

Biochemistry

Department Information

- **Department Chair:**
Gregory Cook, Ph.D.
- **Graduate Admissions Director:**
Svetlana Kilina, Ph.D.
- **Email:**
svetlana.kilina@ndsu.edu
- **Department Location:**
Ladd Hall
- **Department Phone:**
(701) 231-8694
- **Department Web Site:**
www.ndsu.edu/chemistry (<http://www.ndsu.edu/chemistry/>)
- **Application Deadline:**
April 15 for fall, October 31 for spring. Spring admissions depend on the availability of fellowships and faculty interests. If there are no spring openings, spring applications are automatically considered for the subsequent fall semester.
- **Credential Offered:**
Ph.D., M.S.
- **Test Requirement:**
GRE required from applicants who have not earned a degree in the U.S. (general and subject recommended for domestic students, but not required)
- **English Proficiency Requirements:**
RA - TOEFL 71, IELTS 6, Duolingo 100; TA Grader - TOEFL 79, IELTS 6.5, Duolingo 110; TA Instructor - TOEFL 81, IELTS 7, Duolingo 115

Program Description

The Department of Chemistry and Biochemistry offers graduate study leading to the M.S. and Ph.D. degrees. The department also participates in the interdisciplinary Ph.D. program in Cellular and Molecular Biology.

At the start of the first year of study, entering graduate students take entrance examinations in chemistry and biochemistry, as well as analytical, inorganic, organic, and physical chemistry. The graduate student progress committee uses these exams for advisory purposes in recommending course work during the first year. As a consequence, programs are individually tailored to the needs of each student.

The chemistry, biochemistry, and molecular biology of plant, animal, insect, and microbial systems are studied through advanced course work and research. Selection of the area of emphasis depends on the interests of the student. Typically, course work is completed in one to one-and-a-half years for M.S. candidates, and two years for Ph.D. candidates, leaving later years for full-time thesis research. The typical time to complete a graduate degree averages three years for the M.S. degree and approximately five years for the Ph.D.

Research Opportunities and Infrastructure

The Department of Chemistry and Biochemistry has more than 10 externally funded faculty research programs. Research expenditures have averaged \$1.8 million over the last 10 years, with more than \$2.2 million in the last two years.

All research and most teaching activities within the department occur within three centrally-located buildings, including two connected facilities, Ladd Hall and Dunbar Laboratory, as well as the Quentin Burdick Building, located across the street.

Most departmental offices, classrooms and teaching labs, as well as some research labs are located in Ladd Hall, while Dunbar and the third floor of the Quentin Burdick Building primarily consist of research laboratories. Ladd Hall also houses departmental glass, machine, and electronics shops.

Modern instrumentation is vital to research in the chemical sciences. The quality and quantity of instrumentation within the department has been greatly enhanced in the last few years through aggressive fundraising efforts and university matching support.

The department has recently upgraded its mass spectrometry capabilities to include a Bio-TOF III with accurate mass analysis, ESI and CI ionization; as well as an Esquire 3000 Plus - an Ion trap instrument with MS-MS and proteomics capabilities. A dedicated LC can be integrated with the both the instruments.

The Organic Spectroscopy Laboratory is primarily devoted to maintenance and operation of Nuclear Magnetic Resonance (NMR) spectrometers. The recently upgraded facility includes three modern high-field instruments: Varian 500, 400, and 300 MHz spectrometers. All have multinuclear, 2-D,

and variable temperature capabilities, and the 400 MHz instrument has been recently upgraded for solids capabilities. This center also includes the departmental FTIR.

The Materials Characterization Laboratory houses the departmental crystallography facilities, including a Bruker single crystal CCD X-ray diffractometer with low temperature capabilities, a Philips MPD (Multi- Purpose Diffractometer), two Philips X-ray powder diffractometers, and a KeveX X-ray fluorescence unit. CHN Elemental analysis, thermogravimetric analysis (TGA), differential scanning calorimetry (DSC), and differential thermal analysis (DTA) are also available.

The Center for Protease Research - Core Biology Facility is a new facility housing equipment and technical personnel for performing bioassay, cell and tissue culture, and molecular biology experiments. For bioassays, the facility has a fluorimeter capable of top or bottom reading and the capability to handle both 96- and 384-well plates. For sample preparation, researchers can utilize cell and tissue culture capabilities such as flow hoods and culture chambers. In addition, RT-PCR and FPLC protein purification technology is available.

The chemistry library, located in Ladd Hall, provides graduate students and faculty with convenient 24-hour access to more than 200 journals and approximately 10,000 volumes. Literature searching via SciFinder is supported.

Prospective students are encouraged to visit the Department of Chemistry and Biochemistry website (<http://www.ndsu.edu/chemistry/>) for the latest descriptions of research programs and instrumentation.