

# DEPARTMENT OF BASIC SCIENCES

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The Department of Basic Sciences in the School of Medicine offers graduate programs leading to M.S. and Ph.D. degrees in three areas through the Integrated Biomedical Graduate Studies Program (IBGS). This program includes a common integrated first-year core curriculum that explores the biochemical, molecular, cellular, and physiological functions of living systems in a way that emphasizes analytical thinking and problem-solving. During this first year, students also attend seminars and rotate through up to two research laboratories. After completing the first year of study, students select both a program and a laboratory from which they wish to obtain a degree. Advanced, discipline-specific courses are taken during the second year, and research leading to the publication of peer-reviewed articles and doctoral dissertation defense are carried out between the time a research laboratory is selected and the completion of the degree.

## Chair

Penelope J. Duerksen-Hughes

## Primary faculty

Danilyn M. Angeles

Vladimar Bashkirov

Danilo Boskovic

Eileen J. Brantley

John N. Buchholz

Carlos A. Casiano

Daisy D. De Leon

Marino A. De Leon

Charles A. Ducsay

Penelope J. Duerksen-Hughes

Valeri Filippov

Maria Filippova

Hansel M. Fletcher

Ravi Goyal

David A. Hessinger

Salma Khan

William H. Langridge

Xiao W. Mao

Eugenica I. Mata-Greenwood

Gregory A. Nelson

Stephen A. Nyirady

William J. Pearce

Michael J. Pecaut

Christopher C. Perry

Gordon G. Power

Hongyu Qiu

Ubaldo A. Soto-Wegner

Richard S. Sun

Jiping Tang

Julia J. Unternaehrer-Hamm

Roman Vlkolinsky

Nathan R. Wall

Charles Wang

Kylie J. Watts

Christopher G. Wilson

Sean M. Wilson

David L. Wolf

Daliao Xiao

Steven M. Yellon

John H. Zhang

Lubo Zhang

## Adjunct faculty

Daila S. Gridley

Keith E. Schubert

Ihsan Solaroglu

Lawrence C. Sowers

## Emeritus faculty

Anthony J. Zuccarelli

## General regulations

### First-year curriculum (Ph.D. degree)

The first-year curriculum includes a course sequence taught by interdisciplinary faculty that integrates all the disciplines of the biomedical basic science areas—moving from molecules through cellular mechanisms to integrated systems. In addition, a supplemental course covers research-related topics—such as scientific communication and integrity, information handling and statistics, as well as successful grant proposal writing. Students learn of new developments in the biomedical sciences through weekly seminars, and they gain presentation skills of their own in a weekly student presentation seminar series. During subsequent years, formal courses continue to broaden and integrate into a meaningful whole an understanding of clinical consequences of cellular events.

## Religion requirement

Students in the Master of Science (M.S.) degree curricula are required to complete one, three-unit, graduate-level religion course (RELT 617 Seminar in Religion and the Sciences). Students in the Ph.D. degree curriculum are required to complete three graduate-level religion courses of three or more units each. These must include RELT 617 Seminar in Religion and the Sciences; as well as RELE 525 Ethics for Scientists and RELR 588 Personal and Family Wholeness. A course in biblical studies (RELT 559 New Testament Thought, RELT 560 Jesus the Revealer: The Message of the Gospel of John, RELT 564 Apostle of Hope: The Life, Letters, and Legacy of Paul, or RELT 565 Vision of Healing: The Message of the Book of Revelation) may be substituted for either the ethical or relational course.

## Research units

A student will, at all times, have registration in research units. An IP will be assigned until the student registers for new units. The units should be spread out over the course of time it takes to complete thesis or dissertation research satisfactorily. An IP may not be carried for longer than five quarters.

## Admissions

In addition to Loma Linda University (<http://llucatalog.llu.edu/about-university/admission-policies-information/#admissionrequirements>) application requirements, the applicant must also complete the following prerequisites:

- A bachelor's degree from an accredited U.S. college or the equivalent from an international university.
- (Not required/optional) General test of the Graduate Record Examination (GRE): A total (verbal plus quantitative) score of no less than the sum of the scores corresponding to the 50th percentile of each, with neither score less than the 35th percentile; analytical writing 4.0. GRE scores older than five years from the date of matriculation are not considered.
- A full year of each of the following undergraduate courses:
  - General biology
  - General chemistry
  - Organic chemistry
  - General physics
  - Biochemistry (a minimum of one quarter/semester)

Strongly Recommended:

- Upper-division biology (such as cell and molecular biology)
- A full year of biochemistry with labs
- Research experience
- Calculus
- Computer programming experience (neuroscience, systems biology and bioengineering program)

**PLEASE NOTE:** CLEP (College-Level Examination Program), pass/fail performances, and online classes are not acceptable for the science-required courses. Additionally, science credits earned in professional schools (e.g., allied health professions, business, dentistry, nursing or pharmacy) do not fulfill requirements for admissions to the graduate program.

The program reserves the right to decide on the equivalence of courses presented by the applicant.

## Programs

- Cancer, Developmental and Regenerative Biology — M.S., Ph.D. (<http://llucatalog.llu.edu/medicine/cancer-dev-and-regen-biology/>)
- Infection, Immunity, and Inflammation — M.S., PhD. (<http://llucatalog.llu.edu/medicine/infection-immunity-and-inflammation/>)
- Neuroscience, Systems Biology, and Bioengineering — M.S. Ph.D. (<http://llucatalog.llu.edu/medicine/neurosci-syst-biol-bioeng/>)