

The University of
KANSAS



Program and Degrees

KU's Department of Molecular Biosciences offers five paths for graduate study. The course work is diverse and provides challenging, contemporary study for a broad range of interests:

Biochemistry and Biophysics: molecular interactions that mediate a variety of processes, including signal transduction, catalytic RNAs, ion transport proteins, ATP synthesis, and cytoskeletal protein dynamics.

Microbiology: pathogenic microbiology, immunology, virology, microbial genetics, and physiology. These fields are unified by a common approach focused on pathogenesis, genetics, and molecular biology.

Molecular, Cellular, and Developmental Biology: mechanisms that regulate the cell cycle, cell division, organelle assembly, RNA localization during development, signal transduction, cell differentiation, and plant physiology. A variety of experimental systems, including *Drosophila*, *C. elegans*, protozoans, and mammalian tissue culture cells are used.

Neurobiology: mechanisms of chemical communication in the nervous system, biochemistry of neurodegenerative disorders and aging, and developmental neurobiology.

Genetics: Genetic control of organismal development, physiology and evolution: regulation of gene expression, developmental genetics, genomics, comparative evolutionary genetics, population genetics, quantitative genetics and human genetics.

Note: Only the first three areas offer Ph.D. degrees through Molecular Biosciences. A degree-granting neuroscience program is housed in Pharmacology and Toxicology. Genetics is currently an interdepartmental area of training.

Degree Requirements

The first year is devoted to course work, laboratory rotations, choosing a mentor, and initiating an original research project. During the second year, students generally complete their course work, and doctoral students take the qualifying examination. Our department believes that teaching is an invaluable part of a graduate education. Therefore, students must serve as teaching assistants for two semesters during their graduate careers, usually during the first or second years. During the remaining years, research is the primary focus, and students attend seminars, participate in journal clubs, and attend regional and national conferences as they participate in the scientific community.

Students finish the program by completing an original body of work that is publishable in peer-reviewed research journals and writing a thesis or dissertation on this body of work. Doctoral students also must defend their work in an oral examination. The department emphasizes completion and publication of original research.

Application and Admission

Students should have received strong undergraduate training in the biological or chemical sciences, including general and organic chemistry, calculus, physics, and biology. Limited course deficiencies can be made up in the summer before entering the program or during the first year of graduate study. Scores from the general (aptitude) portion of the Graduate Record Examination are required, and students are encouraged to take advanced examinations in either a



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biological or chemical science. Admission is competitive, with only a few applicants accepted each year. For 2004-05, we anticipate a class of 10 to 15 students.

Successful applicants generally have GRE scores in the top one-third of each category and cumulative grade-point averages of 3.0 or higher. Our department particularly favors students who have engaged in research during their college careers. A strong emphasis is placed on the ability to present research in written and spoken format. International applicants must submit scores for the Test of English as a Foreign Language or International English Language Testing System. Priority is given to international applicants who also submit scores for the Test of Spoken English.

The most outstanding students applying to the doctoral program are designated Snow Scholars, and among other benefits, may defer teaching responsibility until the second year. These positions are highly competitive.

Application files must include

- Completed application form
- Two copies of all academic transcripts (International students must provide one copy in English and one in the native language.)
- Curriculum vitae or résumé (one or two pages)
- Graduate Record Examination (GRE) scores
Required: General Exam
Preferred: General Exam and Advanced Exam in biological or chemical science
- Three letters of recommendation from qualified individuals

- Statement of Aims (one page), describing the applicant's interests and professional goals
- Application fee (payable to KU)
Domestic fee is \$55 for paper application or \$45 online
International fee is \$60 for paper application or \$55 online
- International Applicants also must submit scores for either the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System). **Preference is given to applicants who also submit scores for the TSE (Test of Spoken English).**

Further Information

Supporting documents should be sent to the department:

**The University of Kansas
John P. Connolly
Graduate Program Assistant
Department of Molecular Biosciences
Haworth Hall
1200 Sunnyside Ave., Room 2034
Lawrence, KS 66045-7534**

Telephone: (785) 864-4311
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E-mail: jconnolly@ku.edu
URL: www.molecularbiosciences.ku.edu

Applications must be submitted directly to the Graduate School. You may apply online at www.graduate.ku.edu.

**The University of Kansas
Graduate School
Graduate Applications
1450 Jayhawk Blvd., Room 300
Lawrence, KS 66045-7535**



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MOLECULAR BIOSCIENCES

The University of Kansas

Research Facilities

Individual research laboratories and the department are well equipped for a variety of studies. KU maintains research service laboratories available to all students and faculty, including

- Microscopy and electronic imaging laboratory (confocal, SEM and TEM microscopes)
- Hybridoma/tissue culture laboratory
- Peptide sequencing and synthesis laboratory
- Nucleotide sequencing and synthesis laboratory
- Instrumentation design laboratory
- Mass spectrometry laboratory
- Molecular graphics and modeling laboratory
- Nuclear Magnetic Resonance laboratory
- X-ray crystallography laboratory
- AAALAC-accredited animal care facility
- BL3 facilities for work with pathogens
- Bioinformatics lab
- Biochemical research services laboratory (BRSL)

Faculty

For a full description of faculty members and their research interests, see our Web page, www.molecularbiosciences.ku.edu/faculty.

Stephen H. Benedict, Assoc. Prof., Ph.D., Vanderbilt Univ. School of Medicine, 1979. T-cell activation and immune therapies.

John C. Brown, Prof., Ph.D., North Carolina State Univ., 1973. Autoimmune disease and immune function.

Matthew Buechner, Assoc. Prof., Ph.D., Univ. of Wisconsin, 1990. Epithelial cell function in the nematode *Caenorhabditis elegans*.

Robert Cohen, Assoc. Prof., Ph.D., Univ. of Southern California, 1982. Molecular biology of cell differentiation and pattern formation in *Drosophila*.

Victoria Corbin, Assoc. Prof., Ph.D., Harvard Univ., 1989. Regulation of cell fate during muscle development in *Drosophila*.

William Dentler, Prof., Ph.D., Univ. of Minnesota, 1972. Regulation of ciliary and flagellar assembly.

Laurence R. Draper, Prof., Ph.D., Univ. of Chicago, 1956. Role of the immune system in periodontal disease.

Susan M. Egan, Assoc. Prof., Ph.D., Cornell Univ., 1996. Mechanisms of transcription activation, bacterial genetics.

Erik Floor, Assoc. Prof., Ph.D., Univ. of California (Davis), 1969. Synaptic vesicle structure and function; role of oxidative stress in neurodegeneration.

Chris Gamblin, Asst. Prof., Ph.D., Vanderbilt Univ., 1998. Role of tau in Alzheimer's and other neurodegenerative disorders.

Peter Gegenheimer, Assoc. Prof., Ph.D., Washington Univ., 1979. Structure, mechanism, and functional evolution of tRNA processing enzymes, subunit regulation of chloroplast ATP synthase.

Edina Harsay, Asst. Prof., Ph.D., Cornell Univ., 1996. Delineating the membrane transport pathways and the mechanisms of cargo packaging and vesicle formation in the late secretory pathway using the yeast *Saccharomyces cerevisiae* as a model system.

Rebecca Hays, Asst. Prof., Ph.D., Northwestern Univ., 1999. Regulation of apoptosis in *Drosophila*.

Paul T. Kelly, Prof. and Chair, Ph.D., Univ. of Colorado, 1974. Molecular mechanisms that regulate synaptic transmission and synaptic plasticity.

Krzysztof Kuczera, Assoc. Prof., Ph.D., Polish Academy of Sciences, 1985. Computational chemistry of macromolecular structure and dynamics.

Audrey Lamb, Asst. Prof., Ph.D., Vanderbilt Univ., 1998. X-ray crystallographic analysis of enzymes associated with iron uptake.

Erik Lundquist, Asst. Prof., Ph.D., Univ. of Minnesota, 1995. Molecular mechanisms of nervous system development, genetic/molecular biological approach using the nematode *Caenorhabditis elegans*.

Kristi Neufeld, Asst. Prof., Ph.D., Univ. of Utah, 1993. The role of the APC protein in the generation of colon cancer.

James A. Orr, Prof., Chair, Div. of Biological Sciences, Ph.D., Univ. of Wisconsin, 1974. Neural control of breathing and blood pressure.

William Picking, Assoc. Prof., Ph.D., Univ. of Kansas, 1989. Mechanisms by which bacterial pathogens of the gastrointestinal tract promote disease.



Mark L. Richter, Prof., Ph.D., Univ. of New South Wales, 1982. Protein biochemistry, structure, function, and regulation of ATP synthases.

Dean A. Stetler, Assoc. Prof., Ph.D., Univ. of Kansas, 1980. Structure and function of eukaryotic RNA polymerases and role in rheumatic autoimmune disease.

Kathy A. Suprenant, Prof., Ph.D., Univ. of Virginia, 1982. Biochemical, cellular and molecular genetic approach to studying the function of microtubule associated proteins in the nematode, *C. elegans*, as well as mammalian tumor cells.

Fusao Takusagawa, Prof., Ph.D., Osaka City Univ., Japan, 1974. Crystallography of proteins and nucleic acids.

Lisa Timmons, Asst. Prof., Ph.D., Johns Hopkins Univ., 1996. RNAi in *Caenorhabditis elegans*.

Robert Ward, Asst. Prof., Ph.D., Duke Univ., 1998. Mechanisms that provide spatial and temporal specificity for morphogenesis, elongation and eversion of the adult legs in *Drosophila*.

Robert F. Weaver, Prof., Assoc. Dean, College of Liberal Arts and Sciences, Ph.D., Duke Univ., 1969. Baculovirus molecular biology, transcription control.

Vladimir Yamshchikov, Assoc. Prof., Ph.D., Novosibirsk Inst., Russia, 1989. Flaviviruses, members of the Flavivirus genus in the family *Flaviviridae*.

The University

The University of Kansas is a major educational and research institution with 29,000 students and 2,100 faculty members. The university includes the main campus in Lawrence; the Medical Center in Kansas City, Kansas; the KU Edwards Campus in Overland Park; a clinical campus of the School of Medicine in Wichita; and educational and research facilities throughout the state. KU has 14 major academic divisions: the College of Liberal Arts and Sciences, the Graduate School, and the Schools of Allied Health, Architecture and Urban Design, Business, Education, Engineering, Fine Arts, Journalism and Mass Communications, Law, Medicine, Nursing, Pharmacy, and Social Welfare. Visit KU's Web site, www.ku.edu, or the Graduate School's Web site, www.graduate.ku.edu.



mances; showings of classical, popular, and experimental films; special exhibitions in the Helen Foresman Spencer Museum of Art and the Natural History Museum and Biodiversity Research Center; and an endless variety of informal activities organized by individuals and groups of students. The Lied Center of Kansas, a 2,020-seat performing arts hall, offers a series of concerts and shows that bring outstanding performers to the KU campus each year. There are sports for spectators and participants with exciting Big 12 athletics, intramurals, and extensive recreational facilities.

KU's main campus occupies 1,000 acres on and around Mount Oread in Lawrence, a community of more than 80,000 among the forested hills of eastern Kansas. Lawrence offers shopping areas, malls, restaurants, entertainment, and recreational facilities within easy walking distance of the campus or on bus routes. Near Lawrence, there are four lake resort areas for boating, fishing, and swimming. Metropolitan Kansas City with its international airport, professional sports, ballet, opera, concerts, night spots, galleries, museums, and festivals is about 45 minutes away by interstate highway.

To request a copy of the *Graduate School Catalog*, call (785) 864-9036, or send e-mail to graduate@ku.edu.

The University of Kansas prohibits discrimination on the basis of race, color, religion, sex, national origin, age, ancestry, disability, veteran status, sexual orientation, marital status, and parental status.

Tuition

Graduate tuition for the 2003-04 academic year is \$156.05 per credit hour for Kansas residents and \$419.80 per credit hour for nonresidents. Required Lawrence campus fees are \$47 per credit hour for students enrolled in 5 credit hours or fewer and \$287 per semester for those enrolled in more than 5 hours. Tuition and fee rates are subject to change at any time by the Kansas Board of Regents. Tuition information is updated yearly. Information is available from the Office of the University Registrar, Strong Hall, 1450 Jayhawk Blvd., Room 121, Lawrence, KS 66045-7535, (785) 864-4422, www.registrar.ku.edu. See www.ku.edu/tuition or www.registrar.ku.edu/fees for current information.

Financial Aid

Most graduate students receive teaching or research assistantships that, typically, provide a stipend for 12 months with a full or partial tuition waiver. There is no separate application for a departmental assistantship.

Further information is available from KU's Office of Student Financial Aid, Strong Hall, 1450 Jayhawk Blvd., Room 50, Lawrence, KS 66045-7535, (785) 864-4700, osfa@ku.edu.

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