RESEARCH FACILITIES

An impressive array of research facilities is available. Most of those used by polymer science faculty and staff are located in the 146,000-square-foot Goodyear Polymer Center. More than 50 laboratories are equipped with modern tools for the synthesis of polymers, the study of polymer structure and properties, and the fabrication of new composite materials. State-of-the-art instrumentation is available for NMR, FTIR and UV-visible spectroscopy, GPC, MALDI-TOF mass spectrometry, thermal analysis, rheo-optics, X-ray diffraction, and scanning probe, electron and fluorescence microscopy; laser capture microdissection, immunohistochemistry and related bioengineering techniques. Molecular modeling research is pursued using a range of powerful software and advanced computing hardware. Capabilities for biomaterials and biomedical polymer research are growing rapidly. Class II cell and tissue facilities as well as advanced imaging and nanotechnology fabrication capabilities are available. New connections through the Austen BioInnovation Institute are providing greater access to animal facilities and clinical research infrastructure.

Events and Venues

Akron, Ohio

With a population of nearly 200,000, Akron is Ohio’s fifth-largest city. It offers a vibrant downtown, serene parks, shopping, events and venues that appeal to almost every interest. Its regional location and easy access to air and highway travel puts you at the hub of a world of experiences and opportunities.

AKRON SYMPHONY ORCHESTRA PERFORMS AT E.J. THOMAS PERFORMING ARTS HALL
PRO FOOTBALL HALL OF FAME • UA’S INFOCISION STADIUM-SUMMA FIELD
ROCK AND ROLL HALL OF FAME • CUYAHOGA VALLEY NATIONAL PARK
ANNUAL ALL AMERICAN SOAP BOX DERBY
AKRON AEROS MINOR LEAGUE BASEBALL • AKRON RACERS WOMENS SOFTBALL
CLEVELAND PRO SPORTS: BROWNS, CAVALIERS AND INDIANS
About The University Of Akron

The University of Akron is the public research university for Northeast Ohio. The Princeton Review listed UA among the “Best in the Midwest” in its 2010 edition of Best Colleges: Region-by-Region. Approximately 29,300 students are enrolled in UA's 300 associate, bachelor's, master's, doctorate and law degree programs and 100 certificate programs at sites in Summit, Wayne, Medina and Holmes counties. Since 2000, UA's ongoing “New Landscape for Learning” campus enhancement program has added 20 new buildings and 18 major additions or renovations to campus, along with 34 acres of new green space. You'll find the University employs only the best information technology systems, so our students benefit from the state's most wired-for-wireless campus. Our faculty and students have received national recognition in such areas as polymer science, nursing, global business, engineering, marketing, music, intellectual property law, dance and psychology. For more information about all that The University of Akron has to offer, visit www.uakron.edu.

Directions when approaching University of Akron

FROM THE NORTH: TAKING I-77 — Follow I-77 southbound and exit onto Wolf Ledges/Grant Street. Turn left at the first light onto Wolf Ledges, or left at the second light onto Grant Street. Both roads lead to Exchange Street on the south edge of campus.

FROM THE NORTH: TAKING ROUTE 8 — Exit at Buchtel Avenue/University of Akron. Turn right onto Buchtel Avenue.

FROM THE SOUTH: TAKING I-77/RUTHE 8 — Follow The University of Akron exit off Route 8 marked Buchtel Avenue/Carroll Street. Turn left onto Carroll Street to reach campus.

FROM THE WEST: TAKING I-76 — Follow I-76 eastbound and exit onto Wolf Ledges/Grant Street. Turn left at the first light onto Wolf Ledges, or left at the second light onto Grant Street. Both roads lead to Exchange Street on the south edge of campus.

FROM THE EAST: TAKING I-76 — Follow I-76 west into Akron. Take the right fork off I-76 west to Route 8 north. The first exit off Route 8 is Buchtel/Carroll Street to reach campus.

For more options to reach campus, visit www.uakron.edu/parking.

AFTER GRADUATION

Polymer science graduates go on to productive and successful careers in private industry, government and education. Here’s a sampling of their employers:

3M Company
Advanced Elastomer Systems
Akron Polymer Systems
Akron Rubber Development Lab
ALCOA
AMOCO
ATK Space Systems
AT&T Bell Labs
BASF Corporation
Ben Venue Laboratories, Inc
BF Goodrich
BP Research
Bridgestone Americas, Inc.
Case Western Reserve
Carnegie Mellon University
Chemical Abstracts
Dow Chemical
DuPont
Eastman Chemical Company
Exxon Mobil
Firestone Polymers, LLC
Ford Motor Company
GAF Corporation
The Goodyear Tire & Rubber Company
Hankook Tire Co., LTD.
Hercules Research
Honeywell
Hyundai Petrochemical
IBM
Johnson & Johnson
Kumho Tire
LG Chemical
Lexmark
Lubrizol Corporation
The Lord Corporation
Morton Chemical
MRI Medical
NASA
NIST
Ohio Aerospace Institute
Penn State University
Proctor & Gamble
Rensselaer Polytechnic
SABIC
Samsung Electronics
Samyang Corporation
Shell Chemical Company
Shell Oil
Sherwin Williams
Tektronix
The Timken Company
The University of Akron
Ticona
Tremco
University of California
University of Colorado
U.S. Army
U.S. Naval Air Warfare Center
Virginia Tech
Westinghouse
Xerox
Zeon chemical

GRADUATE STUDY IN POLYMER SCIENCE

The Department of Polymer Science invites inquiries regarding its master's and doctoral programs.

Since its inception, The University of Akron’s Department of Polymer Science has embraced courses and research in polymer synthesis, polymer structure, chemical and physical properties of polymers, polymer engineering and polymer technology. The department continues to emphasize its interdisciplinary approach to polymer research in both its teaching and examination system.

Students interested in biology-related research may wish to participate in the newly created Integrated Biosciences Ph.D. program. This exciting new Ph.D. program brings together numerous departments to produce a learning experience designed to fill the need for scientists who can think and talk across several fields of scientific inquiry. Please visit www.uakron.edu/id/fb.

The Department of Polymer Science was formed in 1968. The first Ph.D.'s in polymer chemistry, however, were awarded by the Department of Chemistry in 1959. The M.S. program in the chemistry of polymers has been in existence since the 1940s, and the teaching of rubber chemistry dates back to the early 1900s.

About The University Of Akron

The University of Akron is the public research university for Northeast Ohio. The Princeton Review listed UA among the “Best in the Midwest” in its 2010 edition of Best Colleges: Region-by-Region. Approximately 29,300 students are enrolled in UA’s 300 associate, bachelor’s, master’s, doctorate and law degree programs and 100 certificate programs at sites in Summit, Wayne, Medina and Holmes counties. Since 2000, UA’s ongoing “New Landscape for Learning” campus enhancement program has added 20 new buildings and 18 major additions or renovations to campus, along with 34 acres of new green space. You’ll find the University employs only the best information technology systems, so our students benefit from the state’s most wired-for-wireless campus. Our faculty and students have received national recognition in such areas as polymer science, nursing, global business, engineering, marketing, music, intellectual property law, dance and psychology. For more information about all that The University of Akron has to offer, visit www.uakron.edu.
GRADUATE STUDY IN
POLYMER SCIENCE

www2.uakron.edu/cpspe/dps
DEPARTMENT OF POLYMER SCIENCE STUDENTS

The department has 116 full-time and nine part-time graduate students. Forty-five percent of the full-time students are from the United States, and the rest are from other parts of the world. Undergraduate degree programs pursued by most of our students include chemistry, chemical engineering, physics, materials science and engineering, polymer science, polymer engineering, biology and computer science.

During the 2009-10 academic year, polymer science students received $54,200 in individual scholarships and awards, in addition to support provided by graduate assistantships. In the past, several students have received government fellowships from the National Science Foundation and the National Institutes of Health.

The Polymer Science Student Organization (PSSO) is involved in academic and extracurricular activities. The group sponsors trips to scientific meetings, provides input on student seminars, hosts picnics for the students, faculty and staff of the Department of Polymer Science, and participates in weekly intramural events with teams from other graduate programs. PSSO has sponsored guest speakers on career development and resume/interview preparation, and arranged visits to the research and production facilities of area industries. The group also directs the Eastman Chemical Company Lecture Series, which brings two researchers to campus each year. PSSO officers (elected annually) serve on a planning committee to provide input on issues within the department, college and University.

FINANCIAL AID AND COST OF STUDY

The department supports all incoming qualified full-time graduate students. For 2010-11 the standard stipend amount for departmental assistantships is $22,000, with some enhanced stipends and industrial fellowships as high as $25,000 for 12 months. Students who receive financial aid also are awarded a tuition scholarship for instructional and general fees. Through grants and contracts awarded to polymer science faculty, more than 80 additional students are supported as research assistants.

For the 2009-2010 academic year, graduate tuition for Ohio residents is $447.05 per credit hour. Nonresidents pay an additional $269.10 per credit hour. General fees are $33.05 per credit hour. Regardless of tuition scholarships, each graduate student must pay University fees for parking, technology, administrative and facility maintenance (approximately $500 per semester).

The cost of living in Akron is comparable to that of other medium-sized cities in the Midwest. Rooms in private houses are available in the University area at a price of about $300 to $400 per month. Apartments are more expensive. A University meal plan may be purchased.

APPLICATION INFORMATION AND PROCEDURES

Students with an undergraduate degree in chemistry, physics or engineering and a GPA of 2.75/4.0 or better may apply. Students with a degree in biology or natural sciences usually need additional undergraduate courses in physical and analytical chemistry. For such students a special nondegree admission may be given for one or two semesters, followed by a full admission upon successful completion of the remedial undergraduate courses.

A student with a master's degree from another university may be admitted to the Ph.D. program. Three letters of recommendation are required in such a case to be certain that the student is likely to be successful in doctoral research.

GRADUATE ADMISSIONS REQUIREMENTS FOR THE DEPARTMENT OF POLYMER SCIENCE

Persons seeking admission into the Ph.D. program in the Department of Polymer Science are required to submit all of the listed materials to the department for consideration by the admissions committee. Incomplete applications will not be considered under any circumstances.

1. Completed Graduate Application
2. Application Fee, unless waived by the admissions coordinator
3. ALL Official Undergraduate and/or Graduate Transcripts
4. Letters of Recommendation (3)
5. Statement of Purpose/personal statement
6. GRE Scores
7. TOEFL Scores (required for ALL international applicants)

The early consideration application deadline for fall 2012 is Dec. 15, 2012 for Ph.D. applicants. The final application deadline for both foreign and domestic applicants is Feb. 1, 2013

DEGREE REQUIREMENTS

The requirements for M.S. and Ph.D. degrees in polymer science are described in the current graduate bulletin and are briefly restated here. The UA Graduate School sets the general requirements, while the Department of Polymer Science sets the specific departmental requirements. Beyond these combined requirements, which represent the minimal standards for a particular degree, there are additional requirements and procedures recommended by the department so that graduate programs are tailored to each student's background and research interests.

The following information outlines those requirements and procedures.

Note: Computer proficiency is required of both master's and doctoral degree students. This requirement can be satisfied by an earlier undergraduate computer programming course or by a related course taken at the University.

MASTER OF SCIENCE DEGREE:

30 Total Course Credits = (24 course credits and 6 research credits)
2 credits of Seminar I & II for full-time students; formal seminar; pass one cumulative exam; pre-thesis written review; final written thesis; computer proficiency.

The M.S. degree is awarded for the completion of a prescribed program of course studies, cumulative exams, a formal seminar and a research project that leads to a thesis. The written thesis must exhibit the advanced level of understanding of the principles of polymer science that was developed in the courses and in specialized research reading. Full-time M.S. students must also complete a prescribed seminar requirement.

Course Requirements for the Master of Science in Polymer Science

<table>
<thead>
<tr>
<th>Course Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Required Courses</td>
<td>2</td>
</tr>
<tr>
<td>Polymer Concepts</td>
<td>3</td>
</tr>
<tr>
<td>Polymer Science Lab</td>
<td>3</td>
</tr>
<tr>
<td>Physical Properties of Polymers I</td>
<td>2</td>
</tr>
<tr>
<td>Polymer Structure &amp; Characterization</td>
<td>2</td>
</tr>
<tr>
<td>Polymer Technology I</td>
<td>2</td>
</tr>
<tr>
<td>Elective Courses</td>
<td>13</td>
</tr>
<tr>
<td>Master's Research</td>
<td>6</td>
</tr>
<tr>
<td>TOTAL</td>
<td>30</td>
</tr>
</tbody>
</table>

WELCOME TO THE DEPARTMENT OF POLYMER SCIENCE
The Ph.D. in Polymer Science is considered recognition that the recipient has carried out independent and original research, under the guidance of a polymer science faculty member, at the prevailing advanced level of polymer science understanding. The student is assumed to have the advanced understanding of the principles of polymer science necessary to do research after the successful completion of course studies and cumulative examinations. After discussion of the research work in a departmental seminar and a public research presentation, the dissertation committee examines the written dissertation. A good measure of the scholarship inherent in the research can be determined by the faculty using the described procedures.

Core Requirements for the Ph.D. in Polymer Science

Core Required Courses

- Polymer Concepts ............................................. 2 credits
- Synthesis/Chemical Behavior of Polymers ..................... 2 credits
- Polymer Science Lab .......................................... 3 credits
- Physical Properties of Polymers I .............................. 2 credits
- Physical Properties of Polymers II ............................. 2 credits
- Polymer Structure & Characterization ........................ 2 credits
- Polymer Thermodynamics .................................... 2 credits
- Polymer Technology I ......................................... 2 credits
- Polymer Technology II or III .................................. 2 credits
- Elective Courses .............................................. 17 credits
- Doctoral Research ............................................ 48 credits

TOTAL 84 credits

DEPARTMENT

Matthew L. Becker – Associate Professor of Polymer Science
Ph.D., Washington University, 2002
phone: 330-972-2834 e-mail: becker@uakron.edu
Synthesis and characterization of DNA- and peptide-functionalized polymers, surfaces and nanoparticles, tissue engineering, microfluidic chemistry; combinatorial methods, functionalized, quantum dots, single wall carbon nanotube purification and biodetection.

Gustavo A. Carri – Associate Professor of Polymer Science
Ph.D., University of Massachusetts-Amherst, 2000.
phone: 330-972-7589 e-mail: gac@uakron.edu
Statistical mechanics of semiflexible polymers; novel mathematical methods in polymer physics; statistical physics of helical polymers; Monte Carlo simulations of helical worm-like polymers; biopolymer dynamics in glassy solvents; molecular dynamics simulations of biopolymers; morphologies of nanocomposites via computer simulations.

Stephen Z.D. Cheng – Dean
R.C. Musson and Trustees Professor of Polymer Science
phone: 330-972-7500 e-mail: scheng@uakron.edu
Condensed state of polymeric materials; thermodynamics, kinetics of phase transitions; crystalline structure and morphology; liquid crystalline and rigid rod polymers; surface and interface of polymeric materials; polymer optics.

Ali N. Dhinojwala – Professor, Polymer Science
Department Chair, Department of Polymer Science
H.A. Morton Professor of Polymer Science
Ph.D., Northwestern University, 1994.
phone: 330-972-6246 e-mail: ali4@uakron.edu
Spectroscopic techniques to study structure and dynamics at polymeric and biological active interfaces; dynamics in glassy and rubbery polymers; polymers and liquids at surfaces and in confined geometries; understanding diffusion of polymers and small molecules in heterogeneous systems and in restricted geometries.

Frank Douglas – University Professor of Polymer Science
Ph.D., Cornell University, 1972.
phone: 330-972-7544 e-mail: fdouglas@bioinnovationinstitute.org
President and CEO, Austen BioInnovation Institute in Akron
1 South Main St., Suite 401, Akron, OH 44308

Mark D. Foster – Associate Dean, Professor of Polymer Science
Ph.D., University of Minnesota, 1987.
phone: 330-972-5323 e-mail: foster@uakron.edu
Microstructure and dynamics of polymer systems, especially in thin films at near interfaces, e.g. surface segregation and adhesion; novel X-ray and neutron scattering techniques, especially small angle scattering and reflectometry, for studying these phenomena.
OF POLYMER SCIENCE FACULTY

Purushottam D. Gujrati – Professor of Physics and Polymer Science
Ph.D., Columbia University, 1979.
phone: 330-972-7136 e-mail: pdg@uakron.edu
Statistical mechanics and field theory; phase transitions and critical phenomena; renormalization group theory; self-avoiding walks; glass transition; polymer solution theory; free-volume effects.

Gary R. Hamed – Professor of Polymer Science
Ph.D., University of Akron, 1978.
phone: 330-972-6831 e-mail: hamed@uakron.edu
Rheology of adhesion; autohesion and tack; brass-rubber adhesion; fracture of rubber; anisotropic rubber; rubber reinforcement.

Li Jia – Assistant Professor of Polymer Science
Ph.D., Northwestern University, 1998.
phone: 330-972-7511 e-mail: ljia@uakron.edu
Polymer synthesis; interfacial colloidal self-assemblies for nano- and micro-scale surface patterning; photolithography materials and processes.

Abraham Joy – Assistant Professor of Polymer Science
Ph.D., Tulane University, 2000.
phone: 330-972-6004 e-mail: abraham@uakron.edu
Development of highly functionalized biomaterials; Synthetic substrates that mimic the properties of the extracellular environment; Photodegradable and biodegradable nerve guidance conduits. Delivery of antisense oligonucleotides and small interfering RNAs with neutral multivalent polymeric systems.

Joseph P. Kennedy – Distinguished Professor of Polymer Science
Ph.D., University of Vienna (Austria), 1954, MBA Rutgers University, 1986.
phone: 330-972-7512 e-mail: josep19@uakron.edu
Synthesis of well-defined macromolecules for potential industrial and biomaterial applications.

William J. Landis – Professor of Polymer Science
Ph.D., Massachusetts Institute of Technology.
phone: 330-972-8483 e-mail: wlandis@uakron.edu

Toshikazu Miyoshi – Associate Professor of Polymer Science
Ph.D., Kyoto University, Japan, 1987
phone: 330-972-6269 e-mail: miyoshi@polymer.uakron.edu

George R. Newkome – Vice President of Research and Dean of the Graduate School, James and Vanita Gelschlag Professor of Science and Technology
Ph.D., Kent State University, 1966.
phone: 330-972-6458 e-mail: newkome@uakron.edu
Synthetic and structural studies in diverse areas of supra(macro)molecular chemistry; molecular assemblies (dendritic and fractal constructs); nanochemistry; inorganic-organic interfaces; molecular inclusion chemistry; molecular electronics; and photonics.

Coleen Pugh – Professor of Polymer Science
Ph.D., Case Western Reserve University, 1980.
phone: 330-972-6614 e-mail: cpugh@polymer.uakron.edu

Darrell H. Reneker – Distinguished Professor of Polymer Science
Ph.D., University of Chicago, 1959.
phone: 330-972-6949 e-mail: reneker@uakron.edu
Electrospinning of polymer fibers; electrostriction of polymers; polymer nanofibers; polymer physics; computer modeling of conformation defects in polymer crystals, morphology and scanning tunneling microscopy of polymers; electron holography of polymer molecules.

Nita Sahai – Ohio Research Scholar Professor of Polymer Science
Ph.D., Johns Hopkins University, 1997
phone: 330-972-5795 e-mail: sahai@uakron.edu
Molecular- and nano-scale interactions of biological molecules, as well as human and bacterial cells, at solid ceramic and mineral surfaces, in processes of relevance to surface chemistry, bone biomaterialization and tissue engineering, orthopedic biomaterials, supported lipid membranes, the origin of life and biogeochemistry.

Mesfin Tsige – Associate Professor of Polymer Science
Ph.D., Physics, Case Western Reserve University, 2001.
phone: 330-972-5631 e-mail: mtsige@uakron.edu

Shi-Qing Wang – Professor of Polymer Science
phone: 330-972-7198 e-mail: wang@uakron.edu
Polymer physics and engineering; experimental and theoretical foundations polymer rheology; general phenomenology of linear and nonlinear viscoelastic processes; dynamic and yielding behavior; flow instabilities and processing behavior including wall slip.

Marcia E. Weidknecht – Instructor of Polymer Science
B.S., University of New Hampshire, 1971.
phone: 330-972-7093 e-mail: marcia3@uakron.edu
Solutions properties and physical properties of macromolecules and polymerization methods.

Chrys Wesdemiotis – Distinguished Professor Chemistry of Polymer Science
Ph.D., 1979, Technical University of Berlin
phone: 330-972-7639 e-mail: wesdemiotis@uakron.edu
Development and applications of multi-dimensional mass spectrometry and separation-mass spectrometry methods for the characterization of new synthetic polymers and polymer-biomolecule interactions and interfaces.