



Greetings from the Department Head

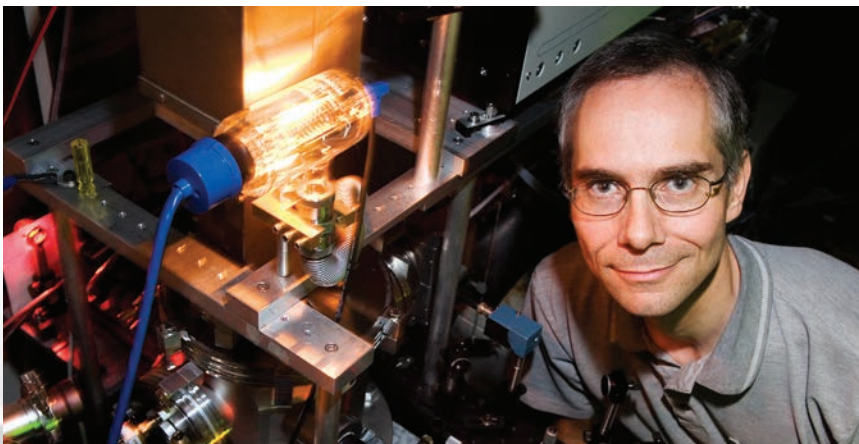
All of us in the Department of Chemistry welcome your interest in our graduate program. We offer comprehensive coverage of all specialty areas in modern chemistry. There are active research programs in the subdisciplines of analytical, inorganic, organic, and physical chemistry, as well as exciting interdisciplinary programs in chemical biology and materials chemistry. Faculty and students in our laboratories benefit from our close relationships with other departments on campus, including Biochemistry, Materials Science, Physics, and Chemical & Biomolecular Engineering. The Department of Chemistry is a focal point for interdisciplinary research on campus.

Illinois Chemistry offers a wide range of opportunities to the young scientist just embarking on an independent career. Our tradition of commitment to excellence results in a uniquely rich environment for research and learning in the chemical sciences. This brochure will give you a first glimpse of the exciting atmosphere you will experience in our graduate program.

The American Chemical Society, in a review of various programs, has called the School of Chemical Sciences at Illinois "a major force in chemical education" in the U.S., and national rankings of chemistry departments consistently put Illinois near the top. We are very proud that our faculty and alumni have played a vital role in shaping the chemical sciences in our nation. As a graduate student at Illinois, you will experience the thrill of working on the most challenging problems in the molecular sciences. After graduation, you will join the world's largest and most successful group of chemical sciences alumni.

I very much hope to meet you next fall here at Illinois.

Professor Martin Gruebele
Head, Department of Chemistry





Roger Adams Laboratory (RAL)

Chemical & Life Sciences Laboratory (CLSL)



Department Administration

The Department of Chemistry has been part of the University of Illinois since the university's beginning in 1868. By 1893, a four-year BS degree program in Chemistry had been established, and the first PhD in Chemistry was awarded in 1903. By the 1920s, the department was one of the largest in the United States in terms of facilities, faculty, and degrees granted. By the end of the twentieth century, more than 3,400 doctoral degrees had been awarded, making the Department of Chemistry at the University of Illinois the premier PhD-producing chemistry program in the United States.

Associate Head of Budget and Operations



Professor Scott Silverman is the Associate Head of Budget and Operations. He chairs the department's Budget and Operations Committee. He coordinates development and implementation of department policies on financial topics, space, teaching, and teaching

assistants. He manages allocation of space within the department. He coordinates with the Assistant Director of Finance and Administration regarding all grants, procurements, and human resources topics. He is an ex officio member of the Admissions Committee, working with the Admissions Committee Chair to finalize all documents and procedures associated with graduate admissions.

Associate Head of Major Projects



Professor Josh Vura-Weis is the Associate Head of Major Projects. He coordinates with the School of Chemical Sciences (SCS) regarding major building projects as well as renovations, repair, and maintenance of department space. He coordinates with SCS service and support

facilities regarding their service to departmental faculty, staff, and students. He oversees the implementation of department safety policies and practices in concert with SCS.

Director of Graduate Studies



Professor Wilfred van der Donk is the Director of Graduate Studies (DGS), who oversee students in the doctoral program. As DGS, he coordinates with the Associate Head of Budget and Operations to provide oversight to the Graduate Admissions Committee. He works

with the faculty to review decisions on the passing of requirements by doctoral candidates and the acceptability of dissertations submitted by graduate students.

Director of General Chemistry



Dr. Christian Ray serves as the department's undergraduate Director of General Chemistry. He is responsible for managing the general chemistry courses and the general chemistry instructional staff, who serve undergraduate chemistry majors as well as students

from across campus. Christian is also the faculty advisor for Project SEARCH (Science Education and Research for Children).

Director of Undergraduate Studies



Tina Huang is the Director of Undergraduate Studies (DUGS). She is responsible for monitoring all aspects of the undergraduate program with the overall goal of better serving the Department of Chemistry undergraduate majors. This includes evaluating the

effectiveness of multiple programs and services that constitute the undergraduate program in chemistry such as undergraduate advising, access to and quality of research experiences, job placement and access to internships, programs to recruit and retain underrepresented minorities, courses and curriculum. She is also liaison to the various offices and facilities that serve the undergraduate students within the department, including the Chemistry Learning Center, the SCS Career Counseling and Placement Services, and the SCS Academic Advising office.

Departmental Staff

Administrative Office

107 & 109 NL (Noyes Laboratory)
505 S. Mathews Ave., Urbana, IL 61801
217-333-5071 • Fax 217-244-7091



Jenny Cox
Associate Director
for Administration
107D NL
jcox@illinois.edu
217-244-3915



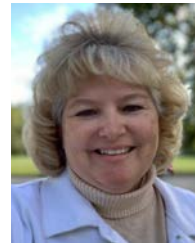
Lloyd Munjanja
Assistant Director of
Graduate Diversity
& Program Climate
109C NL
munjanja@illinois.edu
217-300-4174



Katie Einck
Financial Analyst
107C NL
keinck@illinois.edu
217-333-4938



Tina Lamb
Office Administrator
109 NL
tinalamb@illinois.edu
217-333-9846



Jackie Miller
Office Support
Specialist
109 NL
jmill24@illinois.edu
217-244-3334

Graduate Admissions 217-244-6245



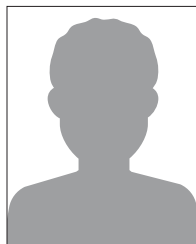
Sean Drummond
Admissions &
Records Supervisor
109G NL
sqd@illinois.edu
217-244-3915



Lisa Williamson
Office Support
Specialist
109E NL
lisaw@illinois.edu
217-300-7265



Christen Mercier
Stewardship
Coordinator
109D NL
cmercier@illinois.edu
217-300-6506



vacant
Communications
Specialist
107A NL



Eva Miller
Events & Activities
Specialist
107B NL
emillr@illinois.edu
217-244-3042

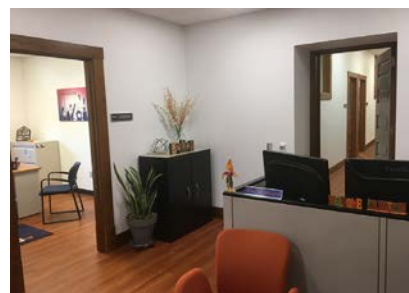
Student Services



Connie Knight
Graduate Program
Coordinator
109B NL
cknight4@illinois.edu
217-300-4452



Heather Schulze
Undergraduate
Student Services
Coordinator
109A NL
schulze@illinois.edu
217-244-9875



Departmental Staff (outside of the Administrative Office)

Engagement and Development



Joe Madden
Associate Director of
Development
101 LAS (College of Liberal
Arts and Sciences)
jsmadden@illinois.edu
217-333-7108

Instructional Technology



Doug Mills
Director of
Instructional
Technology
2019 Chem Annex
dmills@illinois.edu
217-244-5739



**Alejandro (Alex)
Ibarra**
Senior Instructional
Technology
Specialist
468 NL
aibarr@illinois.edu
217-244-0947

Chemistry Learning Center



Dr. Sarah Sheeley
Senior Chemistry
Learning Center
Specialist
212 Chem Annex
sheeley@illinois.edu
217-333-2998

Chemistry Library

170 NL (Noyes Laboratory)
505 S. Mathews Ave., Urbana, IL 61801
For library hours please visit the website at:
library.illinois.edu/chx

The Chemistry Library is one of the oldest chemistry research libraries in the country. It is part of the University Library, whose extensive collection boasts more than 14 million volumes.

The Library collects materials covering all aspects of chemistry and chemical and biomolecular engineering, and provides online access to all journals and e-books published by the American Chemical Society, Wiley, Elsevier, Springer, and the Royal Society of Chemistry. Research databases include SciFinder Scholar, Scopus, Reaxys, and Web of Science. Reference materials such as the CRC Handbook of Chemistry and Physics, Kirk-Othmer Encyclopedia, e-EROS, and several Crystallography databases are all available online.

Remodeled in 2006, the Library offers individual study spaces, an interactive group collaboration room, and a large conference room with projection equipment and teleconferencing capabilities. Scanning equipment and a public printer are also available.

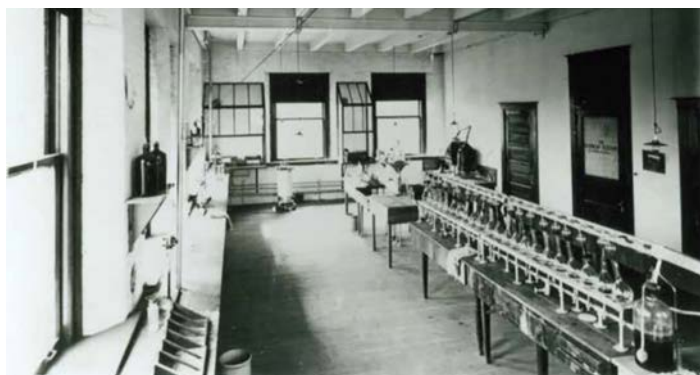


Dr. Mary Schlembach
Chemistry Librarian
schlemba@illinois.edu
217-333-3158



Anna Marie Gerard
Senior Library Specialist
agerard@illinois.edu
217-244-2570

Department of Chemistry History



The Department of Chemistry at the University of Illinois has a rich history that can be traced back to the founding of the University, then known as the Illinois Industrial University. Over its 150 year history, the department has expanded from a basement lab to four buildings, been the site of some of the most important chemical breakthroughs of the last century, and has counted eleven Nobel Prize winners amongst its faculty, fellows, and alumni.

Area Offices

Analytical Chemistry

68 RAL (Roger Adams Laboratory)
600 S. Mathews Ave., Urbana, IL 61801
chemistry.illinois.edu/analytical

Analytical Chemistry at Illinois focuses on measurement science that can help solve some of the most challenging problems in biomedicine, energy generation and storage, environmental quality, and security. From attoseconds to eons, single molecules to bulk materials, isotopic substitutions to reaction network dynamics, the characterization of chemical systems is, as it has been for over a century, a central strength of the Department. World-class support facilities for surface



Gayle Adkisson
adkssn@illinois.edu
217-244-2467



and bulk characterization, instrument fabrication, and computation speed forefront development of science and technology.

Inorganic / Materials / Physical Chemistry (IMP)

A131 CLSL (Chemical and Life Sciences Laboratory)
601 S. Goodwin Ave., Urbana, IL 61801
chemistry.illinois.edu/inorganic
chemistry.illinois.edu/materials
chemistry.illinois.edu/physical

The University of Illinois is one of the premier institutions in Inorganic Chemistry, as shown by its ranking as one of the top 10 graduate inorganic programs by US News and World Report. The faculty members not only are leaders in the field, but are also outstanding mentors of graduate students working toward their PhD degrees. Our students have gone on to extremely successful careers in both academia and industry. The program covers all areas of modern inorganic chemistry from organometallic chemistry, kinetics/mechanism, and catalysis to the frontiers of materials chemistry, bioinorganic chemistry, and advanced physical characterization.

IMP Staff

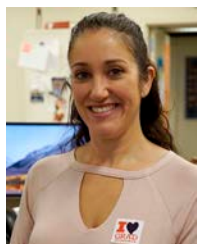
chem-imp@illinois.edu

The Materials Chemistry specialization is an exciting, interdisciplinary program of research at the intersection of materials science and chemistry. Faculty in this specialization represent a range of research interests from biomaterials to polymers to inorganic nanoparticles. Our research encompasses the chemical synthesis of materials, the molecular and physical basis of materials structure and properties, and the interplay between molecular-level structure, composition, and functional properties.

Physical Chemistry studies the physical principles that govern the properties and behavior of chemical

systems, both at the macroscopic and at the molecular level, using experimental techniques, theoretical analysis and computer simulation. Equilibrium and nonequilibrium properties of chemical reactions and phase transformations are studied by thermodynamics and statistical mechanics. Electronic structure applies the laws of

quantum mechanics to predict chemical bonding and molecular structure. The rates and mechanisms of chemical transformations are studied in chemical kinetics. Experimental techniques range from imaging and mass spectroscopy to laser spectroscopy and magnetic resonance.



Lisa Johnson

lisa3@illinois.edu
217-300-9574



Kate Neef

kneef1@illinois.edu
217-300-7223



Raegan Smith

raegans@illinois.edu
217-300-5294



Katie Trabaris

trabari1@illinois.edu
217-244-8632

Organic Chemistry / Chemical Biology (OCB)

61 RAL (Roger Adams Laboratory)
600 S. Mathews Ave., Urbana, IL 61801

chemistry.illinois.edu/organic
chemistry.illinois.edu/chem-bio

The chemistry of carbon compounds, Organic Chemistry, has a long and rich history and continues to be a vibrant and dynamic field of research. Organic chemistry has evolved both as a core discipline and as an integral component of modern biology, medicine, materials science, and a host of other fields. Despite the expanding definition and influence of the field, the central mission of organic chemistry remains unchanged. Thus, the efforts of students within the organic chemistry area are squarely focused on the synthesis, characterization, and study of organic compounds, the understanding of structure, function, and reactivity, and the invention of entirely new reactions, processes, and properties.

OCB Staff

chem-ocb@illinois.edu

Any definition of "Chemical Biology" is inherently imprecise, due to the immense breadth of this relatively new scientific discipline. Many chemists working in chemical biology use chemical tools and approaches to understand and control biological systems, whereas others apply biology in service of chemistry. Our program has many research groups that are investigating all facets of modern chemical biology, with close connections to analytical, inorganic, materials, organic, and physical chemistry.



Sarah Bransley

bransle2@illinois.edu
217-300-1103



Lori Johnson

ljohnso2@illinois.edu
217-333-2255



Katriena Knights

kknights@illinois.edu
217-300-4552



Kara Metcalf

metclf@illinois.edu
217-244-0769

School of Chemical Sciences Facilities

SCS CORES (School of Chemical Sciences: Center of Research and Educational Support)

scs.illinois.edu/cores



Career Counseling and Placement Services

105 NL (Noyes Laboratory)
505 S. Mathews Ave., Urbana, IL 61801
scs.illinois.edu/careers

Provide guidelines, resources, and opportunities to School of Chemical Sciences job seekers to help them achieve their career aspirations relevant to their academic interests and to facilitate and support connections between employers and those job seekers.



Patricia Simpson
Director
plblum@illinois.edu
217-333-1050



Gayle Nelson
Recruiting Coordinator
gln@illinois.edu
217-333-3461

Cell Media Facility

Dr. Sandy McMasters, Director
491 RAL (Roger Adams Laboratory)
600 S. Mathews Ave., Urbana, IL 61801
scs.illinois.edu/cellmedia
smattick@illinois.edu
217-244-5898

At your disposal are economical materials required for the growth of bacteria, yeast, and cultured cells. Services include classic and custom cell culture medium, solid media plates, competent cells, cryogenic cell storage, charcoal-dextran treatment of serum, and cell culture training. Instrumentation



includes the Storm, a laser-based scanner for storage phosphor and fluorescent imaging. The facility also features a complete biosafety level 2 cell culture work area that may be utilized by any researcher who lacks such equipment.

George L. Clark X-Ray Facility and 3M Materials Laboratory

Dr. Danielle Gray, Director
60 NL (Noyes Laboratory)
505 S. Mathews Ave., Urbana, IL 61801
scs.illinois.edu/x-ray
dgray@illinois.edu
217-244-1708

Provides complete structural characterization services using X-rays in solution, colloids, liquid crystals and solids. The facility performs a wide variety of X-ray diffraction experiments on WAXS, SAXS and two CCD instruments, and maintains structural database systems providing electronic search, retrieval, analysis and graphics for inorganic,



organic and macromolecular structures. The professional staff offers instruction on small molecule and macromolecular crystal growth, design of X-ray experiments and strategies for data collection. Trained users have access to the single crystal diffractometers by appointment.

Computer Applications and Network Services (CANS)

125 NL (Noyes Laboratory)
505 S. Mathews Ave., Urbana, IL 61801
scs.illinois.edu/computing
computing@scs.illinois.edu
217-333-6035

Provides hardware, software, and personnel resources to facilitate the use of computational science and molecular modeling in theoretical and experimental research. The visualization laboratory offers training and a wide selection of scientific software and databases for molecular modeling and analysis. The facility also provides hands on support for network, phones and computers.

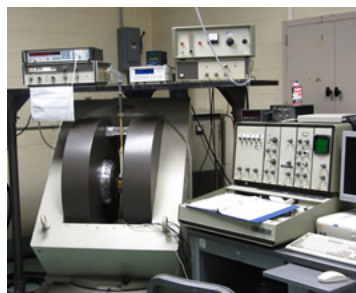


Jay Guelfi
IT Manager
152 NL (Noyes Laboratory)
jeguelfi@illinois.edu
217-244-7515

Electron Paramagnetic Resonance Laboratory (EPR)

Dr. Mark Nilges, Lab Manager
A149 CLSL (Chemical and Life Sciences Laboratory)
601 S Goodwin Ave, Urbana, IL 61801
scs.illinois.edu/epr
mjnilges@illinois.edu
217-333-3969

Your EPR (electron paramagnetic resonance), ENDOR, and ESEEM needs are met here. EPR has applications in chemistry, physics, biology, and medicine: it may be used to probe the “static” structure of solid and liquid systems, and is also very useful in investigating dynamic processes. Scientists



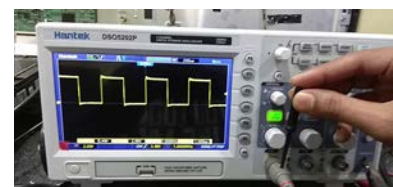
of all disciplines can visit the lab and undertake collaborative or other work. Prospective users should contact the Lab Manager, Dr. Mark Nilges, to discuss the scientific problem and make the necessary arrangements.

Electronic Services (previously CEES)

Kyle Kroha, Interim Supervisor
125 NL (Noyes Laboratory)
505 S. Mathews Ave., Urbana, IL 61801
scs.illinois.edu/electronics
kkroha@illinois.edu
217-333-6035 or 217-300-1610

Offers design, construction and repair service for electronic and electro-mechanical equipment. Our engineers work with clients to design and fabricate hardware that may not be commercially available. Expert technicians are available for repair and maintenance of equipment and devices used in both research and teaching laboratories.

Please continue to submit CEES work orders through Reaction and address specific repair requests through Kyle Kroha at the email address above.



Glass Shop

Andy Gibbs, Supervisor/Glassblower

114 NL (Noyes Laboratory)

505 S. Mathews Ave., Urbana, IL 61801

scs.illinois.edu/glass-shop

agibbs@illinois.edu

217-333-3610

An on-site facility for creating or repairing one-of-a-kind glassware. Clients can work directly with a scientific glassblower to develop new designs and to make custom glassware needed for research. The facility also specializes in the repair and modification of existing glassware, often reducing cost and downtime associated with replacement of critical equipment. The shop is open Monday through Friday from 8:00 am to 12:00 pm and 12:30 pm to 4:00 pm. Walk-ins are welcome from 1:00 pm to 4:00 pm every weekday. Please schedule an appointment if visiting outside of walk-in hours.



E-chem Cell



Allihn Condenser

Graphic Services

Dorothy Loudermilk, Director

71 NL (Noyes Laboratory)

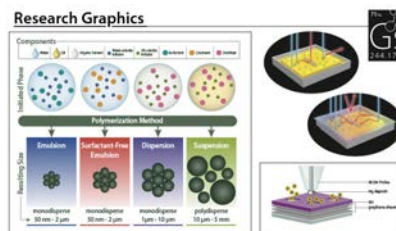
505 S. Mathews Ave., Urbana, IL 61801

scs.illinois.edu/graphics

loudermi@illinois.edu

217-244-1784

The Graphic Services facility provides a wide range of digital imaging, technical drawing and graphic design services for instructional use, publication and seminars. Design and production for large format or large volume jobs including signage, displays, posters, brochures and booklets is also available.



The facility has professional-quality equipment to produce transparencies, prints and illustrations from a variety of computer formats. Researchers can submit their own files or Graphic Services staff can create original artwork from customer specifications.

High Pressure / Hydrogenation Lab (HP/HL)

Dr. David Sarlah, Faculty Advisor

P-8 Penthouse RAL (Roger Adams Laboratory)

600 S. Mathews Ave., Urbana, IL 61801

scs.illinois.edu/hphl

sarlah@illinois.edu

217-244-9154

The purpose of the HP/HL is to provide an environment outside of a standard research laboratory with additional safety features where chemical reactions can be performed at high temperatures and/or high pressures in equipment designed for those purposes.



The HP/HL has a control room and two 4' x 6' cells which are independently ventilated. They have walls reinforced with 3/8" plate steel and 12" reinforced concrete as well as sliding reinforced doors with bullet-resistant viewing windows.

High-Throughput Screening Facility (HTSF)

Dr. Chen Zhang, Director

361 NL (Noyes Laboratory)

505 S. Mathews Ave., Urbana, IL 61801

scs.illinois.edu/htsf

czhang8@illinois.edu

217-244-4198

Assists researchers in developing, optimizing and performing high-throughput screenings (HTS) of chemical libraries to identify macro-molecule effectors. The HTSF contains over 180,000 small molecule compounds. The users will have access to facility equipment including liquid handlers, plate readers, plate washer, plate centrifuge and robotic organic synthesizer. In addition to HTS, the facility can also assist with experiments in mammalian cell cultures.



Machine Shop

Dave Williams, Shop Supervisor

B71 RAL (Roger Adams Laboratory)

600 S. Mathews Ave., Urbana, IL 61801

scs.illinois.edu/machineshop

scs-machineshop@illinois.edu

217-333-4278

Builds and repairs ultra-high vacuum, high pressure, optical and mechanical equipment. The facility also assists in the design of new and custom equipment to meet research needs. They operate a student shop which provides training in basic milling, drilling,



lathe turning, soldering, and sawing techniques. This training course also discusses the generation and interpretation of machine drawings.

Mass Spectrometry Laboratory (MSL)

Dr. Furong Sun, Director

41 NL (Noyes Laboratory)

505 S. Mathews Ave., Urbana, IL 61801

scs.illinois.edu/massSpec

frs@illinois.edu

217-333-2545

The School of Chemical Sciences Mass Spectrometry Laboratory (MSL) provides a wide range of chemical analysis using mass spectrometry techniques for organic and biological samples. The facility is capable of performing analysis on small molecules, small or large non-volatile molecules and mixtures using a variety of ionization techniques. The Carver Biotech Center has many options for proteins available. Instruments range from Quadrupole time-of-flight to multiple MALDI options.



Microanalysis Laboratory

Dr. Danielle Gray, Acting Supervisor

47 NL (Noyes Laboratory)

505 S. Mathews Ave., Urbana, IL 61801

scs.illinois.edu/microanalysis

dgray@illinois.edu

217-244-1708



Provides elemental and thermal analysis. Elemental analysis includes CHN, Halide and ICP analysis. Thermal analysis is done using Micro calorimeter, Thermogravimetric Analyzer (TGA) and Differential Scanning Calorimeter (DSC-Diamond) and can be

used by students once they are trained. The facility is well equipped with a state-of-the-art ICP-MS which can be used to detect trace elements.

Hours are Monday-Friday from 8:30am to 5:00pm.

Nuclear Magnetic Resonance Laboratory (NMR)

Dr. Dean Olson, Director

55 NL (Noyes Laboratory) / 146 RAL (Roger Adams Laboratory)

505 / 600 S. Mathews Ave., Urbana, IL 61801

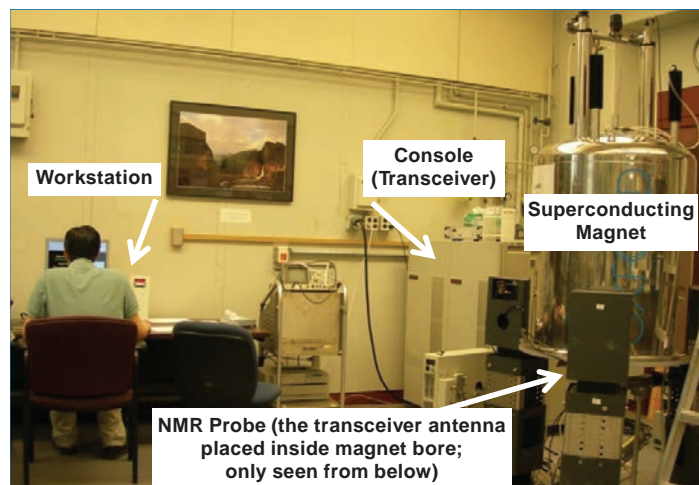
scs.illinois.edu/nmr

dolson@illinois.edu

217-244-0564



The NMR Lab offers a wide range of spectrometers, probes, and technical capabilities including multi-dimensional, multi-nuclear, and solid-state NMR on instruments ranging from three Varian Innova 500 MHz to a Varian 750 MHz widebore. Supported by four full-time staff and two student hourlies, ten spectrometers in three locations allow walk-up and long-term NMR experiments 24/7. New users receive about four hours of individual basic training with additional instruction available for variable temperature control, multi-dimensional NMR, and specialty spectrometers and experiments. Our primary goal is to provide the highest level of NMR performance to the students, staff, and faculty of the School and UIUC campus.



Storeroom

Karla Southern, Coordinator

94 RAL (Roger Adams Laboratory)

600 S. Mathews Ave., Urbana, IL 61801

scs.illinois.edu/storeroom

ksouther@illinois.edu

217-244-0985



Stocks supplies of: chemicals, gloves, glassware, dry ice, general laboratory and office supplies—available for purchase to anyone with a valid University netid and University FOPL account number. Also manages

the SCS Chemical Inventory System “Chem-Tracking” database. Users of each research group have only group-specific access to this database. Hours are 8:00am - 4:30pm.

Campus Facilities

Beckman Institute

405 N. Mathews Ave, Urbana, IL 61801

beckman.illinois.edu

Biomedical Imaging Center (BIC)

bic.beckman.illinois.edu

ryambert@illinois.edu

- Prisma MRI 3 Tesla (2 on location)
- 3 T Siemens Trio (at Carle)
- 14.1 T Varian 600 MHz small-bore scanner
- Siemens Inveon preclinical PET/SPECT/CT
- Perkin-Elmer IVIS/CT
- Visual Sonics Vevo 2100 – high frequency preclinical ultrasound

Imaging Technology Group (ITG)

itg.beckman.illinois.edu

Staff: itg@beckman.illinois.edu

Partial list of equipment (for full list see website).

- Atomic Force Microscope (MultiMode AFM)
- Dissecting Light Microscope (Stereoscope)



- Fluorescence Light Microscope
- Inspection Light Microscope
- Leica SP8 Confocal Microscope
- Micro-Spectroscopy & Stereology Workstations
- Transmission Electron Microscope
- Clean room

Blue Waters Sustained Petascale Computing (National Center for Supercomputing Applications)

725 S. Oak St., Champaign, IL 61820

ncsa.illinois.edu/enabling/bluewaters

217-244-6689

Blue Waters is one of the most powerful supercomputers in the world and is one of the fastest supercomputers on a university campus. Scientists and engineers across the country use the computing and data power of Blue Waters to tackle a wide range of challenging problems, from predicting the behavior of complex biological systems to simulating the evolution of the cosmos.

Blue Waters, built from the latest technologies from Cray, Inc., uses hundreds of thousands of computational cores to achieve peak performance of more than 13 quadrillion calculations per second. If you could multiply two numbers together every second, it would take you millions of years to do what Blue Waters does each second. Blue Waters also has:

- more than 1.5 petabytes of memory, enough to store 300 million images from your digital camera
- more than 25 petabytes of disk storage, enough to store all of the printed documents in all of the world's libraries



- up to 500 petabytes of tape storage, enough to store 10 percent of all of the words spoken in the existence of humankind

Blue Waters is supported by the National Science Foundation and the University of Illinois.

For more information, including details about applying to use Blue Waters, how it is being used, and scientific results achieved by using the supercomputer, visit the Blue Waters website.

Hours: Monday-Friday, 9am - 5pm, central time.

Roy J. Carver Biotechnology Center

1206 W. Gregory Drive, Urbana, IL 61801

biotech.illinois.edu

lipking@illinois.edu

217-333-1695

The Roy J. Carver Biotechnology Center provides a state-of-the-art research infrastructure to investigators. Our portfolio includes core research facilities supporting DNA, functional genomics, bioinformatics, proteomics, flow cytometry and metabolomics.

HPCBIO

HPCBio is a collaborative effort between multiple partners in the University community. It is administratively attached to the Roy J. Carver Biotechnology Center, and incorporates the Center's Bioinformatics Unit. It is strongly anchored in the genomics research agenda of the Carl R. Woese Institute for Genomic Biology (IGB), and in particular in its Genomic Technology program area. It builds on the research expertise of IGB faculty and affiliates. The National Center for Supercomputing Applications (NCSA) provides high-level technical expertise in high-performance computing. The Office of the Vice-Chancellor for Research financially supports HPCBio and provides institutional oversight.

DNA SERVICES

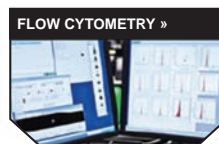
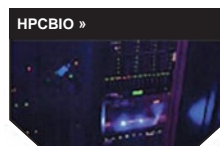
The primary mission of the DNA Services Lab is to provide outstanding service and state-of-the-art instrumentation to support basic, environmental, agricultural, and translational medical research for our campus investigators and external academic and corporate collaborators.

FUNCTIONAL GENOMICS

The Functional Genomics Unit of the W.M. Keck Center uses high-throughput technologies for gene expression, SNP, microbial metagenome, and single cell analysis. The unit offers services for a number of advanced technologies including Fluidigm qPCR, SNP and single cell analysis, Illumina Bead Array, Agilent microarray, and Lifetech qPCR. In addition we have available technologies for accurate quantitation and quality assessment of nucleic acids (Nanodrop, Qubit, Bioanalyzer) as well as a BioRad TC20 cell counter for cell concentration and size distribution.

PROTEIN SCIENCES

The Protein Sciences Facility performs mass spectrometry-based proteomics analyses using Thermo Orbitrap Fusion Tribrid and Q Exactive HF-X



Hybrid Quadrupole-Orbitrap mass spectrometers. The facility has extensive experience and success in providing customized sample preparation and experimental designs for each project to maximize data collection and data analysis. Services include protein identification, mapping post-translational modifications, protein complex analysis (immunoprecipitation, affinity pull downs), quantitation (label-free and isotope labeled) and bioinformatics analysis on the relationships between protein factors and cellular function.

FLOW CYTOMETRY

Flow Cytometry Facility provides the campus research community ready access to analyze and sort live cells or other particles (biological or artificial) based on their optical properties. Flow cytometry instruments measure the characteristics of cells as they flow in the suspension, in single file, through an illuminated volume. Scatter and autofluorescence can be measured, and fluorescent dyes can be added to measure other characteristics.

METABOLOMICS

The primary goal of the Metabolomics Center is to identify and quantify small molecules (metabolites) from various resources including but not limited to plants, animals, and human (BSL1) being. Multiple complementary analytical methods based on mass spectrometry, primarily GC/MS and LC/MS which are funded through the generosity of the Roy J. Carver Charitable Trust and the National Center for Research Resources, are utilized.

The Frederick Seitz Materials Research Laboratory (MRL)

104 S. Goodwin Ave., Urbana, IL 61801

mrl.illinois.edu

mrl@illinois.edu

217-333-1370

Research Cores

Bio Services

mrl.illinois.edu/facilities/bio-services

- Services lab for biological and soft materials
- In-house negative staining for viruses, bacteria, proteins, polymers, nanoparticles, etc.
- SEM preparation for biological materials, with custom SEM prep available
- Full embedding and microtoming services, including cryo-ultramicrotomy
- Experience with preparing biological samples using fixative

Electron Microscopy

mrl.illinois.edu/facilities/electron-microscopy

- EM Support Instruments
- Transmission and Scanning Transmission Electron Microscopy (TEM/STEM)
- Focused Ion Beam (FIB)
- Scanning Electron Microscopy (SEM)

Laser and Spectroscopy – see more on next page

mrl.illinois.edu/facilities/laser-and-spectroscopy

- Microscopy
- Spectroscopy
- Contact Angle Goniometry
- Light Sources
- Ellipsometry

Mask Fabrication Services

mrl.illinois.edu/facilities/mask-fabrication-services

- Photomask services, including imaging of patterns onto photosensitive glass

Micro/Nano Fabrication and Cleanroom – see more on following pages

mrl.illinois.edu/facilities/micronano-fabrication-and-cleanroom

- Additional Micro/Nanofabrication Resources
- Probe Stations
- Bonding Stations
- Diffusion / Annealing Furnaces
- Lithography
- Wet Processing
- Dry Etching
- Deposition Tools

Scanning Probe Microscopy

mrl.illinois.edu/facilities/scanning-probe-microscopy

- Nanoindentation



Paul V. Braun
Director, MRL
pbraun@illinois.edu
217-244-7293



Mauro Sardela
Director, Research Facilities
sardela@illinois.edu
217-244-0547

- Scanning Tunneling Microscopy (STM)
- Atomic Force Microscopy (AFM)

Surface Analysis

mrl.illinois.edu/facilities/surface-analysis

- Surface Profilometry
- Secondary Ion Mass Spectrometry
- Auger Electron Spectroscopy
- X-Ray Photoelectron Spectroscopy
- Accelerator-based Techniques

Thermal Analysis & Soft Materials Characterization

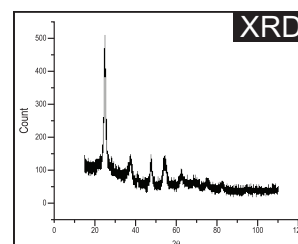
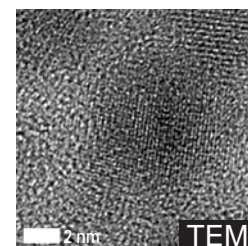
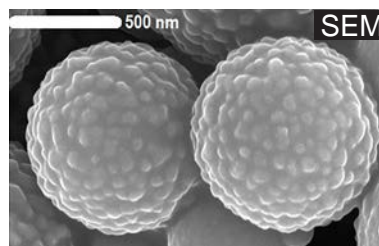
mrl.illinois.edu/facilities/thermal-analysis-and-soft-materials-characterization

- Materials Properties Measurement

X-Ray Analysis

mrl.illinois.edu/facilities/x-ray-analysis

- X-Ray Data Analysis Software Packages
- X-Ray Diffractin (XRD) and Scattering



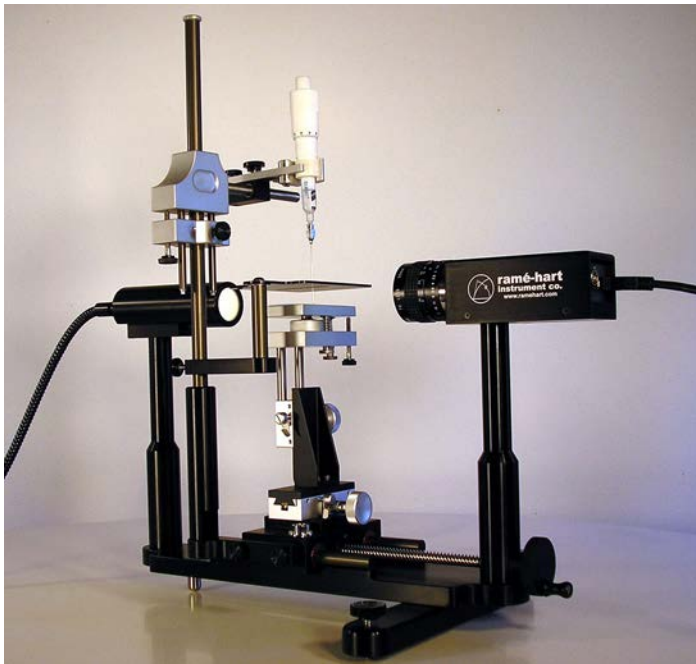
MRL Laser and Spectroscopy Facility (LSF)

mrl.illinois.edu/facilities/laser-and-spectroscopy

The LSF is a collaborative research center open to researchers from universities, government laboratories, and industry, national and international. The Laser and Spectroscopy Facility (LSF) is part of the MRL Central Research Facilities and is a user-oriented, user-friendly facility that provides the modern photon-based analytical capabilities essential to today's materials science. These services emphasize the study of optical properties of materials and interfaces, and the relation to microstructural and microchemical composition, phase transitions, crystalline, electronic, and defect structure of materials, surfaces, and interfaces.

Techniques and Equipment

- Contact Angle Goniometry
 - Ramé-Hart Model 250 Contact Angle Goniometer / Tensiometer
- Ellipsometry
 - Gaertner L116C
 - J.A. Woollam VASE
- Light Sources
 - Oriel Solar Simulator
- Microscopy
 - Keyence VK-X1000 3D Laser Scanning Confocal Microscope
 - Nanophoton Raman 11
 - Neaspec NanoFTIR/NIM AFM, SSNOM
 - WITec Alpha NSOM
 - Zeiss Axiovert
 - Zeiss LSM LSM7 Live
- Spectroscopy
 - Photoluminescence
 - Sum-Frequency-Generation
 - Thermo Nicolet Nexus 670 FTIR
 - Time-Domain Thermoreflectance
 - Time-Resolved Photoluminescence
 - Transient Absorption
 - Varian Cary 5G and Agilent Cary 5000
 - Newport Solar Simulator
 - OL 750 Spectroradiometer
 - SLM/ISS Fluorometer



Ramé-Hart Model 250 Contact Angle Goniometer/Tensiometer



Zeiss Axiovert

MRL Micro/Nanofabrication Facility

mrl.illinois.edu/facilities/micronano-fabrication-and-cleanroom

The MRL Micro/Nanofabrication Facility is a multidisciplinary, user-supported facility providing equipment and resources for thin film deposition and the fabrication of patterned micro- and nano-sized structures on flexible and other multi-layer electronic devices. The facility operates a 1,400 square foot, class-100 cleanroom with instrumentation for wet/chemical etching, spin coating, mask aligners, and general optical and 3D printing lithography. The facilities also include an on-site mask fabrication service and an additional 500 square foot class-100 cleanroom with an electron-beam lithography system capable of 20-nm line resolution for pattern delineation and device fabrication. See a partial list of equipment below.

Cleanroom

The MicroFab cleanroom is used for a wide range of micro and nano-fabrication projects. In addition to UIUC researchers, the cleanroom allows outside academic users as well as users from industry.

Techniques and Equipment

- Deposition Tools
 - AJA Orion-8 Magnetron Sputtering System
 - Kurt J. Lesker Nano36 Thermal Evaporator System
 - Plasma-Therm Plasma Enhanced Chemical Vapor Deposition System (PECVD)
 - Savannah S100 Atomic Layer Deposition Cambridge Nanotech
 - AJA ATC2000 Sputter Coater 1
 - AJA Orion 3 Sputter Coater 2
 - Temescal Ebeam Evaporator 2
 - Temescal Ebeam Evaporator 4
- Diffusion/Annealing Furnaces
 - 6" Tube oxidation furnace
 - Box furnace – max. temperature 900°C
 - CVD Graphene/Carbon Nanotube Growth Furnace – max. temperature 1050°C
 - High Temperature CM furnace – max. temperature 1600°C
 - Lindberg 2@ Tube oxidation/annealing furnace
 - Rapid Therman Annealing furnace (Custom) – max. temperature 1000°C
 - Vacuum furnace – max. temperature 1050°C
- Dry Etching
 - Commonwealth Scientific Ion Milling & Thermal Evaporator System
 - Nano-Master Reactive Ion Etch (RIE) Plasma System
 - Nordson March Reactive Ion Etch (RIE) PLasma System 1 & 2
 - Plasma-Therm 790 MF Reactive Ion Etch (RIE) Plasma System
 - Harrick Plasma Oxygen Cleaner
- Lithography
 - MJB3 Mask Aligner + Stamper Tool
 - MJB4 Mask Aligner
 - Nano Engineering Workstation (eLine RAITH)
 - Nanoscribe Photonic Professional GT 3D Printer
 - Spin Coater Systems (Headway Research)
 - UV 365 nm Exposure System (Oriel)
 - Yield Engineering HMDS Vapor Prime Oven
 - Yield Engineering P-I Curing Ovens
 - Raith eLine electron Beam Lithography System
- Wet Processing
 - Acid Fume Hood
 - Metal Etchant Fume Hood
 - Solvent Developer Flow Bench

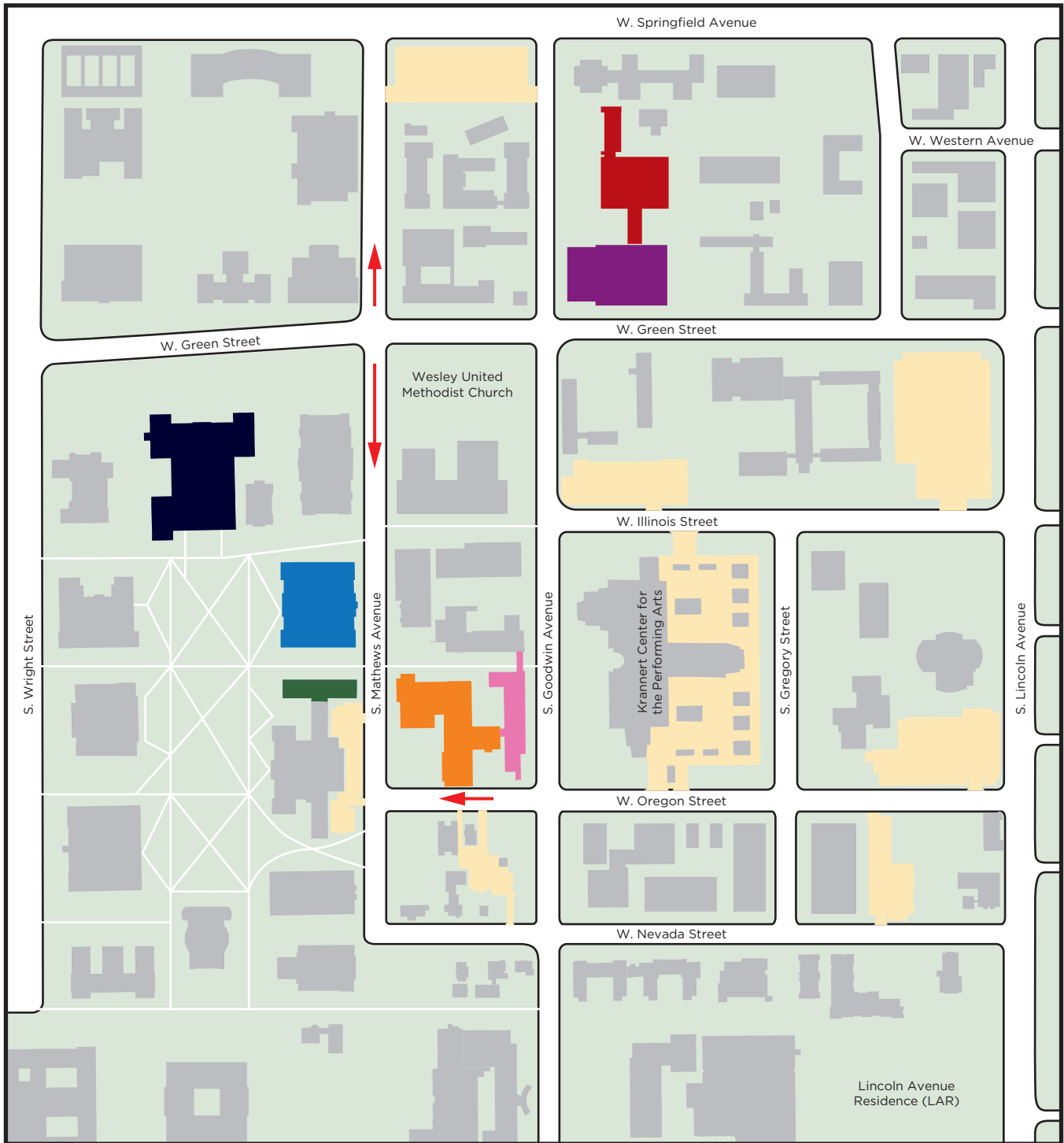


*Kurt J. Lesker Nano36
Thermal Evaporator System*



MJB4 Mask Aligner

Campus Map



Department of Chemistry

chemistry.illinois.edu
 chemistry@illinois.edu
 217-333-5071



Legend

- CLSL (Chemical & Life Sciences Laboratory)
- Chemistry Annex
- Illini Union
- LL (Loomis Lab)
- MRL (Frederick Seitz Materials Research Laboratory)
- NL (Noyes Laboratory)
- Parking
- RAL (Roger Adams Laboratory)