discipline that is stimulating, dynamic and challenging. We strive to pass along to students our curiosity and enthusiasm for chemistry as they endeavor to learn more about this fascinating subject. The Department of Chemistry at UWSP offers only baccalaureate degrees in chemistry and biochemistry, in part because the faculty feel very strongly that interaction with undergraduates on a one-to-one basis is the best foundation for learning. In contrast to many universities, a fully qualified faculty or staff member, not a graduate assistant, teaches every chemistry course on this campus including laboratories. If students have questions or need help with assignments, their instructors' doors will be open to them. We are committed to working with students to help them achieve both their personal and professional goals.

This pamphlet is a brief introduction to our department that will hopefully be useful to you. If you require additional information please do not hesitate to visit our website or contact me. Contact information is available on the back of this brochure.

Thank you for showing an interest in the UWSP Department of Chemistry. I look forward to meeting you and answering your questions.

Dr. Paul Hladky
Professor and Chair of Chemistry

Chemistry Program

Introduction

The main focus of the UWSP Department of Chemistry is the chemical education of undergraduate students. We do not offer graduate degrees in chemistry. Chemistry courses, including laboratories, are taught by PhD-trained chemists who are effective instructors and mentors. We are an American Chemical Society (ACS) approved department which means that our facilities, instrument holdings, resources, faculty expertise, and curriculum meet stringent ACS guidelines. Students can earn our Letters & Sciences (L&S) degree or an ACS certified degree. The latter option requires several additional courses at the advanced level and is usually pursued by students wishing to achieve a deeper and broader understanding of chemistry. By taking four additional polymer chemistry courses in the junior and senior years, students can earn the L&S and ACS degrees with a polymer option.

Why Study Chemistry at UW-Stevens Point

We offer a challenging and modern course of study in a supportive learning environment. The Department is comprised of 16 full-time, PhD-trained faculty members who have dedicated their careers to the chemical education and mentoring of undergraduate students. Our faculty's expertise encompasses all the sub-disciplines of chemistry (analytical, inorganic, organic, physical, biological, environmental, and materials chemistry). Class sizes are small, particularly for upper-level courses. Chemistry majors are assigned an academic advisor who is a chemistry faculty member. We possess many state-of the-art instruments for chemical analysis and a wide variety of faculty-directed research experiences are available to students.

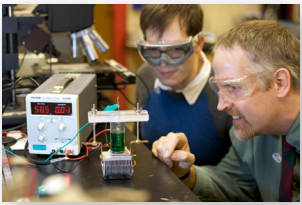
Department Features

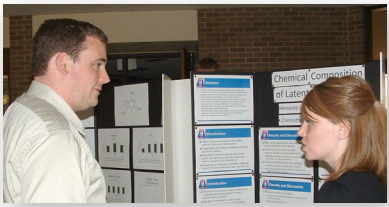
- At any given time there are approximately 80 chemistry majors on campus. On average, we graduate 15 chemistry majors each year.
- The Department possesses instrumentation valued in excess of 1.5 million dollars. Students acquire hands-on use of instruments and learn about their operating principles.
- Many students elect to participate in the ACS Student Chemistry Club. This group has regular meetings, performs outreach activities, and organizes social events that bring together students and faculty. This club allows chemistry majors to stay connected.
- Students entering UWSP with a particularly strong high school math and chemistry preparation may be eligible to take CHEM 117 (Accelerated General Chem., 5 credits) during their first semester on campus.
- The Department offers the Trytten Scholarship to incoming freshmen that is worth up to $4000 over four years (see our website for details).

Suggested Course of Study for Chemistry Majors

	Fall Semester	Spring Semester
Year One	CHEM 105 General Chemistry I (5 cr) or CHEM 117 Accelerated General Chem. (5 cr) MATH 120 Calculus I (4 cr) ENGL 101 (3 cr) Gen. Ed. + Electives (3 cr)	CHEM 106 General Chemistry II (5 cr) English 102 (3 cr) Gen. Ed. + Electives (3-8 cr) MATH 121 Calculus II (4 cr)
Year Two	CHEM 325 Organic Chemistry I (4 cr) [1] MATH 222 Calculus III (4 cr) PHYS 150 University Physics I (5 cr) COMM 101 (2 cr)	CHEM 326 Organic Chemistry II (4 cr) CHEM 248 Quantitative Analysis (4 cr) [1, 2] PHYS 250 University Physics II (5 cr)
Year Three	CHEM 335 Physical Chemistry I (4 cr) CHEM 329 Advanced Synthesis Lab (2 cr)* Gen. Ed. + Electives (9-11 cr)	CHEM 336 Physical Chemistry II Lecture (3 cr) CHEM 339 Physical Chemistry II Lab (1 cr)* CHEM 355 Intermediate Inorganic Chem (3 cr) Gen. Ed. + Electives (5-8 cr)
Year Four	CHEM 365 Biochemistry (4 cr) Gen. Ed. + Electives (11 cr)	CHEM 446 Instrumental Analysis (4 cr) CHEM 455 Advanced Inorganic Chem. (3 cr)* Gen. Ed. + Electives (8-11 cr)

1. Students who pass CHEM 117 do not need to take CHEM 106. These students may enroll in CHEM 248 or CHEM 325 in the spring semester of their freshman year.
2. CHEM 248 is offered during the summer.
3. The un-starred courses and 2 credits of chemistry electives are required for the L&S degree.
4. The un-starred and starred courses plus 3 credits of chemistry electives are required for the ACS certified chemistry degree.
5. In order to earn the L&S and ACS degrees with a polymer option requires that 4 polymer courses be taken during the junior and/or senior years.





Biochemistry Program

Introduction

Biochemistry combines the knowledge of biology and chemistry to explain life processes in terms of molecular structure and chemical reactions within living cells. The role of a biochemist is to look for understanding of organismal function and diversity in the principles and concepts of chemistry and physics, as well as in the structure, mechanisms and chemical processes that are common to all organisms. The Departments of Biology and Chemistry are collaborating to offer a biochemistry degree. This interdisciplinary program has a chemistry-based curriculum, coupled with a significant biology component, thus providing a solid foundation in both disciplines. It also gives students options to pursue different emphases depending on their career aspirations, and gives students the opportunity to participate in faculty-mentored research projects. The curriculum of the major is in accord with that recommended by the American Society of Biochemistry and Molecular Biology (ASBMB) for an undergraduate biochemistry major.

Program Features

- The major was initiated in 2007. Currently there are over 100 biochemistry majors on campus.
- Students use a wide variety of instrumentation for the analysis of biomolecules including a DNA sequencer and a liquid chromatograph with a mass spectral detector (LCMS).
- Students entering UWSP with a particularly strong high school math and chemistry preparation may be eligible to take CHEM 117 (Accelerated General Chem., 5 credits) during their first semester on campus.
- Biochemistry majors are assigned a faculty advisor from either the Biology or the Chemistry Department.

Suggested Course of Study for Biochemistry Majors

	Fall Semester	Spring Semester
Year One	CHEM 105 General Chemistry I (5 cr) or CHEM 117 Accelerated General Chemistry (5 cr) BIOL 130 Plant Biology (5 cr) ENGL 101 (3 cr) COMM 101 (2 cr)	CHEM 106 General Chemistry II (5 cr) or ENGL 102 (3 cr) Gen. Ed. + Electives (3-7 cr) BIOL 160 Animal Biology (5 cr)
Year Two	CHEM 325 Organic Chemistry I (4 cr) [1] BIOL 210 Genetics (3 cr) MATH 120 Calculus I (4 cr) Gen. Ed. + Electives (3 cr)	CHEM 326 (Organic Chemistry II, 4 cr) BIOL 281 Animal Physiology (4 cr) or BIOL 285 Human Physiology (4 cr) MATH 355 Elementary Statistical Methods (4 cr)
Year Three	CHEM 248 Quantitative Analysis (4 cr) [1, 2] BIOL 314 Cell Biology (4 cr) PHYS 203 College Physics I (5 cr) Gen. Ed. + Electives (3 cr)	CHEM 365 Biochemistry (4 cr) PHYS 204 College Physics II (5 cr) Gen. Ed. + Electives (6 cr)
Year Four	BIOL 318 Molecular Biology Lecture (3 cr) BIOL 319 Molecular Biology Lab (1 cr) BIOL 490 Molecular Biology Seminar (1 cr) Gen. Ed. + Electives (9 cr)	CHEM 333 Biophysical Chemistry (3 cr) Gen. Ed. + Electives (12 cr)

1. Students who pass CHEM 117 don't need to take CHEM 106. These students may enroll in CHEM 248 and/or CHEM 325 in the spring semester of their freshman year.
2. CHEM 105, 106, 248; BIOL 130, 160, 210; MATH 120, 355; PHYSICS 203 are offered each summer.
3. Biochemistry Electives: Eight credits of elective courses must be taken from math, physics, chemistry, and/or biology. These electives define your emphasis within the degree.

Areas of Emphasis

The different areas of emphasis are ways of personalizing the program of study to best fit the student's career goals. The following is a list of suggested courses from the Biology / Chemistry / Math electives category for particular emphases.

- ***Biochemistry / Chemistry / Biophysics:*** Chemistry 335, 336, Math 121, 222
- ***Biotechnology / Molecular Biology / Genetics:*** Biology 310, 312, 333, 415, 498 (immunology), 498 (protein purification workshop)
- ***Plant Molecular Biology:*** Biology 310, 351
- ***Medical / Dental / Pharmacology / Toxicology:*** Biology 285, 312, 333, 498
- ***Veterinary:*** Biology 281, 333, 498

The Chemistry Minor

The Chemistry Minor is designed to give students a solid background in chemistry to supplement a major in other areas. Many students pursuing majors in Biology, Physics, Paper Science and Engineering, and Health Sciences (Clinical Laboratory Sciences) elect to pursue a minor in chemistry. The minor consists of 26 credits (21 credits if taking CHEM 117).

You may take one of the following course sequences:

1. CHEM 105 and 106 or CHEM 117, 248, 325, 326, and a minimum of 4 credits selected from CHEM 329, 335, 365, 371, 373, 387, 395 or the combination of Water/Geology 487 and Water 492.
2. CHEM 105 and 106 or CHEM 117, 220, 248, 260, and the combination of Water/Geology 487 and Water 492.

It is highly recommended that students select the courses required to fulfill the minor in consultation with the faculty of the Chemistry Department in order to best complement the student's major and career goals.

Pre-Pharmacy

If you are interested in completing a Pharmacy Doctorate or a BS in Pharmacology & Toxicology, you may start your course sequence here, and then apply to the UW-Madison or other pharmacy schools. The following courses must be completed in order to be admitted to UW-Madison's program:

Chemistry 105 and 106 or 117, 325, 326; Mathematics 120 and 355; Physics 203 and 204 (or 150 and 250); Biology 130 (or 210), 160, and 333.

Other courses required for admission to Madison's program: English 102 or 150; Economics 111; Sociology 101 or Anthropology 101 or 110; Psychology 110 or 320.

For additional information, a pre-pharmacy advisor should be consulted.

Student Opportunities

ACS-Student Affiliate — The Chemistry Club

The UWSP Chemistry Department supports the local chapter of the American Chemical Society-Student Affiliate (ACS-SA). This is a student-run organization that helps promote interest in chemistry and chemical education, specifically, and science in general. The ACS-SA encourages interaction between its members and the Chemistry Department faculty to help students become more comfortable with their education. Each year the organization plans many activities where students and faculty mingle. Some examples are the fall, spring, and holiday parties, bowling parties, a golf social, ski trips, and research nights. Becoming a member is a great way to become involved in the chemistry department and the university community.

Faculty Advising

Chemistry and biochemistry majors are assigned a faculty advisor with whom they meet at least once each semester. Students will work with their advisor to plan out their course of study, discuss career options, and discuss on- and off-campus opportunities including research internships and scholarships.

Employment in the Department of Chemistry

The Department of Chemistry regularly employs students during the academic year to assist in many different areas of departmental activities. Student workers gain experience in laboratory preparations, assisting in the stockroom and/or the departmental computer laboratory, tutoring, grading papers, and other miscellaneous tasks. Depending on the availability of funds, some faculty members are able to pay students to work in their research laboratory during the normal school year and in the summer.

Colloquium Series

Each semester the Department of Chemistry invites several speakers from other universities and chemical industries to visit our department and present and discuss some aspect of chemistry. These seminars are very important to the education of students and faculty because they provide exposure to a variety of chemistry related topics. The seminars are open to all and are usually followed by an informal time of refreshments and conversation.

Faculty-Mentored Research

Chemistry is one of the broadest and most dynamic disciplines in today's world. Our understandings of the physical and biological world are constantly being challenged by new data and theoretical perspectives. Research chemists and biochemists are at the forefront of efforts to solve some of society's most pressing problems related to disease, drug discovery, energy, resource sustainability, and the environment. For these reasons, the Department of Chemistry recognizes the importance of involving students in research projects. Although it is not required, the department strongly recommends that all students get involved. Research is a highly creative and challenging endeavor which allows students to apply the knowledge and skills learned in the classroom towards solving problems and developing new knowledge. Students are guided by a faculty mentor, but work independently in the laboratory. They often present their work at the on-campus Letters & Sciences Research Symposium, at off-campus scientific conferences, and as co-authors on refereed journal articles. For some students, their research experience at UWSP is a life changing experience as they decide to pursue graduate studies in chemistry or biochemistry. Another advantage associated with joining a research group is being able to work closely with a faculty member. Such a close working relationship often leads to strong letters of reference that are needed when applying for jobs, professional schools, or graduate schools.

The Departments of Chemistry and Biology offer a wide variety of interesting research projects for students to choose from. Projects are available in the areas of nanotechnology, polymer chemistry, organic and inorganic synthesis, analytical chemistry, computational chemistry, environmental chemistry, biochemistry, microbiology, cell biology, and molecular biology. For details on the research programs of chemistry faculty members, please refer to the department's "Student Handbook" that is available in the Chemistry Department Office (D-129 Science) and on the department's website.

Scholarships and Awards

Scholarships:

- ***Roland Trytten Scholarship*** — Offered to one or two outstanding incoming freshman students each year. This scholarship is worth $4,000 over the course of a student's four years at UWSP and was established in memory of Roland Trytten, a long-time chair of the department. Details concerning the application process can be found on the department's website.
- ***Peter Fuqua Memorial Scholarship*** ($500 applied towards tuition) — Established by the family of Peter Fuqua, a 1971 graduate of our department. It is presented annually to a junior chemistry major in recognition of academic accomplishments and of involvement in campus and/or community activities including support for the needy.
- ***Gilbert Kazcmarek Scholarship*** ($500 applied towards tuition) — Created by an endowment from Gilbert J. Kaczmarek, a graduate of our department. It is awarded to a junior chemistry major for distinguished achievement in academics, leadership and a demonstrated potential for success as a chemist.
- ***Trytten-Thalacker Scholarship*** (approx. $2000 applied towards tuition) — Established by Victor Thalacker, a graduate of our department, in memory of his professor and mentor Roland Trytten. It is presented annually to a high-achieving undergraduate student majoring in either chemistry, physics or mathematics.
- ***Wisconsin Chemistry Student Scholarship*** ($500 applied towards tuition) — Established by an anonymous donor in 2008. It is presented annually to a deserving junior or senior chemistry major who resides in Wisconsin.

Awards:

The Chemistry Department administers 14 awards to recognize outstanding student performance in the chemistry curriculum. The recipient of each award is, in general, decided via a nomination and balloting process by the faculty of the Department. Awards are presented annually in the latter portion of the spring semester.

Alumni Success

A crucial question in choosing a major is "Can I find a job when I graduate?" The UWSP Department of Chemistry plays a central role in helping its graduates find satisfying and appropriate employment upon completion of the chemistry or biochemistry major. This is done by personal referral and exposure of students to current openings. The department also provides individual assistance, as requested, in preparing resumes and applications and on how to handle a job interview. Personal letters of recommendation are also available from faculty familiar with the student's performance record. These letters might be written by the student's instructor in a particular course, academic advisor, and research advisor.

UWSP graduates in chemistry and biochemistry are very competitive in today's job market. About 35% of UWSP chemistry and biochemistry graduates go on to graduate or professional schools. Schools across the country have a high regard for the chemistry program at UWSP and vie competitively for our graduates. Successful job placement is usually attained within six months of graduation.

UWSP Chemistry and Biochemistry Graduates at Work

Director of Technical Services
Siemens Water Technologies. Wausau, WI

Medical Student
Medical College of Wisconsin
Des Moines College of Osteopathy

High School Chemistry Teacher
Marathon H.S., Marathon, WI
East H.S., West Bend, WI
Reedsville H.S., Reedsville, WI

Analytical Chemist
Coating Place Inc, Verona, WI
Ortho Molecular Products, Stevens Point, WI

Product Development Chemist
Guzmer Enterprises, Waupaca, WI

Process Engineer
Pacur Industries, Oshkosh, WI

Manager of Process Improvement
Aldrich Chemical Company, Milwaukee, WI

Pharmacy Student
UW-Madison, School of Pharmacy

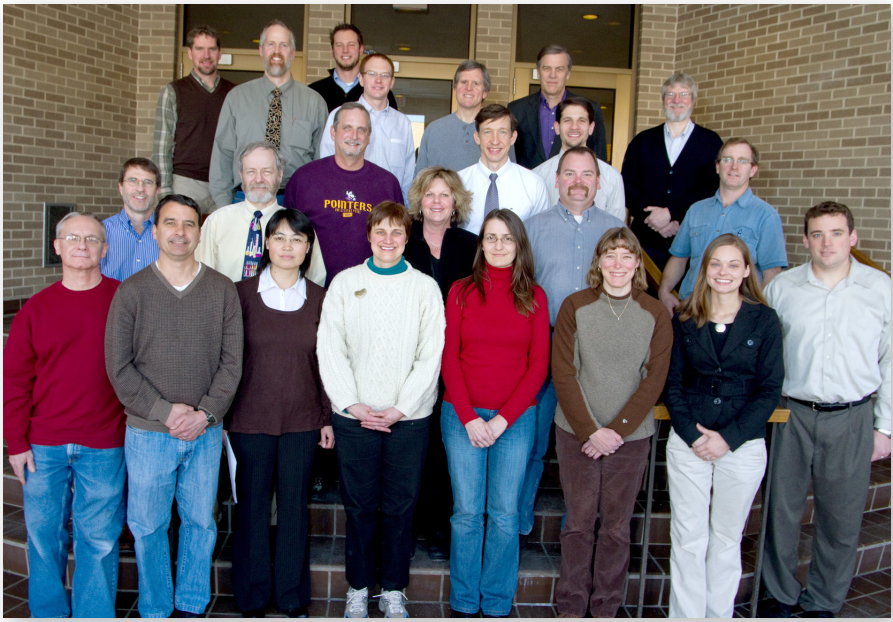
Chemistry Professor
University of Wyoming, UW-La Crosse,
UW-Green Bay, UW-Stevens Point

Chemistry Graduate Student
Univ. of Minnesota , UW-Madison,
University of Utah, Purdue University,
Washington State University
University of Indiana, Marquette University,
University of Iowa,
University of Southern Mississippi,
University of Arizona

Research & Development Chemist
Bristol-Myers Squibb Pharmaceuticals

Director of Instrument Facility
Northwestern University

Faculty and Staff



Cristina Altobelli, Academic Department Associate, *caltobel@uwsp.edu*

Robert Badger, Professor, *rbadger@uwsp.edu*
Ph.D.—Organic Chemistry, University of Toledo
Interests: Nuclear magnetic resonance spectroscopy;

Nate Bowling, Assistant Professor, *nbowling@uwsp.edu*
Ph.D.—Organic Chemistry, UW-Madison
Interests: Organic synthesis of extended conjugated systems;

James Brummer, Professor, *jbrummer@uwsp.edu*
Ph.D.—Physical chemistry, Washington State University
Interests: Photoluminescence of metal-centered complexes

Laura Cole, Associate Professor, *lcole@uwsp.edu*
Ph.D.—Analytical Chemistry, University of Florida
Interests: Bio-analytical investigations using separation methods

Kevin Czerwinski, Professor, *kczerwin@uwsp.edu*
Ph.D.—Organic Chemistry, UW-Milwaukee;
Interests: Synthesis of organic compounds for pharmacological study

Jason D'Acchioli, Assistant Professor, *jdacchio@uwsp.edu*
Ph.D.—Inorganic Chemistry, Ohio State University
Interests: Computational chemistry, inorganic synthesis, spectroscopy, and reaction mechanisms

John Droske, Professor, *jdroske@uwsp.edu*
Ph.D.—Organic and Polymer Chemistry, Colorado State University
Interests: Synthesis of polymers for biomedical applications and the synthesis of thermally stable polymers

Paul Hladky, Professor and Chair, *phladky@uwsp.edu*
Ph.D.— Chemical Physics, University of Minnesota-Minneapolis
Interests: Theoretical modeling of polymer growth

Jim Lawrence, Assistant Professor, *jlawrenc@uwsp.edu*
Ph.D.—Biochemistry and Molecular Biology, Purdue University
Interests: IGFBP-4 protease specificity and mechanistic studies

Gary Lueck, Laboratory Instructor, *glueck@uwsp.edu*
M.S.—Natural Resource - Water Chemistry, UW- Stevens Point;
Interests: Chemical education

Margaret O'Connor-Govett, Stockroom Manager, *poconnor@uwsp.edu*
B.S.—Biology, UW-Stevens Point

Gary Shulfer, Instructional Specialist, *gshulfer@uwsp.edu*
B.S.—Chemistry, UW-Stevens Point
Interests: Chemical education and chemical demonstrations

David Snyder, Assistant Professor, *dasnyder@uwsp.edu*
Ph.D.—Environmental Chemistry and Technology, UW-Madison
Interests: Monitoring pollutants in environmental air samples

Erin Speetzen, Assistant Professor, *espeetze@uwsp.edu*
Ph.D.—Physical Chemistry, University of Minnesota
Interests: Computational chemistry of biologically relevant systems including small molecule reactions and enzyme-ligand interactions

Robin Tanke, Professor, *rtanke@uwsp.edu*
Ph.D.—Organic and Organometallic Chemistry, Yale University
Interests: Synthesis of germanium complexes

Anthony Timerman, Associate Professor, *atimerma@uwsp.edu*
Ph.D.—Biochemistry, Ohio State University
Interests: Biochemistry and biophysics of integral membrane proteins

Steven Wright, Professor, *swright@uwsp.edu*
Ph.D.—Inorganic Chemistry, Marquette University
Interests: Chemical education and inorganic chemistry

Mike Zach, Assistant Professor, *mzach@uwsp.edu*
Ph.D.—Analytical Chemistry, University of California-Irvine
Interests: Electrodeposition of nanowires and the development of nanostructure chemical sensors

Facilities, Equipment and Other Resources

Laboratory Facilities: The UWSP Department of Chemistry has seven teaching laboratories (24 student capacity), an advanced-level laboratory (16 student capacity), two large instrument rooms, and a laser/spectroscopy laboratory. The department has ten research laboratories with a total area in excess of 5200 square feet. Many of our research areas have been remodeled within the past seven years.

Computer Facilities and Support: The department maintains a computer laboratory that houses 13 new (summer of 2009) dual-processor, power McIntosh computers. Resident on these computers is a wide-range of software for molecular-level calculations, mathematical computation, data analysis and presentation, spectral analysis, and manuscript preparation. Chemistry and Biochemistry majors are issued keys to this room that affords them 24-7 access. The department is supported by experts from our Information Technology division and the Science Computer Support Specialist from the College of Letters & Science. Two of the department's faculty members have recently collaborated to purchase a high-powered computer cluster for performing advanced calculations on inorganic, organic, and biomolecules.

Research Funding: Recent (2005-2010) faculty hires received an average of $17,000 in start-up funds from the University and an additional $5,000 from the Department of Chemistry. These funds have allowed them to expeditiously initiate their research programs, which in turn provide outstanding learning opportunities for students.

The College of Letters & Sciences administers the Undergraduate Educational Initiative (UEI) Fund and the L&S Enhancement Fund to which faculty can apply for monies to support their research efforts. These funds have provided research stipends for students to perform faculty-mentored research during the regular school year and in the summer. Chemistry faculty members have also been very successful at writing external grants to support their research and purchase instruments for the department. Recent grants have been awarded by the National Science Foundation, the National Institutes of Health, the Research Corporation, the American Chemical Society, and the State of Wisconsin.

Philip and Helen Marshall have generously endowed the Philip and Helen Marshall Chemistry Research Fund which supports the research efforts of chemistry faculty members. Philip Marshall is a former Chancellor of UWSP and taught in the Department of Chemistry for two years.

Major Equipment: The Department of Chemistry possesses a wide-array of modern, sensitive instruments for chemical analysis. All of these instruments are used by students in their classes and research. We place a high priority on students acquiring hands-on experience with modern instruments.

Major Instruments

- Bruker Avance III 400 MHz Superconducting Nuclear Magnetic Resonance Spectrometer
- Agilent Model 6520 Liquid Chromatograph with a QTOF Mass Detector
- Agilent Model 1200 Gel Permeation Chromatograph with Laser Light Scattering, Refractive Index, and Viscometry Detectors
- Agilent Technologies 6870N Gas Chromatograph with a 5973 Mass Detector
- Agilent 1100 Series High Performance Liquid Chromatograph
- Perkin-Elmer AAnalyst 100 Atomic Absorption Spectrophotometer
- Perkin-Elmer Optima 3100-XL Inductively Coupled Plasma Spectrometer
- Cary 300 Conc UV-Visible Spectrophotometer
- Jasco 460 Plus Fourier Transform Infrared Spectrometer (x 2)
- Aminco-Bowman Series 2 Luminescence Spectrometer
- Perkin-Elmer Pyris 1 Differential Scanning Calorimeter
- Perkin-Elmer Pyris 1 Thermogravimetric Analysis System
- Laser/Spectroscopy Laboratory: Nitrogen Pumped Dye Laser and Argon-ion Laser
- Computer Laboratory with 13 Power Macintosh Computers
- Braun MB-SBS Two Solvent Purification System (x 2)
- Altix CMN024 Computer Cluster
- Ambius EIU Atomic Force Microscope

Polymer Education Center: (Director: Dr. John Droske, jdroske@uwsp.edu): The Department is home to the American Chemical Society's National Information Center for Polymer Education. This center serves as a clearinghouse for information on polymer education and distributes resources to teachers throughout the U.S. The Center also offers "hands-on" polymer experiments and demonstration workshops for teachers, students and other groups.

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www.uwsp.edu/chemistry/

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