Directory of U.S. Courses in Biotechnology for Developing Country Scientists (1984)

Pages
268

Size
5 x 9

ISBN
0309324262

Board on Science and Technology for International Development; Office of International Affairs; National Research Council

Directory of U.S. Courses in Biotechnology for Developing Country Scientists

Report of an Ad Hoc Panel of the
Board on Science and Technology
for International Development
Office of International Affairs
National Research Council

NATIONAL ACADEMY PRESS
Washington, D.C. 1984

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This report has been prepared by the Board on Science and Technology for International Development, Office of International Affairs, National Research Council, for the Agency for International Development, Office of the Science Advisor. Contract Grant # DAN-5538-G-SS-1023-00.

Copies available from:

Board on Science and Technology
for International Development
National Research Council
2101 Constitution Avenue, N.W.
Washington, D.C. 20418 USA

Panel on Directory of U.S. Courses in Biotechnology for Developing Country Scientists

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Introduction

The purpose of this directory is to provide information on U.S. graduate degree programs, special courses, and internships in biotechnology for developing country scientists.

The information was obtained from colleges, universities, research institutes, professional associations, and industries during the spring of 1984. Although not all of the institutions contacted chose to submit information, it represents a fairly complete picture of the types of opportunities for study that are available in the various biotechnology disciplines.

The directory includes separate lists for institutions, degree programs, and special (non-degree) courses. The listing of institutions includes addresses and telephone numbers for key contacts as well as information on consortium memberships and previous experience with admitting developing country students. Consortium memberships can be significant because they provide expanded opportunities and resources for students.

The listings for the degree programs and special courses include a title and brief description of the subject matter and admission requirements, information on advisors or instructors, and degrees or certificates awarded. Unless otherwise indicated, the starting time for degree programs is in the fall and the language of instruction is English*; masters' programs require 1-2 years and Ph.D. programs 3-5 years to complete. Information on costs is included for special courses. Cost information is not included for degree programs because of continuing changes in tuition, fees, and living expenses.

The index is divided into sectoral listings, with courses shown under Agriculture, Engineering, Environment, Health, Interdisciplinary Programs and Basic Studies, and Veterinary Sciences.

This directory is intended for use as a first step in determining where specific types of training can be obtained and to facilitate communication with the institutions identified. Full details on the specifics of courses, costs, timing, and prerequisites are readily available from the institutions of interest.

*See pages 22, 24, 32, 37, 120 and 121 for courses taught in Spanish.

Related information on other aspects of U.S. colleges and universities may be obtained through such publications as:

Barron's Profiles of American Colleges. Available from Barron's Educational Series, Inc., 113 Crossways Park Drive, Woodbury, NY 11797;
Guide to American Graduate Schools. Penguin Books Inc., 625 Madison Avenue, New York, NY 10022; and
Peterson's Annual Guide to Graduate Study. Peterson's Guides Inc., P.O. Box 2123, Princeton, NJ 08540.

Information on U.S. educational opportunities for foreign students may be obtained from:

Institute for International Education, 809 United Nations Plaza, New York, NY 10017

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Degree Programs and Special Courses

Note: Special courses are on pages 1-37. Degree Programs are on pages 41-179.

Institutions

Courses and Programs by Institution

SPECIAL COURSES

Institution: San Diego State University

Title: Recombinant DNA Technology

Description: Series of courses designed to provide the student with background and laboratory experience in recombinant DNA technology. Courses include lectures and laboratories in microbiology, bacterial and viral genetics, radioisotope techniques, biochemistry, and recombinant DNA techniques. Students are required to do an internship in a local biotechnology company or in a research laboratory on campus.

Admission Requirements: Basic courses in chemistry, microbiology, and genetics

Starting Date: Fall or Spring semesters

Duration: 1-2 years beyond Bachelor's degree

Instructors: Drs. Judith Zyskind and Sanford Bernstein, Department of Biology

Costs: $1,250 ($105 per credit hour) per semester, plus books and living expenses

Certificate Awarded: Certificate in Recombinant DNA Technology

Technical Skills or Practical Procedures Acquired: Manipulation of bacteria and viruses; biochemical assays; DNA isolation; restriction enzyme mapping; DNA cloning; DNA sequencing; DNA hybridization.

Institution: Center for Advanced Training in Cell and Molecular Biology, Catholic University of America

Title: Recombinant DNA Methodology

Description: This is an integrated lecture and laboratory course designed to provide the novice with an introduction to the area of recombinant DNA. An approach emphasizing both principles as well as methodology will provide the scientist with the esssential fundamentals to fully utilize recombinant DNA technolgy.

Admission Requirements: An undergraduate degree in biology or its equivalent

Starting Date: Contact Center

Duration: 5 days

Instructor: Dr. James J. Greene

Costs: $600

Certificate Awarded: Continuing Education Units—3.5

Technical Skills or Practical Procedures Acquired: Extraction and purification of DNA from eukarayotic cells; extraction and purification of RNA from eukarayotic cells; synthesis of cDNA; inserting cDNA into plasmids; digestion with restriction enzymes; agarose cel electrophoresis; transfection of recombinant plasmid DNA into bacteria; selection of transfected bacteria; southern blot analysis.

Institution: Center for Advanced Training in Cell and Molecular Biology, Catholic University of America

Title: DNA Sequencing

Description: The goal of this lecture/lab course is to provide each participant with sufficient practical experience in DNA sequencing so that they can duplicate these procedures in their own laboratories with a minimum of problems.

Admission Requirements: An undergraduate degree in biology or its equivalent

Starting Date: Contact Center

Duration: 5 days

Instructors: Drs. Nancy J. Pearson and David M. Donovan

Costs: $550

Certificate Awarded: Continuing Education Units—3.5

Technical Skills or Practical Procedures Acquired: Subcloning a small DNA fragment (1 KB) into an M13 phage vector; transfection of recombinant phage into the host strain; isolation of single stranded DNA from recombinant plagues; annealing of primer and sequencing reactions; gel electrophoresis, autoradiography, reading of sequencing ladders.

Institution: University of Mississippi

Title: Methods in Molecular Biology

Description: An advanced methodology course that provides hands-on experience with techniques used to study and purify proteins, nucleic acids, and hormones.

Admission Requirements: Consent of instructor

Starting Date: Usually taught in odd years

Duration: 1 semester

Instructors: Team taught by H. Drake, J. Lep, J. Heindel, Department of Biology

Costs: $345

Technical Skills or Practical Procedures Acquired: See above.

Institution: State University of New York at Albany, Department of Biological Sciences

Title: Workshop on Recombinant DNA Techniques

Description: This workshop will introduce basic techniques of molecular cloning and recombinant DNA analysis. Lectures will provide background for procedures employed and a discussion of application to diverse research problems. Invited guests will participate in this phase of the program. The laboratory work will be full time for three to four weeks. The laboratory experiments will be organized principally around one gene system to provide continuity as well as insight into overall experimental strategy. Participants will be able to work at their own speed within this framework. The list of topics is ambitious and leaves room for rapid advancement by more experienced participants. Certain techniques will be demonstrated by the staff and guests.

Admission Requirements: Background in biology, preferably biochemistry; permission of instructor

Starting Date: Contact Department of Biological Sciences

Duration: Approximately 1 month

Instructor: Dr. Charles Lowry

Costs: $1,000. Fellowships available for graduate students and postdoctorals.

Certificate Awarded: None

Technical Skills or Practical Procedures Acquired: Basic techniques: gel analysis and restriction mapping; construction of a plasmid gene bank; mutagenesis; cloning genes by diverse methods from plasmid bank; clone analysis, including subcloning for sequence analysis; southern blot analysis; RNA analysis: northern blots and S_1 mapping; DNA sequencing (demonstration).

Institution: New Mexico State University

Title: Molecular and Biochemical Genetics

Description: An accelerated and rigorous treatment of the molecular basis of gene expression. Chemical, enzymological, and genetic techniques of molecular biology will be discussed.

Admission Requirements: Background in biochemistry and molecular biology

Starting Date: Fall

Duration: 1 semester

Instructors: Graduate faculty

Costs: Not indicated

Certificate Awarded: Graduate credit

Technical Skills or Practical Procedures Acquired: Skills in recombinant DNA technology.

Institution: University of North Carolina at Chapel Hill, Program in Molecular Biology and Biotechnology

Title: The Carolina Workshops

Description: Intense laboratory workshops in nucleic acid technology. Three courses offered in 1984: Chemical Synthesis of DNA Oligonucleotides, Human Genetics/General DNA Technology, DNA Sequencing. Hands-on learning experience as well as lectures and seminars by expert faculty from UNC-CH as well as other institutions. Similar courses planned for 1985.

Admission requirements: Varies somewhat with course content. Acceptance determined by admissions committee. Number of students accepted is limited to 15 per course because of space limitations.

Starting Date: Varies with course--generally late spring and summer

Duration: Varies with course--10 to 17 days

Instructors: Courses taught by expert faculty from UNC-CH and other institutions

Costs: 1984 tuition costs were $1,000 and $1,200 depending on course. Travel, lodging, and food expenses are not included.

Certificate Awarded: None

Technical Skills or Practical Procedures Acquired: Specific laboratory techniques and protocols determined by course content.

Institution: Center for Advanced Training in Cell and Molecular Biology, Catholic University of America

Title: Basic Cell and Tissue Culture

Description: This lecture and laboratory course is structured to provide life scientists who are not experienced in cell culture with an introduction to theory and practice, which will facilitate their ability to develop and use *in vitro* systems. The course is predicated on the application of the most rigorous principles of quality control.

Admission Requirements: An undergraduate degree in biology or its equivalent

Starting Date: Contact Center

Duration: 5 days

Instructor: Dr. Roland M. Nardone

Costs: $550

Certificate Awarded: Continuing Education Units--3.5

Technical Skills or Practical Procedures Acquired: Subculturing techniques; sterility checks; vital staining; cell enumeration; media preparation; mycoplasma detection; primary embryo cell cultures; karyotyping; cell hybridization; isozymes and cell characterization; transformed cells and growth in soft agar.

Institution: Center for Advanced Training in Cell and Molecular Biology, Catholic University of America

Title: Plant Cell and Tissue Culture

Description: This lecture and laboratory course will provide the basics in plant cell and tissue culture. The course will emphasize both the background for the techniques and actual experience with the techniques. The lecture and laboratory topics are fully coordinated, with the laboratory exercises designed to extend, expand, and reinforce those topics discussed in lecture.

Admission Requirements: An undergraduate degree in biology or its equivalent

Starting Date: Contact Center

Duration: 5 days

Instructor: Dr. Gideon W. Schaeffer

Costs: $550

Certificate Awarded: Continuing Education Units--3.5

Technical Skills or Practical Procedures Acquired: Laboratory organization; sterile technique; establishment and maintenance of callus and suspension cultures; control of organogenesis and embryogenesis; single cell methods; plant propagation; meristem culture; anther culture and haploid plant production; protoplast isolation and culture.

Institution: Center for Advanced Training in Cell and Molecular Biology, Catholic University of America

Title: The Study of Differentiation in Culture

Description: This lecture/workshop course is designed to introduce investigators to the use of cell culture systems for the study of the process of differentiation and to convey the specialized information needed to effectively exploit this valuable experimental approach.

Admission Requirements: An undergraduate degree in biology or its equivalent

Starting Date: Contact Center

Duration: 2 days

Instructor: Dr. Alan Perantoni

Costs: $200

Certificate Awarded: Continuing Education Units--1.4

Technical Skills or Practical Procedures Acquired: Practical consideration of growth factors (exocrine and autocrine); cell-to-cell interactions and extra-cellular matrix components; tissue-specific intracellular filaments; methodologies employed in studies of differentiation, including immunocyto-chemistry; select models used in studies of tissue development; principles underlying the evolution of new model systems.

Institution: New Mexico State University

Title: Cell and Tissue Culture Methods

Description: A 1-semester course in cell and tissue culture. The course includes instruction in media preparation and cell and tissue culture maintenance and preservation.

Admission Requirements: Bachelor's degree with at least one course in microbiology. TOEFL score of 500.

Starting Date: September 1 each year

Duration: 3 months

Instructor: R. T. O'Brien

Costs: $500 tuition plus living costs

Certificate Awarded: Certificate of successful completion

Technical Skills or Practical Procedures Acquired: Experience for establishing and maintaining a cell culture laboratory.

Institution: Utah State University

Title: Tissue Culture Procedures

Description: A hands-on training program in culturation of animal or plant cells.

Admission Requirements: Experience in aseptic technique, preferably one or more courses in microbiology. Not a regularly scheduled course.

Starting Date: By arrangement with students

Duration: 6 months

Instructors: J.K.K. Li and R.P. Warren

Costs: Course, about $2,600; living expenses, about $2,000/6 months

Certificate Awarded: Letter of completion if requested

Technical Skills or Practical Procedures Acquired: Ability to establish and culture animal or plant cell lines in tissue culture. Maintain an adequate laboratory for these procedures.

Institution: NPI, Inc.

Title: Special Courses in Plant Biotechnology R & D

Description: Tissue culture propagation

Admission Requirements: Prior arrangements and sufficient academic and technical preparation.

Starting Date: As arranged

Duration: 2-4 weeks

Instructors: Senior scientific staff

Costs: As appropriate to the subject and duration

Certificate Awarded: Certificate of Attendance

Technical Skills or Practical Procedures Acquired: As appropriate to subject.

* * *

Institution: The Council for Research Planning in Biological Sciences, Inc.

Title: Propagation of Higher Plants through Tissue Culture: Development and Variation

Description: Contact Dr. Karen Hughes, Department of Botany, University of Tennessee, Knoxville, TN 37916

Admission Requirements: Contact Dr. Hughes

Starting Date: Contact Dr. Hughes

Duration: 5 days

Instructor: Contact Dr. Hughes

Costs: Contact Dr. Hughes

Institution: State University of New York at Binghamton

Title: Research Affiliation with SUNY-Binghamton's Organized Research Center for Somatic-Cell Genetics and Biochemistry.

Description: An organized research center that provides a setting for interdisciplinary research in the specialties of plant tissue culture, somatic-cell genetics, and biochemical genetics, which are blended together to approach the question of how cells differentiate in the developmental process of higher organisms.

Admission Requirements: To be determined in consultation with the Director, Professor Jensen

Starting Date: At the discretion of the Director

Duration: At the discretion of the Director

Instructor: Professor Roy A. Jensen, Director of the Center for Somatic-Cell Genetics and Biochemistry

Costs: Dependent upon length of affiliation

Technical Skills or Practical Procedures Acquired: Recombinant DNA technology, gene manipulation, cloning, plant propagation by tissue culture.

Institution: Utah State University

Title: Immunology and Monoclonal Antibody Production

Description: A laboratory training program in immunology or production of monoclonal antibodies.

Admission Requirements: Experience in aseptic techniques and some biochemistry desirable

Starting Date: By arrangement with students

Duration: 6 months

Instructor: R.P. Warren

Costs: Course, about $2,600; living expenses, about $2,000/6 months

Certificate Awarded: Letter of completion if requested

Technical Skills or Practical Procedures Acquired: Ability to establish monoclonal antibody lines and determine antibody response. Establish a laboratory with immunological capability.

Institution: Center for Advanced Training in Cell and Molecular Biology, Catholic University of America

Title: Cloning of T Lymphocytes: Murine and Human Systems

Description: This integrated lecture/lab course will focus on methodologies and procedures involved in the establishment, maintenance and characterization of long-term murine and human T-cell lines and T-cell clones and assays testing functional activity of these cells. Emphasis will be placed on lines and clones displaying antigen specificity, helper activity, and alloreactivity and cytolytic properties.

Admission Requirements: An undergraduate degree in biology or its equivalent

Starting Date: Contact Center

Duration: 5 days

Instructor: Dr. U.Y. Krzych

Costs: $550

Certificate Awarded: Continuing Education Units--3.5

Technical Skills or Practical Procedures Acquired: Immunization protocols; long-term culture of murine immune lymph node cells; cloning of murine T cells (alloreactive/helper) by limiting dilution; cloning of murine T cells (alloreactive/helper) by Sott agar techniques; helper assay; proliferative assay.

Institution: Gorgas Memorial Laboratory

Title: Medicine in the Tropics

Description: A 6-week didactic and field program for physicians; essentially for U.S. Department of Defense medical officers, but open to medical students and foreign national physicians on a space available basis.

Admission Requirements: M.D. degree or senior level medical student

Language of Instruction: English, knowledge of Spanish helpful but not required

Starting Date: 4 times a year starting in January, April, July, and October. Dates to be announced.

Duration: 6 weeks

Instructors: Staff of GML, local consultants, and visiting scientists

Costs: $500 for U.S. non-military, fully trained physicians; $400 for U.S. non-military interns and residents; $350 for U.S. students; $250 for foreign nationals

Certificate Awarded: Certificate of Attendance

Technical Skills or Practical Procedures Acquired: Practical knowledge of tropical infectious diseases; diagnostic procedures; appreciation of living conditions and cultural aspects of rural health problems.

In addition to the formal "Medicine in the Tropics" course, Gorgas Memorial Laboratory (GML) has trained pre- and postdoctoral physicians in association with U.S. universities. Notably, an agreement with the Louisiana State University in New Orleans has provided work experience at GML with university credits towards M.A. and Ph.D. degrees. In addition, there have been informal arrangements with individuals from several universities in the United States and Latin America providing experience in the laboratory and in the field on an ad hoc basis for periods ranging from 2 weeks to several months. These are provided at no expense. The laboratory has been generous in accommodating plans for most professional endeavors to interested individuals who are willing to work in an on-the-job training capacity.

Institution: Roche Institute of Molecular Biology

Title: Postdoctoral Research in Molecular Biology

Description: Basic research in biochemistry, genetics, virology, neurobiology, pharmacology, and other areas of molecular biology.

Admission Requirements: Fellowships are awarded on an equal opportunity basis to recent recipients of an M.D., a Ph.D., or equivalent degree in the biological or biochemical sciences

Starting Date: Anytime

Duration: 1-2 years

Instructors: Members of staff

Costs: Stipend of $20,000 first year, $21,000 second year plus travel allowance

Certificate Awarded: None

Technical Skills or Practical Procedures Acquired: As provided by research.

Institution: Fogarty International Center, National Institutes of Health

Title: International Research Fellowship Program

Description: This program provides opportunities for postdoctoral biomedical scientists to extend their research experience in the United States.

Admission Requirements: Prospective fellows must first be designated qualified candidates by the nomination of committee in their own country. Contact the Center for details.

Starting Date: Applications by September can result in awards on April 1

Duration: 1 year

Instructors: NIH staff

Costs: Stipends range from $18,000-$22,000 per year

Certificate Awarded: None

Technical Skills or Practical Procedures Acquired: As acquired during research.

Institution: Maplehurst Ova Transplants, Inc.

Title: Embryo Transfer

Description: The following aspects of embryo transfer will be covered in a two-day short course up to a four-week "hands on" course: physiology and endocrinology of the bovine reproductive system; reproductive diseases; heat detection; embryology (identification, classification, and handling); semen evaluation and A.I. techniques; selection, management (to include feeding procedures, feed analysis, and loss prevention at calving) and syncronization of recipients and donors; collection procedures; transfer procedures; freezing; splitting; general laboratory procedures; record keeping; financial aspects of embryo transfer.

Admission Requirements: D.V.M and/or Ph.D. in Reproduction Physiology (knowledge in bovine reproduction and palpation are helpful)

Starting Date: Flexible

Duration: 2-day short course; 2-week course; 4-week course

Instructors: R.A. Carmichael, D.V.M.; C.F. Coussens, D.V.M.; W.R. Boone, Ph.D.

Costs: $1,000/2 days; $5,000/2 weeks; $10,000/4 weeks

Certificate Awarded: Certificate of Completion

Technical Skills or Practical Procedures Acquired: Semen evaluation; nonsurgical embryo recovery; surgical and nonsurgical embryo transfer; embryo freezing; embryo splitting; general laboratory skills.

Institution: Bova Transplant Division of Northwest Veterinary Clinic

Title: Special Course in Embryo Transfer Techniques

Description: Review of reproductive physiology and anatomy of reproductive organs. Administration of superovulating hormones in donors. Synchronization of estrus in recipients. Palpation of donors for evaluation. Recovery (flushing) uterus for ova recovery. Evaluation and preparation of ova for transfer including cryopreservation. Implant of fertile ova in recipients. Post-implant pregnancy diagnosis.

Admission Requirements: D.V.M, or equivalent degree in animal science or biology

Starting Date: Negotiable

Duration: 4 to 6 weeks

Instructors: D.V.M/Ph.D.

Costs: $6,000 to $8,000

Certificate Awarded: Certificate of attendance

Technical Skills or Practical Procedures Acquired: Preparation of ova donors and recipients; evaluation and preservation of ova; transfer of ova to recipients; pregnancy diagnosis.

Institution: American Society for Microbiology

Title: Experimental Models for Studies on Host-Parasite Relations

Description: Course given at Instituto Veterinario de Investigaciones Tropicales y de Altura (IVITA), Lima, Peru

Admission Requirements: Post-baccalaureate degree

Language of Instruction: Spanish

Starting Date: Contact Institution

Duration: 1 week

Instructor: Dr. Jorge Guerrero, Pre-clinical Research, Pittman-Moore, Inc.

Costs: None

Certificate Awarded: None

Technical Skills or Practical Procedures Acquired: A substantial component of the program will be hands-on experience or demonstration. Participants will be able to utilize the information in their own research endeavors or professional activities.

Institution: Louisiana Tech University

Title: Special Problems Courses in College of Life Sciences

Description: Special technology studies with practical training aimed at problems and solutions from the student's home country. Areas include Animal Science, Forestry, Agriculture, Dairying, Pest Management, Soil Science, Crops and Water Quality.

Admission Requirements: Advanced undergraduate standing and graduate students at master's level or pursuing master's degree program

Starting Date: Quarterly

Duration: 3 months

Instructors: Selected faculty members in the College of Life Sciences

Costs: Tuition and appropriate fees

Certificate Awarded: Certificate upon satisfactorily completed course

Technical Skills or Practical Procedures Acquired: Skills targeted toward training student to take practical skills home for improving existing procedures and increasing efficiency.

Previous Experience with Developing Country Students: 19 percent of the total LSU Graduate School enrollment is composed of foreign students, the majority of whom are from developing countries.

Institution: Ohio State University, Department of Entomology

Title: The Detection, Isolation, Identification, and Use of Biological Agents

Description: Students receive practice in the detection and isolation of bacteria, fungi, protozoa, and nematodes, which reduce the activities of populations of invertebrates, particularly insects of public health and agricultural importance. Students are trained in the techniques for isolation of the agents, prepare the selective media necessary for their cultivation, and prepare the microbial agents for identification by specialists. Students will detect the presence of biological agents affecting populations of invertebrates, produce small quantities of agents, and conduct screening and quantitative biological assays.

Admission Requirements: Completion of a secondary school credential and either 2 years of additional education or 2 years' experience working in an entomology or microbiology program

Language: English and Spanish

Starting Date: Dates arranged for the students, preferably in a location where the participants are to be engaged in agricultural or public health activities

Duration: 10 to 20 days

Instructors: Professor John D. Briggs (Entomology Department) and Roland L. Seymour (Botany Department)

Costs: Travel/per diem for instructors (and participants if necessary), supplies, and use of laboratory facilities in a host institution

Certificate Awarded: Certificate of completion specifying the course elements

Technical Skills or Practical Procedures Acquired: Preparation of media, pure-culture techniques for each of the four groups of organisms; preparation of isolates for identification; preparation of test samples; elementary design of assays for estimating the activity of the isolates; use of principal literature sources; care and use of essential laboratory equipment and supplies.

Institution: The Council for Research Planning in Biological Sciences, Inc.

Title: Biotechnology in Plant Science: Relevance to Agriculture in the Eighties

Description: Contact Dr. Milton Zaitlin, Plant Pathology, Cornell University, Ithaca, NY 14853

Admission Requirements: Contact Dr. Zaitlin

Starting Date: June 23, 1985 in Ithaca, NY

Duration: 5 days

Instructors: Contact Dr. Zaitlin

Costs: Contact Dr. Zaitlin

Institution: United States Department of Agriculture, Office of International Cooperation and Development

Title: Integrated Pest Management (IPM)

Description: Includes concepts used in U.S. IPM models, opportunities to work with U.S. specialists in basic research or extension plus visits to various experimental or demonstration sites.

Admission Requirements: Should be scientist involved in developing single or integrated pest control systems

Starting Date: Contact USDA

Duration: 6 weeks

Instructors: Purdue University faculty

Costs: Approximately $5,700 plus transportation to U.S.

Certificate Awarded: Statement of attendance

Technical Skills or Practical Procedures Acquired: The application of IPM to small farms is emphasized.

Institution: The Council for Research Planning in Biological Sciences, Inc.

Title: International Symposium on Recent Trends in Genetic Engineering

Description: Contact Dr. B. B. Biswas, Department of Plant Biochemistry, Bose Institute, 931 Acharya Profulla Chandra Road, Calcutta 9, India

Admission Requirements: Contact Dr. Biswas

Starting Date: 1985, to be announced

Duration: To be announced

Instructors: Contact Dr. Biswas

Costs: Contact Dr. Biswas

Institution: University of Mississippi, Department of Biology

Title: Biosynthetic Pathways of Metabolism--Nitrogen Fixation

Description: This course varies considerably with the instructor. When taught by Dr. Lep, it is a course in the metabolism of nitrogen from the fixation of gaseous nitrogen to its assimilation into amino acids and nucleotides. The regulation and physiology of these processes are emphasized.

Admission Requirements: Prerequisites are organic chemistry and biochemistry courses

Starting Date: Course is offered on request of students

Duration: 1 semester

Instructor: Dr. Joe Eugene Lep

Costs: $460

Technical Skills or Practical Procedures Acquired: The course is mostly theory, although certain techniques for estimation of nitrogen fixation and assimilation are usually taught.

* * *

Institution: University of Connecticut

Title: Uses of Biotechnology in Enology

Description: Specialized application of biotechnology in the field of wine making.

Admission Requirement: Contact University

Starting Date: Contact University

Duration: Contact University

Instructors: Three faculty members

Costs: Contact University

Technical Skills or Practical Procedures Acquired: Skills and know-how in newer methods of enology.

Institution: American Society for Microbiology

Title: New Technology and Industrial Applications of Lactic Acid Fermentation

Description: Course given at Centro de Referencia para Lactobacilos (CERELA), Tucuman, Argentina

Admission Requirements: Participants must have a basic understanding of industrial microbiology, namely fermentation techniques, and an undergraduate degree in one of the biological sciences.

Language of Instruction: English

Starting Date: Contact Institution

Duration: 4 weeks

Instructor: Professor Stanley E. Gilliland, Department of Animal Science, Oklahoma State University

Costs: Not indicated

Certificate Awarded: None

Technical Skills or Practical Procedures Acquired: Participants will become familiar with the new technology and industrial applications of lactic acid fermentation. They will be able to utilize the information in their own research endeavors or professional activities.

Institution: Utah State University

Title: Cultivation, Maintenance, and Use of Lactic Fermenting Organisms

Description: A program on use and maintenance of cultures used in fermenting foods, especially cheese and meat. Genetic modification of starting cultures is included. A joint program between Biology and Nutrition and Food Science.

Admission Requirements: Knowledge of aseptic techniques essential

Starting Date: By arrangement with students

Duration: 6 months

Instructors: G.H. Richardson and F.J. Post

Costs: $2,600; living expenses about $2,000/6 months

Certificate Awarded: Letter of completion if requested

Technical Skills or Practical Procedures Acquired: The skills to maintain and prepare lactic cultures for fermentation as well as the practical side of fermentation itself. Some experience in genetic manipulation of starter cultures is included.

Institution: Solar Energy Research Institute (SERI)

Title: Research Participation Programs

Description: SERI's research includes programs on alcohol fuels and biomass energy, which can include elements of biotechnology

Admission Requirements: By special arrangement; contact SERI

Starting Date: Individually determined

Duration: Individually determined

Instructors: SERI staff

Costs: Stipends provided

Technical Skills or Practical Procedures Acquired: Dependent on research.

* * *

Institution: Sybron Chemicals, Inc.

Title: Wastewater Treatment by Bioaugmentation; Bacteriological Silage Preservation

Description: Development and use of microorganisms for domestic and industrial wastewater treatment

Admission Requirements: B.S. (Sciences)

Starting Date: Negotiable

Duration: Negotiable

Instructor: Dr. Joe Wilkinham III

Costs: Negotiable

Technical Skills or Practical Procedures Acquired: Mutation and selection techniques; pilot testing techniques.

Institution: University of Mississippi

Title: Applied Microbiology

Description: Industrial applications of microbiology, including current concepts in bioengineering, recombinant DNA, fermentations and food manufacturing, cellulolytic and biowaste conversions, immobilized enzyme technology.

Admission Requirements: General Microbiology

Starting Date: Usually offered in even years

Duration: 1 semester

Instructor: Harold L. Drake, Associate Professor of Microbiology

Costs: $460

Technical Skills or Practical Procedures Acquired: See description above.

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Institution: American Society for Microbiology

Title: Microbial Physiology and Genetics

Description: Course given at Planta Piloto de Procesos Industriales Microbiologicos (PROIMI), Tucuman, Argentina

Admission Requirements: Post-baccalaureate

Language of Instruction: Spanish

Starting Date: Not yet final

Duration: 3 weeks

Instructor: Dr. Norberto J. Palleroni, Hoffmann-La Roche, Nutley, NJ

Costs: None

Technical Skills or Practical Procedures Acquired: Approximately one-half of the course time will be spent in the laboratory. Participants will be able to utilize the acquired information in their own research endeavors and professional activities.

Institution: Indiana University (Bloomington) Institute for Molecular and Cellular Biology

Title: Advanced Research Training in Molecular and Cellular Biology

Description: Industrial fellowships--sabbatical-type exchanges of university and industrial scientists; post-doctoral fellowships--competitive 2-4 year appointments to scientists to conduct research with full member; visiting scientists--visiting scientists from industry and other universities engaged in short-term projects; graduate students--students working for advanced degrees with full member.

Admission Requirements: Application approval of Advisory Board

Starting Date: Negotiated

Duration: Depends on type of program and/or project

Instructors: Full members of Institute: established investigators holding faculty-equivalent research ranks in biology, chemistry, and optometry

Costs: Negotiated: again depends on individual project costs and/or program

Certificate Awarded: None

Technical Skills or Practical Procedures Acquired: Plant molecular biology, monoclonal antibodies, gene expression, recombinant DNA, developmental genetics.

Institution: Center for Advanced Training in Cell and Molecular Biology, Catholic University of America

Title: Hybridoma/Monoclonal Antibody Production

Description: The lecture/lab course covers each of the fundamental steps associated with the development of hybridomas and the evaluation of the monoclonal antibodies that they produce.

Admission Requirements: An undergraduate degree in biology or its equivalent

Starting Date: Contact Center

Duration: 5 days

Instructor: Dr. J. Michael Mullins

Costs: $550

Certificate Awarded: Continuing Education Units--3.5

Technical Skills or Practical Procedures Acquired: Immunization; subculturing; cytological and physiological characterization of myeloma cell lines; cell counting and viability; spleen dissociation; PEG fusion; cloning; assays for demonstration of positive clones; harvesting and culturing hybridoma cells in ascites fluid.

Institution: New Mexico State University

Title: Biochemical Analysis

Description: Theory and Practice of Ultracentrifugation, Chromatography, Spectroscopy, Electrophoresis, Fingerprinting, and Isotopic Methods

Admission Requirements: Elementary biochemistry

Starting Date: Variable

Duration: 1 semester or summer session

Instructors: Graduate Faculty

Costs: Not indicated

Technical Skills or Practical Procedures Acquired: Laboratory experience involved with the instruments and techniques described above.

* * *

Institution: Cold Spring Harbor Laboratory

Title: Postdoctoral Research in Molecular Biology, Cellular Biology, and Neurobiology

Description: Opportunities for postdoctoral research on gene function and analysis and DNA studies in conjunction with laboratory staff are sometimes available.

Admission Requirements: Contact Laboratory

Starting Date: Determined on an individual basis

Duration: Determined on an individual basis

Instructors: Cold Spring Harbor Laboratory Staff

Costs: Stipend provided

Institution: College of William and Mary, School of Marine Science

Title: Mariculture Techniques for Hard Clam (Mercenaria) Seed

Description: Hands-on practical applications for the production of hard clam seed. Techniques include spawning and rearing of clam seed for grow-out under natural conditions.

Admission Requirements: None

Starting Date: May-June

Duration: 1 week

Instructor: Mike Castagna

Costs: $40-$80

Certificate Awarded: CEU credits

Institution: New Mexico State University

Title: Spanish Masters Graduate Program

Description: Program designed to allow admission to graduate school without TOEFL 500. Students enroll in intensive English and graduate level statistics courses taught in Spanish, then progressively increase regular graduate course load as English proficiency is gained. After first year, all students enroll full time in regular graduate courses.

Admission Requirements: B.S. equivalent and B average.

Language of Instruction: Spanish

Starting Date: July 1 each year for those wih TOEFL 325 or less; August 15 for those with TOEFL below 500 but above 325

Duration: 10 months (Summer Session II, Fall, and Spring semesters)

Instructors: Regular advisor from each department assigned to each student. International programs coordinator assists students during the first year.

Costs: Regular tuition and fees plus one-time $500 language fee

Certificate Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: English.

Degree Program Organization
(also see main index)

Institution: Iowa State University, Department of Biochemistry and Biophysics

Title: Agricultural Biochemistry

Description: M.S. and Ph.D. programs. In both, experimental theses are required.

Admission Requirements: B.S. or B.A. with a strong background in chemistry and biology, good academic record, good GRE scores, strong letters of recommendation

Degree Awarded: M.S., Ph.D.

* * *

Institution: Oklahoma State University, College of Agriculture

Title: Agronomy

Description: Can include plant breeding, genetics, cytogenetics, crop physiology. Generally 90 hours above B.S.

Admission Requirements: B.S. in Agronomy or equivalent. TOEFL of 550 or above.

Starting Date: Late August or early January

Degree Awarded: Ph.D.

Institution: Oregon State University

Title: Crop Science

Description: Graduate programs are offered in plant breeding and genetics, crop physiology, weed control, and seed production and technology.

Admission Requirements: B.S.; 3.0 GPA (American B average), TOEFL score of 500

Starting Date: Beginning of Fall, Winter, Spring, or Summer quarter

Advisor: E.E. Hardin, Acting Head, Department of Crop Science

Degree Awarded: M.S., Ph.D.

* * *

Institution: Texas Tech University

Title: Agronomy

Description: A Ph.D. program that studies agronomic principles of crop physiology, nutrition, metabolism, and genetics.

Admission Requirements: Standard admission requirements to doctorate program is 1,000 minimum on GRE. Appropriate degree (i.e., B.S. or M.S.) is needed.

Starting Date: Normally around September 1, January 20, and June 1 of each year

Advisors: Faculty members serve as instructors and program advisors.

Degree Awarded: Ph.D.

Technical Skills or Practical Procedures Acquired: Techniques include an ability to understand the basic principles of crop growth and understand plant processes, such as herbicidal action in plants.

Institution: University of Arizona, Department of Plant Sciences

Title: Agronomy and Plant Genetics

Description: Concentrations are available in physiology, plant breeding, genetics, ecology, weed science, and agronomic production. We are recognized as an international center for arid land agricultural research. The environment provides unique opportunities for pioneering research in efficient water use and plant stress in crops.

Admission Requirements: Undergraduate major in agriculture or biology, including at least 16 units in plant sciences or closely related fields. The undergraduate program must have included basic courses in botany, genetics, entomology, plant pathology, and soils. Foreign students need TOEFL of 500 and 550 before obtaining full graduate standing for M.S. and Ph.D. degrees, respectively.

Starting Date: August, Fall semester; January, Spring semester

Advisors: Drs. Marcarian, Briggs, Voigt, Hofmann, Dobrenz, Ramage, Rubis, Taylor, McDaniel, Ray, Katterman, Kneebone, Muramoto, Hamilton, Gathman, Day, Endrizzi

Degree Awarded: M.S., Ph.D.

* * *

Institution: University of California, Davis*

Title: International Agricultural Development

Description: The application of agricultural knowledge and technology to problems of food production, nutrition, health, income generation, marketing, and asset redistribution in less developed nations.

Admission Requirements: Contact University

Advisors: D.E. Hansen and L.E. Grivetti

Degree Awarded: M.S.

*Information from University catalog

Institution: University of Missouri, Columbia

Title: Agronomy-Genetic Engineering

Description: Training in wheat cytogenetics, the evolution and species relationships of wheat and its relatives, and the manipulations needed to introduce alien variation into cultivated forms.

Admission Requirements: B.S. degree from accredited institution; acceptable scores on Graduate Record Exam and Test of English as Foreign Language

Starting Date: August, January, June

Advisors: Gordon Kimber, Perry Gustafson, G. Redei, M.G. Neuffer

Degree Awarded: M.S., Ph.D.

* * *

Institution: Drexel University

Title: Lipid Biochemistry of Insects and their Parasites

Description: This program concentrates on the lipid biochemistry of insects (e.g., Heliothis zea) and certain insect parasites (e.g., viruses and nematodes) which may be useful as natural pesticides.

Admission Requirements: Contact University

Starting Date: Anytime

Duration: Negotiable

Advisor: Dr. Karla S. Ritter

Degree Awarded: M.S., Ph.D., or postdoctoral experience

Technical Skills or Practical Procedures Acquired: Training in analytical biochemistry of the lipids (using gas-liquid chromatography; high performance liquid chromatography, etc.) of insects and their parasites; insect pathology.

Institution: Purdue University

Title: Plant Genetic Engineering

Description: Genetic engineering of crop plants for insect resistance

Admission Requirements: Admission standards as outlined in the Bulletin of the Graduate School. Criteria used in evaluating an application: grades, Graduate Record Examination scores (verbal, quantitative, advanced biology), letters of recommendation, statement regarding objectives of graduate study.

Advisors: Dr. P.E. Dunn, Professor R.E. Shade, Dr. Larry Murdock

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Skills in biochemical and physiological techniques; bioassays using insects; host-plant resistance techniques.

Institution: Purdue University

Title: Insect Biochemistry

Description: Major research areas include: characterization and regulation of the insect immune response; characterization and regulation of insect digestive proteinases; purification and structural analysis of plant inhibitors of insect digestive proteinases.

Admission Requirements: Admission standards as outlined in the Bulletin of the Graduate School. Criteria used in evalutating an application; grades, Graduate Record Examination scores (verbal, quantitative, advanced biology), letters of recommendation, statement regarding objectives of graduate study.

Starting Date: Semesters begin in January and August of each year.

Advisor: P.E. Dunn

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Depending on thesis research project, student may obtain practical experience in protein isolation and structural analysis, analytical biochemistry, organ culture, immunological methods including monoclonal antibody production, and molecular biology.

Institution: Texas Tech University

Title: Entomology

Description: A Master's program that will provide background in agricultural, environmental, medical and veterinary, urban and industrial, and/or systematic aspects of entomology.

Admission Requirements: Standard admission requirements to Master's program is 800 minimum on GRE. Appropriate degree (i.e., B.S.) is needed.

Starting Date: Normally around September 1, January 20, and June 1 of each year.

Advisors: Faculty of the College serve as instructors and program advisors.

Degree Awarded: M.S.

Technical Skills or Practical Procedures Acquired: The ability to recognize and alleviate insect problems and apply the latest biotechnology information to this field.

Institution: University of Arizona

Title: Plant Protection

Description: The program provides the broad training needed by individuals to apply and make recommendations for chemicals used to control insects, diseases, and weeds in integrated systems of pest management. The primary objective is to impart the philosophy that plant protection is based on the integration of all known control measures (biological, cultural, chemical) designed to maintain pest densities below economically damaging thresholds while producing a minimal impact on the environment.

Admission Requirements: Applicants may be from any undergraduate discipline provided that they have the appropriate background in the physical and biological sciences. This background includes basic courses in chemistry, mathematics, biology (plant science), plant pathology, entomology, and soils. Deficiencies can be made up without graduate credit after admission to the program.

Advisors: Members of the Committee on Plant Protection and advisors from the four participating departments

Degree Awarded: M.S.

Technical Skills or Practical Procedures Acquired: Each student completes a research project and a thesis or a Master's report.

* * *

Institution: University of Florida

Title: Entomology and Nematology

Description: The department offers degrees in the areas of entomology, nematology, acarology, biotechnology, and genetic engineering.

Admission Requirements: New graduate students should have backgrounds in biology, chemistry, physics, and mathematics and knowledge of basic entomology or nematology. Minor deficiencies may be made up after entering graduate school.

Degree Awarded: Master of Agriculture, M.S., Ph.D.

Institution: University of Georgia, Department of Entomology

Title: Entomology, with emphasis on integrated pest management for agricultural crops

Description: Training will involve formal courses and original research in the area of economic entomology of specific agricultural systems.

Admission Requirements: For M.S., baccalaureate; for Ph.D., M.S. degree in entomology or agricultural science

Starting Date: Any quarter

Advisors: Appropriate faculty advisor depending upon area of specialization

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Understanding of basic and applied entomology of economically important agricultural pests.

* * *

Institution: University of Georgia, Department of Plant Pathology

Title: Plant Protection and Pest Management

Description: A comprehensive multidisciplinary professional degree program with training in plant pathology, entomology, and weed science. Involves the integration of chemical, cultural, and biological approaches to the management of pests. Sixty hours of formal courses plus two 3-months internships or one 6-month internship.

Admission Requirements: A baccalaureate degree from an accredited college or university with a background in agricultural and/or biological sciences

Starting Date: January, March, June, or September

Advisors: Faculty in the Division of Plant Pathology, Entomology, or Agronomy

Degree Awarded: Master of Plant Protection and Pest Management

Institution: University of Hawaii at Manoa*

Title: Entomology

Description: Independent study, course work, and research in acarology, biological control of insect and weed pests, insect ecology, insecticide, toxicology, and tropical economic entomology

Admission Requirements: Minimum of 18 undergraduate credits in entomology and zoology; 2 years of chemistry; 1 year of physics; 1 year of foreign language; and courses in botany, genetics, and microbiology

Advisor: J.W. Beardsley, Jr.

Degree Awarded: M.S., Ph.D.

*Information from University catalog

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Institution: Oklahoma State University, College of Agriculture

Title: Forestry (Forest Resources and Environmental Sciences)

Description: Allows concentration in biometry, ecology, economics, genetics and tree improvement, tree physiology, silviculture and watershed management. Thirty hours including research thesis, above B.S.

Admission Requirements: B.S. in Forestry or equivalent. B average or above. TOEFL of 550 or above.

Starting Date: Late August or early January

Degree Awarded: M.S.

Institution: Oregon State University

Title: Forest Science

Description: Graduate programs are offered in forest ecology, forest genetics, forest physiology, and silviculture

Admission Requirements: B.S., 3.0 GPA (American B average), TOEFL score of 500

Starting Date: Beginning of Fall, Winter, Spring, or Summer quarter

Advisor: Dr. Logan Norris, Head, Department of Forest Science

Degree Awarded: M.S., Ph.D.

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Institution: University of Georgia, School of Forest Resources

Title: Forest Biology and Silviculture

Description: The School of Forest Resources offers instruction and opportunities for graduate research in a large number of specialty areas within forest biology. These are: forest ecology, natural and artificial regeneration, forest entomology, forest genetics and tree improvement, plant-water-soils relationships, tree physiology, tissue culture, morphogenesis, and the biology of wood formation and silviculture.

Admission Requirements: Minimum GRE and GPA, committee approval, and available major professor. TOEFL required of foreign students.

Starting Date: Any quarter

Advisors: School of Forest Resources faculty

Degree Awarded: M.S., Ph.D.

Institution: Oklahoma State University, College of Agriculture

Title: Horticulture

Description: Allows concentration in fruit and nut crops, vegetable crops, ornamental nursery crops, flower crops, and turf. Thirty hours above B.S.

Admission Requirements: B.S. in Horticulture or equivalent. TOEFL of 550 or above.

Starting Date: Late August or early January

Degree Awarded: M.S.

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Institution: Oregon State University

Title: Horticulture

Description: Graduate programs are offered in physiology, biochemistry, genetics, breeding and culture of fruit, vegetable, or ornamental crops.

Admission Requirements: B.S., 3.0 GPA (American B average), TOEFL score of 500

Starting Date: Beginning of Fall, Winter, Spring, or Summer quarter

Advisor: Dr. C.J. Weiser, Head, Department of Horticulture

Degree Awarded: M.S., Ph.D.

Institution: University of Wisconsin, Madison, Graduate School

Title: Horticulture

Description: Modern genetic selection and gene manipulation for new crops, disease resistance, crop improvement, tissue culture, plant cloning and plant genetic engineering, plant breeding, vegetable production, plant physiology, and chromosome manipulation.

Admission Requirements: Bachelor's degree, 3.0 grade point average, TOEFL, English proficiency required

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Basic and applied skills for plant breeding, genetic engineering of trees, vegetable crops, and grains.

* * *

Institution: Iowa State University

Title: Plant Breeding and Cytogenetics

Description: Improvement of crop plants through the study and application of quantitative genetics, cytogenetics, molecular genetics, tissue culture, agronomy, and related sciences.

Admission Requirements: B.S. in a biological science, standing in the upper one-fourth of the baccalaureate class, and full financial support. English-TOEFL score of 500 or higher.

Starting Date: January or August each year if vacancies are available

Advisors: K.J. Frey, Peter A. Peterson, Reid Palmer, R.E. Atkins, Walter Fehr, Arnel Hallauer, W.A. Russell, Linda Pollak, Detroy Green, L. T. Carlson

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Ability to utilize biotechnology and plant-breeding techniques in the improvement or development of cultivars of all food plants. Graduates of the Ph.D. program capable of organizing and directing plant science research in the relevant field.

Institution: Texas Tech University

Title: Plant Breeding

Description: A Master's program that applies biotechnology and genetic engineering to this field of science.

Admission Requirements: Standard admission requirements to Master's program is 800 minimum on GRE. Appropriate degree (i.e., B.S.) is needed.

Starting Date: Normally around September 1, January 20, and June 1 of each year

Advisors: Faculty of the College serve as instructors and program advisors.

Degree Awarded: M.S.

Technical Skills or Practical Procedures Acquired: The ability to perform plant-breeding techniques and procedures for the improvement of varieties.

* * *

Institution: University of Wisconsin, Madison, Graduate School

Title: Plant Breeding and Plant Genetics

Description: Special interdisciplinary program on modern plant breeding. Full coverage from genetic engineering to field trials.

Admission Requirements: Bachelor's degree, 3.0 grade point average, TOEFL, English proficiency required.

Degree Awarded: M.S., Ph.D.

Institution: University of Florida

Title: Plant Pathology

Description: The Department of Plant Pathology offers graduate studies leading to the Master of Agriculture, Master of Science, and Doctor of Philosophy degrees. A superior student with a baccalaureate may begin graduate study toward a higher degree in the basic areas of plant pathology. These areas include biochemical aspects of host-pathogen systems, epidemiology, etiology, genetics of host-pathogen systems, and pathogen taxonomy. In Florida the diversity of cropping sequences coupled with an environment ideal for plant disease development is unexcelled and offers the student opportunities to study diseases of unique crops as well as diseases of crops of national and international importance. Intimate knowledge can be gained of diseases of field, forage, forest, fruit, ornamental, pasture, range, turf, and vegetable crops in temperate, subtropical, and tropical environments.

Admission Requirements: Students who anticipate study in plant pathology at the University of Florida should include in their undergraduate programs training in botany (anatomy, cytology, physiology, systematics), chemistry (through biochemistry), introductory microbiology, physics, zoology, and mathematics.

Degree Awarded: Master of Agriculture, M.S., Ph.D.

Institution: University of Georgia, Department of Plant Pathology

Title: Plant Pathology

Description: A traditional academic degree program in plant pathology. Students may specialize in general plant pathology, bacteriology, nematology, virology, physiology, mycology, or molecular genetics of plant pathogens.

Admission Requirements: A baccalaureate degree from an accredited college or university with a background in agricultural and/or biological science

Starting Date: January, March, June, or September

Advisors: Faculty in the Division of Plant Pathology

Degree Awarded: M.S., Ph.D.

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Institution: Oklahoma State University, College of Agriculture

Title: Plant Pathology

Description: Disease control, genetic improvement of crops. Approximately 90 hours above a B.S., including research thesis. Prefer M.S. in Plant Pathology.

Admission Requirements: GRE and strong background in biological or agricultural sciences. TOEFL of 550 or above.

Starting Date: Late August or early January

Advisor: Contact University

Degree Awarded: Ph.D.

Institution: Iowa State University

Title: Plant Pathology or Microbiology

Description: Conduct thesis research leading to the M.S. or Ph.D. in Plant Pathology or Microbiology. Research will develop, utilize, and assess monoclonal antibodies (hybridomas) to plant and animal viruses.

Admission Requirements: Fulfill graduate admission requirements of Iowa State University and the Departments of Plant Pathology, Seed and Weed Sciences or Microbiology.

Starting Date: After admission to graduate school (generally in July or August of any year)

Advisors: John H. Hill (Plant Pathology, Seed and Weed Sciences), Donald P. Durand (Microbiology)

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Analytical and molecular techniques required in development and characterization of monoclonal antibodies included chromotography, ELISA, radioimmunoassay, cell culture, ultracentrifugation, spectrophotometry.

Note: These techniques are not offered as part of a course in monoclonal antibodies but are treated as part of the research component of a graduate degree program at present. Special short courses in this technology have not been established.

Institution: University of Missouri, Columbia

Title: Plant Pathology

Description: Familiarization with bacterial pathogens of plants, their identification; methods of control, study of the biochemical and physiological aspects of disease development; studies concerning resistance to bacterial disease, genetic resistance; induced resistance immunizing plants against bacterial infection.

Admission Requirements: B.S. degree from accredited institution; acceptable scores on Graduate Record Exam and Test of English as Foreign Language

Starting Date: August, January, June

Advisors: R.N. Goodman, A. Novacky, A. Karr

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Identification of disease-causing organism, *in vitro* culture of bacteria, comprehension of control, resistance immunity, plant and microbial genetics.

* * *

Institution: University of Missouri, Columbia

Title: Plant Pathology-Microbiology

Description: Propagate pathogen-free plants by micro-propagation; cell and tissue culture.

Admission Requirements: B.S. degree from accredited institution; acceptable scores on Graduate Record Exam and Test of English as Foreign Language

Starting Date: August, January, June

Advisor: Daniel Millikan

Degree Awarded: M.S., Ph.D.

Institution: University of Wisconsin, Madison, Graduate School

Title: Plant Pathology

Description: Plant selection, engineering, and treatment for disease resistance; adaption to stress and high productivity. Full range of plants from temperate to tropical. Biotron and farms available. Research forests available. Forest pathology, pathogenic bacteria, epidemiology, virology, disease resistance.

Admission Requirements: Bachelor's degree, 3.0 grade point average, TOEFL, English proficiency required

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Genetic engineering for plant productivity, disease resistance. Research skills for forestry, food crop, and ornamental disease control.

Institution: Iowa State University

Title: Soil Microbiology and Biochemistry

Description: Microorganisms and enzymes present in soils and their activities bearing on soil fertility, plant growth, and the decomposition of organic residues and environmental pollutants.

Admission Requirements: B.S. in microbiology, biochemistry, soil science, or related fields. English-TOEFL score of 500 or higher.

Starting Date: January or August each year if vacancies are available

Advisors: J.M. Bremer, A. Tabatabai, T.E. Loynachan, Alfred Blackmer

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Capability to carry on research on the improvement of nitrogen fixation organisms, degeneration and deactivation of enzymes in soils, and the chemical and biochemical transformations of plant nutrient compounds in soils. Ph.D. degree holders can initiate and direct original research programs.

Institution: University of Tennessee, Knoxville College of Agriculture

Title: Plant and Soil Science

Description: M.S. and Ph.D. programs in the broad fields of plant and soil science with concentrations in soils, plant breeding and genetics, and crop physiology and ecology.

Admission Requirements: TOEFL score, 525; undergraduate grade point average, 3.0; graduate grade point average, 3.5; approval of Graduate School and Department of Plant and Soil Science

Starting Date: Any term

Advisor: Dr. Lloyd Seatz, program advisor and department head

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Knowledge, skills, and scientific accomplishments required in typical U.S. graduate programs.

Institution: Texas Tech University

Title: Soil Science

Description: An M.S. program that considers soil-plant relationships and the management and control of soil factors influencing plant growth.

Admission Requirements: Standard admission requirements to Master's program is 800 minimum on GRE. Appropriate degree (i.e., B.S.) is needed

Starting Date: Normally around September 1, January 20, and June 1 of each year

Advisors: Faculty of the College serve as instructors and program advisors.

Degree Awarded: M.S.

Technical Skills or Practical Procedures Acquired: Techniques on determing important physical, chemical, and biological characteristics of a soil and how to manipulate them for maximum production.

Institution: Columbia University*

Title: Chemical Engineering (Bioengineering)

Description: Areas of interest include biochemical and microbial processes for chemical production.

Admission Requirements: Contact University

Advisor: Jordan L. Spencer

Degree Awarded: M.S., Sc.D.

*Information from University catalog

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Institution: Cornell University*

Title: Chemical Engineering (Biochemical Engineering)

Description: Study and research to provide a deeper comprehension of the basic and applied sciences; may involve food production, immobilized microbes, microbial growth and interaction, growth of plant cells, mathematical models of plant cells.

Admission Requirements: Contact University

Advisor: M.L. Shuler

Degree Awarded: M.S., Ph.D.

*Information from University catalog

Institution: Georgia Institute of Technology

Title: Applied Biology

Description: The program provides training in biotechnology with opportunities to concentrate in microbiology, biophysics/genetics, and environmental biology. With microbiology as its cornerstone, biotechnology incorporates recent advances in genetics engineering, biomass utilization, and electronics. The program has laboratories for fermentation, immobilized cells and enzymes, recombinant DNA, and analytical Studies.

Admission Requirements: All students who wish to enroll at Georgia Tech should write to the Office of Admissions for special information pamphlet describing application procedures and other basic information

Starting Date: September, January, March, and June

Advisors: Biomass Conversion, Dr. J. Benemann; Recombinant DNA Technology, Dr. D. Hall; Natural Product Chemistry, Dr. T.G. Tornabene

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Aquatic species cultivation; bioreactor designs; genetic engineering; immobilization of cells and enzymes; fermentation technology; biomass conversion.

Institution: Illinois Institute of Technology

Title: Biology, Chemical Engineering, or Environmental Engineering

Description: IIT's Biotechnology Program is interdisciplinary in nature involving both course work and research. In this program engineers receive training in biology, and biologists in applied biology or engineering. The focus of the program is on bioreactor modeling, optimization, and control.

Admission Requirements: Bachelor's degree from an accredited institution with a "B" average. TOEFL score 550

Starting Date: August or January

Advisors: Prof. Douglas J. Cork, Biology Department; Prof. Charles N. Haas, Environmental Engineering Department; Prof. William Weigand, Chemical Engineering Department

Degree Awarded: M.S., M.Ch.E.

Technical Skills or Practical Procedures Acquired: Students will be trained to perform research in biotechnology. One object of the program is to train students to work effectively with other relevant disciplines.

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Institution: Johns Hopkins University, G.W.C. Whiting School of Engineering

Title: Chemical Engineering (Biotechnology)

Description: By selecting appropriate electives, a coherent program in biotechnology can be developed. An interdisciplinary faculty committee guides this program

Admission Requirements: Undergraduate work in chemistry, engineering, mathematics, and physics equivalent to that of JHU. TOEFL minimum of 560 for foreign students

Starting Date: Spring or Fall semesters

Degree Awarded: M.S., Ph.D.

Institution: Massachusetts Institute of Technology*

Title: Food Science and Technology

Description: Academic and research programs are offered in three broad areas: applied chemistry, applied microbiology, and engineering.

Admission Requirements: Contact Department

Degree Awarded: M.S., Ph.D.

*Information from University catalog

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Institution: Massachusetts Institute of Technology*

Title: Biochemical Engineering

Description: Integration of studies in biological sciences with engineering is emphasized, with particular attention to industrial microbiology and fermentation processes.

Admission Requirements: Contact Department

Degree Awarded: M.S., Ph.D.

*Information from University catalog

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Institution: Michigan Biotechnology Institute

Title: Biotechnology

Description: Degrees in microbiology, chemical engineering, biochemistry through Michigan State University with research in biotechnology

Admission Requirements: Same as Michigan State University

Advisors: Faculty advisors would be MSU scientists with joint appointments

Degree Awarded: M.S., Ph.D.

Institution: New Mexico State University

Title: Biochemical Engineering

Description: Students allowed to concentrate electives in biokinetics and bioprocesses. Research opportunities are available in synthesis, separation processes, and biomass utilization.

Admission Requirements: B.S., preferably Chemical Engineering

Starting Date: January, June, August

Advisors: J.T. Patton, R. Roubicek

Degree Awarded: M.S.

Technical Skills or Practical Procedures Acquired: Professional chemical engineering expertise.

* * *

Institution: Texas Tech University

Title: Food Technology

Description: A Master's program that emphasizes the technological aspects of food handling and processing. It is related to development and quality control.

Admission Requirements: 800 minimum on GRE. Appropriate degree (i.e., B.S.) is needed.

Starting Date: Normally around September 1, January 20, and June 1 of each year

Advisors: Faculty of the College serve as instructors and program advisors.

Degree Awarded: M.S.

Technical Skills or Practical Procedures Acquired: Provides skills of research and development of food products and techniques for quality control.

Institution: Purdue University

Title: Food Process and Biochemical Engineering

Description: Design and development of new processes and equipment needed by food and technology industries. Scale-up and layout of production facilities. Pharmaceutical processing and production. Microorganism production facilities and equipment.

Admission Requirements: B.S. in Agricultural or Chemical Engineering is the normal background. Other disciplines considered on a case-by-case basis.

Starting Date: August, January, or June

Advisors: M.R. Okos, M. Ladisch

Degree Awarded: M.S., Ph.D.

* * *

Institution: Purdue University, School of Chemical Engineering

Title: Biochemical Engineering

Description: The School of Chemical Engineering offers graduate programs leading to M.S. and Ph.D. degrees with specialization in the field of biochemical engineering. A student may choose to do research on growth of microorganisms, immobilization of enzymes, hydrolysis of cellulose, optimal control of biochemical reactors, biochemical separations, and synthesis of biopolymers.

Admission Requirements: B.S. in Chemical Engineering or Chemistry

Starting Date: August and January

Degree Awarded: M.S., Ph.D.

Institution: Rutgers University*

Title: Chemical and Biochemical Engineering

Description: Current research emphasis is on microbial and enzyme engineering and environmentally oriented projects. Target uses are in food processing, pharmaceutical manufacture, wastewater treatment, and clinical applications.

Admission Requirements: Contact University

Advisor: Professor Alkis Constantinides

Degree Awarded: M.S., Ph.D.

*Information from University catalog

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Institution: Texas Tech University

Title: Meat Science

Description: A Master's program that applies current biotechnology related to meat improvement, processing, storage, and cooking.

Admission Requirements: Standard admission requirements to Master's program is 800 minimum on GRE. Appropriate degree (i.e., B.S.) is needed.

Starting Date: Normally around September 1, January 20, and June 1 of each year

Advisors: Faculty of the College serve as instructors and program advisors

Degree Awarded: M.S.

Technical Skills or Practical Procedures Acquired: The ability to understand and perform techniques for meat improvement and processing and subsequent preparation for the consumer.

Institution: Tufts University

Title: Food and Biotechnology Program

Description: M.S. program in food and biotechnology

Admission Requirements: Contact University

Degree Awarded: M.S.

Technical Skills or Practical Procedures Acquired: Fermentation operation, food processing and preservation, biochemical processing, enzyme production, chemical processing, nutrition, immunology, tissue culture, microbiology.

* * *

Institution: University of California, Berkeley*

Title: Energy and Resources

Description: Graduate courses and research that treat energy issues as the intersection of technological, economic, environmental, and sociopolitical components.

Admission Requirements: Contact University

Advisor: Jack M. Hollander

Degree Awarded: M.A., M.S., Ph.D.

*Information from University catalog

Institution: University of Maryland, Baltimore County

Title: Applied Molecular Biology

Description: The object of this program is to train new kinds of science professionals to meet the needs of the biotechnology industry. This program is unique in that it establishes a university-industry educational partnership. Industry scientists will be involved (as adjunct faculty) in curriculum development, evaluation, and revision, and will participate in laboratory and lecture courses as well as joint seminars. Industry will also provide meaningful internships for students in the program.

Admission Requirements: B.A. or equivalent degree in Biochemistry

Advisor: AMB Coordinator

Degree Awarded: M.S.

Technical Skills or Practical Procedures Acquired: Cell and tissue culture, enzymotology, genetic engineering, hybridomas, immunology, microbiology, molecular genetics, monoclonal antibodies.

* * *

Institution: University of Minnesota, Department of Chemical Engineering and Materials Science

Title: Chemical Engineering with specialization in Biochemical Engineering

Description: Regular degree programs for M.S. and Ph.D. in chemical engineering, with option to specialize in biochemical engineering.

Admission Requirements: B.S. in Chemical Engineering, Chemistry, Biochemistry, Microbiology, or related field

Advisors: Professors A.G. Fredrickson, W-S Wu

Degree Awarded: M.S., Ph.D.

Institution: University of Mississippi

Title: Biochemical Engineering

Description: Within the Department of Chemical Engineering, one may choose to specialize in biochemical engineering. In these cases the student writes the thesis or dissertation in an area of biochemical engineering such as enzyme deactivation and stabilization or fermentation. The student would take 1 or 2 special topic courses in biochemical engineering as well as courses in the traditional areas of chemical engineering to satisfy the major course requirement and may take elective courses in microbiology, genetics, biochemistry, etc., which are offered in other departments.

Admission Requirements: B.S. with a grade point average of 3.0/4.0; GRE combined verbal and quantitative scores of 900 and a TOEFL score of 550

Starting Date: January, June, or August

Advisors: Drs. Ajit Sadana, James E. Clemmer

Degree Awarded: Ph.D. in Engineering Science; M.S. in Engineering Science

Technical Skills or Practical Procedures Acquired: The student should obtain a working knowledge of biochemical engineering for further research or application. The area of specialization is cellulose degradation, fermentation, enzyme deactivation and enzymology, reactor design.

Institution: University of Pennsylvania

Title: Biochemical Engineering

Description: Program is designed to be flexible and emphasizes the fundamental nature of chemical and physical operations. Basic knowledge is provided through course work and research. Research is focused on 3 areas: biochemical engineering, energy, and surfaces.

Admission Requirements: GRE General Test, required; 2 of the required letters of recommendation should be from biologists with whom the applicant has worked; college-level mathematics, physics, and organic and inorganic chemistry.

Advisors: S.W. Churchill, E.B. Dussan, W.C. Forsman, E.D. Glandt, R.J. Gorte, D.J. Graves, A.N. Hixson, A.E. Humphrey, A. Kivnick, D.A. Lauffenburger, M. Litt, M.C. Molstad, A.L. Myers, D. Perlmutter, J.A. Quinn, W.D. Seider

Degree Awarded: Ph.D. (No terminal Master's degrees)

* * *

Institution: University of Virginia*

Title: Chemical Engineering (Biochemical Engineering)

Description: Current research includes enzyme engineering, biological systems, biological separations, and fermentation.

Admission Requirements: Undergraduate degree in chemical engineering or chemistry, physics, or biology with additional selected courses in the summer preceding registration.

Advisor: Elmer L. Gaden, Jr.

Degree Awarded: M.E., M.S., Ph.D.

*Information from University catalog

Institution: Vanderbilt University

Title: Chemical Engineering

Description: Specific course on enzyme kinetics and fermentation modeling.

Admission Requirements: Contact University

Advisor: R. Tanner

Degree Awarded: M.S., Ph.D.

* * *

Institution: West Virginia University, Department of Chemical Engineering

Title: Biochemical Engineering

Description: Graduate level courses in biochemical engineering and research programs on biochemical separations, enzyme catalysis, and plant tissue culture.

Admission Requirements: Contact University

Technical Skills or Practical Procedures Acquired: Research experience in biotechnology, biochemical engineering, biochemical separations.

Institution: University of Georgia

Title: Ecology

Description: The interdepartmental Ecology Degree Program leads to the Ph.D. degree with a major in ecology. Program requirements are tailored to student's background and research area. Programs of study are decided and examinations held by committee. A dissertation is required.

Admission Requirements: B.S. in biological sciences or equivalent. Master's degree preferred but not required.

Starting Date: Any quarter

Advisor: D.A. Crossley, Jr.

Degree Awarded: Ph.D.

Technical Skills or Practical Procedures Acquired: Ecological analysis of natural, disturbed, and man-made ecosystems, using both theoretical and empirical methods.

* * *

Institution: California Institute of Technology*

Title: Environmental Engineering Science

Description: Students may do major study in water quality control, aquatic chemistry, marine ecology, water resources, or envrionmental health engineering.

Admission Requirements: Contact Institute

Advisor: Professor F.S. Buffington

Degree Awarded: M.S., Ph.D.

*Information from University catalog

Institution: University of Notre Dame, Department of Civil Engineering

Title: Environmental Engineering

Description: Graduate programs in civil engineering that emphasize research in the following areas: bioengineering, environmental engineering design, water chemistry, subsurface hydrology, pollution transport, and hazardous waste management, as well as the more traditional wastewater treatment, water supply, and water pollution control. Currently, there is research and a developing cooperative program with the Universidad Technological de Panama to study wastewater treatment systems particularly well suited for rural United States, Central America, and the Caribbean. These include aerobic and anaerobic biological systems, and biogas production from agricultural residues.

Admission Requirements: Undergraduate degree in engineering and related physical and life sciences. For regular admission: grade point average at 3.0, TOEFL score above 550, and GRE scores.

Starting Date: Late August or early January each year

Advisor: Dr. Lloyd H. Ketchum, Jr.

Degree Awarded: M.S., E.H.E., M.S.C.E., Ph.D.

Technical Skills or Practical Procedures Acquired: The emphasis is in water pollution control.

Institution: Georgetown University, Department of Physiology and Biophysics

Title: Biomedical Engineering

Description: Part-time evening program, which can be completed in 2 or 3 years (2 or 3 courses/week). Course covers basic sciences in medicine, a survey of medicine, applied mathematics and engineering, and computer science for biomedical problems. It includes 4 elective courses.

Admission Requirements: 2 years of university-level chemistry, 1 year of university-level physics, 1 year of biology. B.S. or equivalent in a natural science or in engineering.

Duration: 2 or 3 years

Advisors: Professors Robert Ledley, David Namatzadeh, Lawrence Lilienfield, Estelle Ramey

Degree Awarded: M.S.

Technical Skills or Practical Procedures Acquired: Computer programming applied to medical imaging; evaluation of biomedical electronic transducers.

Institution: University of Illinois, Urbana-Champaign

Title: Electrical and Computer Engineering

Description: Graduate work in 4 general areas: circuits and systems, computer and information systems, electromagnetic fields, and physical and quantum electronics. Department participation in interdisciplinary specialization: bioengineering, biomedical instrumentation, and ultrasonics.

Admission Requirements: Minimum 520 TOEFL score for applicant where native language is not English

Starting Date: Usually about August 21

Duration: Variable

Degree Awarded: M.S., Ph.D.

* * *

Institution: University of Pennsylvania

Title: Bioengineering

Description: Program is designed to provide students with basic training in biology and engineering, together with an intensive study in specific areas of interest, including the cardiovascular system, respiratory system, biorheology, musculoskeletal system and biomaterials, effects of non-ionizing radiation on living systems, electrical interfaces with biological systems, radiological physics, dielectric spectroscopy of biomatter, biomechanics, sensory communication, and dental bioengineering.

Admission Requirements: Undergraduate degrees in engineering or the physical or life sciences preferred

Degree Awarded: M.S.E., Ph.D., M.D./Ph.D.

Institution: Northwestern University

Title: Interdisciplinary Program in Molecular, Cellular, and Integrative Biomedical Science

Description: The purpose of this interdepartmental program is to offer graduate students interdisciplinary training in the basic health sciences with sufficient flexibility to allow specialization in areas of research interest.

Admission Requirements: Contact Graduate School

Advisor: Professor Robert H. Rownd, Program Director

Degree Awarded: M.S., Ph.D.

Institution: Johns Hopkins University, School of Hygiene and Public Health

Title: Environmental Health Sciences

Description: The Department of Environmental Health Sciences offers graduate and postgraduate instruction in 3 major program areas: (1) research in the sciences pertaining to environmental health; (2) education for careers in applied environmental health services; and (3) professional training for the practice of occupational and environmental medicine and nursing and environmental health engineering. Scientific research is focused on environmental physiology, toxicology, behavioral and neurosciences, experimental pathology, cell biology, environmental chemistry, microbiology and immunology, molecular biology and biophysics, and radiation biology, chemistry, and physics. Experience in general occupational medicine, or in sub-specialty areas of occupational pulmonary, neurology, or dermatologic diseases is available. Environmental health engineering and management focuses on the areas of water and wastewater, sanitary engineering, industrial hygiene and safety, and air pollution control.

Admission Requirements: A baccalaureate in engineering, nursing, or one of the sciences plus appropriate experience or training in public health

Starting Date: Spring or Fall semesters

Degree Awarded: Students in the department may be candidates for the M.H.S., Sc.M., Dr.P.H., Sc.D. or Ph.D. degrees, though not all degrees are offered in each program. The student should consult the section on academic information in the University catalog.

Institution: Johns Hopkins University, School of Hygiene and Public Health

Title: Immunology and Infectious Diseases

Description: The Department of Immunology and Infectious Diseases studies the biological basis of infectious and immunological diseases. It employs the disciplines of virology, bacteriology, parasitology, immunology, biochemistry, molecular biology, medical entomology, and ecology to gain a deeper understanding of the interaction of host and infectious agent. Although its major focus is on laboratory investigations, the Department also emphasizes field studies conducted locally and internationally.

The Department has a long-standing commitment to tropical medicine. The Tropical Medicine Center (Director, Dr. Howard Goodman) located within the Department fosters, coordinates, and administers collaborative research and teaching throughout the University and with overseas institutions. It strives to draw on the skills of scientists engaged in research in laboratory and clinical science, which is required to develop new methods for control of the parasitic and other diseases of major public health importance in the tropics. The Center helps to develop collaborative research programs with institutions in Latin America, Africa and Asia, affording opportunities for exchange of students and faculty.

Admission Requirements: Appropriate undergraduate training plus GRE and GAT. TOEFL required for foreign students

Starting Date: Spring or Fall semesters

Degree Awarded: Dr.P.H., D.Sc., Ph.D., M.S., and Master of Health Science in Tropical Public Health

Institution: University of Florida

Title: Immunology and Medical Biology

Description: The Department of Immunology and Medical Microbiology offers a program leading to a Ph.D. degree in the medical sciences, with specialization in immunology and microbiology. Specific areas of specialization include infectious diseases, cellular and humoral immunity, immunochemistry, molecular genetics, parasitology, dental microbiology, and bacterial and animal virology.

Admission Requirements: The undergraduate preparation for graduate study should be wide in scope and should include general biology, physics, chemistry (2 to 3 years, including organic and physical chemistry), and preferably statistics, calculus, genetics, and bacteriology.

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Students will acquire appropriate skills and experience for research in one of the specific areas of specialization listed above.

The Department also offers non-degree, postdoctoral experience in the areas of specialization listed above. Prerequisites are the Ph.D., M.D., D.D.S., or D.V.M. degree or equivalent. Duration is 1-3 years.

Institution: University of North Carolina at Chapel Hill

Title: Molecular Parasitology

Description: This program, which is part of the campus-wide program in molecular biology and biotechnology, provides graduate-level training in the molecular biology and immunology of medically important parasites. In addition, the program emphasizes the application of the tools of the emergent biologies (such as recombinant DNA and hybridoma techniques), top research problems on pathogenic protozoa and helminths.

Admission Requirements: Admission to the UNC Graduate School, Graduate Record Examination, selection by departmental admission committee, acceptance by faculty research sponsor.

Starting Date: Open

Instructors: Stephen C. Merritt, Ph.D., Department of Parasitology; Program in Molecular Biology and Biotechnology: Marshall H. Edgell, Ph.D., Department of Microbiology and Immunology; Director, Program in Molecular Biology and Biotechnology

Degree Awarded: Ph.D.

Technical Skills or Practical Procedures Acquired: Recombinant DNA procedures; hybridoma and monoclonal antibody techniques; antigenic and genetic analysis of eukaryotic parasites; standard biochemical and molecular analytical procedures.

Institution: Virginia Commonwealth University, School of Basic Sciences

Title: Immunology

Description: Training in hybridomas, immunology, monoclonal antibodies

Admission Requirements: Baccalaureate degree or equivalent in a relevant field of study; satisfactory Graduate Record Examination score. TOEFL score of 550.

Starting Date: June, August, or January

Advisors: Advisor for each student

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Cellular immunology; molecular immunology; immunotoxicology.

Institution: Indiana University Graduate School, Indianapolis

Title: Medical Genetics

Description: The Department of Medical Genetics is part of the Indiana University School of Medicine. The program includes clinical, molecular, cytogenetic, population genetics, and biochemical approaches to human hereditary disorders of man. Students are trained in all areas of human genetics but specialize in one of the above.

Admission Requirements: Baccalaureate degree or its equivalent, including 2 years of chemistry, mathematics through calculus, 2 years of biology, and 1 course in principles of genetics. Graduate Record Examination, including both the aptitude test and the advanced test in biology, chemistry, or math.

Advisor: Robert C. Karn, Ph.D.

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Cell and tissues culture; human cytogenetics; genetic engineering; hybridomas; molecular genetics; the use of DNA proven in identification of carriers of hereditary diseases.

Institution: University of Alabama, Birmingham

Title: Medical Genetics

Description: The Medical Genetics Graduate Program is a multidisciplinary, interdepartmental effort to produce research scientists who will have competence in genetics as it relates to human disease and who might also function as educators and health care providers. Students should have desire for a career in genetic research and teaching and/or interest in family studies and counseling.

Admission Requirements: Undergraduate majors in biology, chemistry, physics, genetics, or related fields

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Family studies and counseling

Institution: George Washington University

Title: Clinical Microbiology (program offered jointly by the Microbiology and Pathology Departments)

Description: This is a non-thesis program requiring a total of 36 semester hours, including Bioc 221-22; Micr 225, 226; Path 230, 231, 232; Micr or Path 298; and Stat 127. The remaining academic work should consist of graduate-level courses selected with the approval of the Microbiology and Pathology Departments.

Admission Requirements: A bachelor's degree in medical technology or in biological or physical science, and a minimum of 3 years of experience, within the last 5 years, in a clinical laboratory; a B average in the undergraduate program; TOEFL scores or English placement test at George Washington University.

Starting Date: Fall and/or Spring semesters and Summer session

Duration: Variable 2-3 years

Advisors: Drs. Bernard Zook, Melvin Reich

Degree Awarded: M.S.

Institution: University of Georgia, Department of Medical Microbiology

Title: Medical Microbiology

Description: Traditional program with major in Medical Microbiology. Dissertation specialization may be in the general areas of immunology, bacteriology, mycology, virology, epidemiology, or infectious diseases of man, other mammals, avian species, or fish.

Admission Requirements: Undergraduate average of B or better, GRE score (verbal + quantitative) of 1,000 or more. TOEFL score of 500 or more for those whose native language is not English.

Advisors: Drs. J.B. Gratzek (head), J.L. Blue, J. Brown, J.D. Clark, J.R. Cole, D.J. Dawe, D.W. Dreesen, D.E. Evans, S. Kadis, P.D. Lukert, E.B. Shotts, Jr., W.P. Van Eseltine, R.E. Wooley, K.L. Jacobsen, R.B. Davis, S.H. Kleven, W.L. Ragland, III, L.W. Schierman, P. Villegas

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: All students receive basic grounding in biochemistry and medical immunology, bacteriology, virology, and mycology. Certain areas of dissertation research may involve aspects of hybridomas, monoclonal antibodies, molecular genetics, epidemiology.

Institution: Indiana University Graduate School, Indianapolis

Title: Medical Neurobiology

Description: This is an interdepartmental program in Medical Neurobiology housed in the Department of Psychiatry of Indiana University School of Medicine. The program is disease oriented and committed to teaching and research directed to understanding diseases of the nervous system with manifestations in serious behavioral disorders.

Admission Requirements: Baccalaureate degree in chemistry, biological sciences, physics, mathematics, or psychology. Graduate Record Examination.

Advisor: Joseph N. Hingtgen

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Cell and tissue culture; enzymology; neurobiochemistry; neuroanatomy; neurophysiology; developmental neurobiology.

* * *

Institution: University of California, San Diego, Neurosciences Group

Title: Neurosciences

Description: Its multidisciplinary faculty includes members of the Departments of Neurosciences, Biology, Mathematics, Medicine, Reproductive Medicine, Behavioral Physiology, Psychiatry, and Psychology. Laboratories are located on the Main Campus, at University Hospital, at the Scripps Institution of Oceanography, and at The Salk Institute. This amalgam of nearly 60 faculty participants is called the Neurosciences Group, which provides instruction to graduate students.

Admission Requirements: GRE, 3 letters of recommendation

Degree Awarded: Ph.D.

Institution: Johns Hopkins University, School of Medicine

Title: Pharmacology and Experimental Therapeutics

Description: Coursework can include lectures and laboratory exercises in protein chemistry, gene cloning, and monoclonal antibodies.

Admission Requirements: Appropriate undergraduate training plus GRE and GAT. TOEFL required of foreign students.

Starting Date: Spring and Fall semesters

Degree: Ph.D.

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Institution: Oregon State University

Title: Pharmacy

Description: Graduate programs are offered in biopharmaceutics and pharmacokinetics, pharmaceutical medical chemistry, pharmaceutical socioeconomics, pharmacognosy, pharmaceutics, pharmacology and toxicology.

Admission Requirements: B.S.; 3.0 GPA (American B average), TOEFL score of 500

Starting Date: Beginning of Fall, Winter, Spring, or Summer quarter

Advisor: Dr. R.A. Ohvall, Dean, College of Pharmacy

Degree Awarded: M.S., Ph.D.

Institution: George Washington University

Title: Pharmacology

Description: The program includes biochemical pharmacology and toxicology, cancer chemotherapy, developmental pharmacology and toxicology, endocrine pharmacology, molecular pharmacology, neuropharmacology, neurotoxicology, genetic toxicology, cardiovascular pharmacology, pharmacokinetics, pharmacology of drug abuse, and physiological disposition of drugs.

Admission Requirements: B.A. or B.S., which included courses in biology, physics, math, and chemistry. A course in physical chemistry is recommended. Also required is a B average in the undergraduate program and TOEFL scores or English placement test at George Washington University.

Starting Date: Fall and/or Spring semester

Duration: Variable. M.S.: 2-3 years; Ph.D.: 4-6 years

Advisor: Dr. Victor Cohn

Degree Awarded: M.S., Ph.D.

Institution: University of Arizona

Title: Pharmacology and Toxicology

Description: The program is oriented towards modern pharmacology and toxicology with special emphasis on mechanisms of therapeutic and toxic actions of drugs, chemicals, and environmental pollutants. Course work includes drug and chemical disposition, general toxicology, analytical toxicology, cardiovascular, molecular, and neuropharmacology.

Admission Requirements: Prerequisites include course work in biology, chemistry (inorganic, organic, analytical), physics, mathematics, and English.

Advisors: Drs. I. Glenn Sipes (Committee Chairman), Thomas Burks, Sue Duckles, Klaus Brendel, Henry Yamamura, Thomas Davis, David Kreulen, Andrew Dray, David Nelson, Hugh Laird, Paul Consroe

Degree Awarded: Ph.D.

Technical Skills or Practical Procedures Acquired: Research emphasis in biochemical, molecular, neural, behavioral, and cardiovascular pharmacology; environmental, general, inhalation, and analytical toxicology; chemical carcinogenesis.

* * *

Institution: University of South Dakota

Title: Pharmacology

Description: Emphasis is on mechanisms of drug addiction.

Admission Requirements: Admission as a degree student requires undergraduate transcripts and the TOEFL when English is not the native language. The Graduate Record Examination is normally required.

Degree Awarded: M.A., Ph.D.

Institution: Brandeis University

Title: Biochemistry

Description: Designed to equip students with a broad understanding of the chemistry involved in biological processes and to train them to carry out independent research. Research and experimental projects rather than formal course training will be emphasized. Courses will be taken in advanced biochemistry, physical biochemistry, biochemical techniques, molecular biology, chemistry, biology, and seminars.

Admission Requirements: General requirements for admission to graduate school, GRE, TOEFL, fundamental courses in chemistry and biology

Degree Awarded: M.A., Ph.D.

Technical Skills or Practical Procedures Acquired: Agricultural biochemistry; cell and tissue culture; enzymology; genetic engineering; hybridomas; molecular genetics; natural pesticides; pharmacology; plant molecular biology.

* * *

Institution: Cornell University*

Title: Biochemistry, Molecular and Cell Biology

Description: Study and research programs related to the interests of the faculty include molecular immunology, membrane biochemistry, metabolic pathways in bacteria, enzyme kinetics, and gene expression in slime molds.

Admission Requirements: Contact University

Advisor: P. Hinkle

Degree awarded: M.S., Ph.D.

*Information from University catalog

Institution: Duquesne University

Title: Biochemistry

Description: A minimum of 30 semester hours plus a seminar are required for the Master's degree. Students have the option of taking 30 credits in course work or 24 credits in course work and 6 credits in thesis research.

Admission Requirements: A minimum of 32 semester hours of undergraduate chemistry, including 1 year of physical chemistry, together with at least 1 year of physics, and mathematics through calculus

Advisors: Drs. Andrew J. Glaid, David W. Seybert

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: The degree programs in chemistry and biochemistry include course work plus laboratory research experience. In biochemistry, this includes isolation and purification of molecular cellular components. Enzyme assays, kinetics, amino acid sequencing of proteins are routine procedures included in the research.

Institution: Harvard University, Department of Biochemistry and Molecular Biology

Title: Biochemistry and Molecular Biology

Description: Applicants should realize that competition for admission to the program is great. The first year of study is spent in course work and a laboratory rotation program. After consulting with members of the Department, students make arrangements to begin research on a particular problem. Each student must pass an oral examination (ordinarily taken in the second year) in biochemistry and molecular biology. The final exam is an oral defense of the thesis and related research.

Admission Requirements: Entering students should have taken basic courses in chemistry, biology, physics, and mathematics as undergraduates.

Advisors: The Department's Graduate Committee advises students as necessary.

Degree Awarded: Ph.D.

Technical Skills or Practical Procedures Acquired: As derived from specific research.

Institution: Indiana University, Bloomington

Title: Biochemistry

Description: Areas include proteins and peptide hormones, enzymology, molecular biology and molecular genetics, photobiology, neurochemistry, biogeochemistry, and biophysical chemistry.

Admission Requirements: Undergraduate courses must include 2 semesters each of organic chemistry and physical chemistry and 8 hours of biology.

Advisor: Dr. Frank R.N. Gurd

Degree Awarded: M.S., Ph.D.

* * *

Institution: Indiana University Graduate School, Indianapolis

Title: Biochemistry

Description: The Department of Biochemistry is part of the School for Medicine of Indiana University. It maintains an active graduate program, which includes areas such as X-ray crystallography of models for enzyme systems and antibiotics, molecular biology, including S-V 40 replication, effects of irradiation on DNA replication and repair, and a wide range of metabolic studies, peptide synthesis, etc.

Admission Requirements: 2 semesters each of calculus, organic chemistry, and physical chemistry. Graduate Record Examination including general and advanced chemistry.

Advisor: Professor Robert Harris

Degree Awarded: M.S., Ph.D., M.D.

Technical Skills or Practical Procedures Acquired: Molecular genetics protein processing; analytical biochemistry.

Institution: Louisiana State University, Agricultural and Mechanical College

Title: Biochemistry

Description: Biochemical reaction mechanisms; chemistry of macromolecules; technology of molecular biology--genetic aspects; biochemistry of nucleic acids; biochemical regulation and control; chemistry of proteins; advanced enzymology; lipid chemistry, biochemistry of viruses.

Admission Requirements: Contact University

Starting Date: Ongoing

Advisor: Dr. Roger Laine

Degree Awarded: M.S., Ph.D.

* * *

Institution: Michigan State University*

Title: Biochemistry, Botany, and Plant Pathology; Crop and Soil Sciences; Microbiology and Public Health

Description: Students working toward graduate degrees in any of these disciplines may do their research at the MSU/DOE Plant Research Laboratory. This center for modern experimental plant biology includes a research program which includes studies at the molecular, subcellular, cellular, tissue, organ, and organismal levels and which draws on plant physiology, biochemistry, biophysics, cell biology, genetics, and other disciplines.

Admission Requirements: Contact University

Degree Awarded: M.S., Ph.D.

*Information from University catalog

Institution: New Mexico State University

Title: Biochemistry

Description: Program is tailored to the needs of the student. Presently there are programs available with emphasis in enzymology, reproductive biochemistry, bioinorganic chemistry, affinity chromatography, analytical biochemistry, physical biochemistry, developmental biochemistry, recombinant DNA chemistry, molecular genetics. Minors are available in chemical toxicology.

Admission Requirements: Graduate standing

Starting Date: Spring and Fall semester

Advisors: Graduate faculty

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Depends on field of specialization.

* * *

Institution: Northwestern University

Title: Biochemistry, Molecular and Cell Biology

Description: Research programs in monoclonal antibodies, genetic engineering, molecular and viral genetics, control of gene expression, cell-cell interaction, developmental genetics, thermostabile enzymes, immunogenetics.

Admission Requirements: Contact Graduate School

Advisor: Professor F. Neuhaus, Chairman, Department of Biochemistry, Molecular Biology, and Cell Biology

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Monoclonal antibody and hybridoma production; recombinant DNA technology; molecular biological techniques (e.g., RNA, protein extraction, purification, and analysis).

Institution: Oklahoma State University, College of Agriculture

Title: Biochemistry

Description: For M.S., 24 hours of formal graduate courses are required plus a research thesis. For Ph.D., 30 to 40 semester credits above the M.S. in addition to a research thesis.

Admission Requirements: B.S. in chemistry or biochemistry preferred. Must have at least 8 semester credits in each of organic and physical chemistry and calculus. TOEFL of 550 or above.

Starting Date: Late August or early January

Degree Awarded: M.S., Ph.D.

* * *

Institution: Oregon State University

Title: Biochemistry and Biophysics

Description: Basic science programs related to biochemistry and biophysics.

Admission Requirements: B.S., 3.0 GPA, TOEFL score of 500

Starting Date: Beginning of Fall, Winter, Spring, or Summer quarter

Duration: 2 to 5 years

Advisor: Dr. Chris Mathews, Chairman, Department of Biochemistry and Biophysics

Degree Awarded: M.S., Ph.D.

Institution: Purdue University

Title: Purdue University Biochemistry (PUB) Program

Description: PUB is an interdisciplinary program that includes 50 faculty members from 7 departments (Biochemistry, Biological Sciences, Chemistry, Medical Chemistry and Pharmacognosy, Agronomy, Botany and Plant Pathology, and Horticulture) and offers graduate training and research opportunities covering virtually the entire spectrum of modern biochemistry.

Admission Requirements: Applicants must have at least a B.S. or equivalent in biochemistry, chemistry, or biology. Applicants must submit an application, transcripts from all universities attended, 3 recommendations, and GRE and TOEFL scores.

Degree Awarded: Ph.D.

Technical Skills or Practical Procedures Acquired: Students gain a broad knowledge of the biochemistry field and research expertise in their chosen area of concentration.

* * *

Institution: George Washington University

Title: Biochemistry

Description: Endocrinology, immunology, lipid chemistry and metabolism, nutrition, neurochemistry, and bioenergetics.

Admission Requirements: B.S. in chemistry, or its equivalent; a B average in the undergraduate program; TOEFL scores or English placement test at George Washington University

Starting Date: Fall and/or Spring semesters and Summer session.

Duration: Variable. M.S.: 2-3 years; Ph.D.: 4-6 years

Advisor: Dr. Gary Fiskum

Degree Awarded: M.S., Ph.D.

Institution: University of Arizona

Title: Biochemistry

Description: Within the Department of Biochemistry faculty are a number of individuals whose research interest is plant molecular biology. These programs would encompass Ph.D. or Master's work with thesis in plant molecular biology.

Admission Requirements: Specified by the Graduate College, but for Biochemistry a baccalaureate or equivalent in some area of science

Starting Date: Spring or Fall semester

Advisors: Drs. H. Bohnert, D. Bourque

Degree Awarded: Ph.D., M.S.

Technical Skills or Practical Procedures Acquired: Modern procedures of molecular biology as applied to plants.

* * *

Institution: University of Florida

Title: Biochemistry and Molecular Biology

Description: The Department offers degrees in biochemistry with specialization in physical biochemistry, molecular biology, cell biology, and medical biochemistry.

Admission Requirements: New graduate students should have adequate training in general organic, quantitative, and physical chemistry as well as in physics, biology, and calculus. Minor deficiencies may be made up immediately after entering Graduate School.

Degree Awarded: M.S., Ph.D.

Institution: University of Illinois, Chicago

Title: Biological Chemistry

Description: The graduate program in Biological Chemistry aims to train students for modern biochemical research opportunities in all areas of biology and medicine. Its 25 graduate faculty are all active in research, and their work addresses a range of topics, including the nature of muscular disorders, schistosomiasis, antibody expression, and protein phosphorylation.

Admission Requirements: Undergraduate training should include 16 semester hours of chemistry--including organic, physical, and quantitative analysis--and at least 1 thorough course in biology. Graduate Record Examination scores for the aptitude test are required. Foreign applicants whose native language is other than English must pass the Test of English as a Foreign Language (TOEFL) with a minimum score of 550.

Starting Date: September 17, 1984, for Fall quarter but later starting dates are possible

Duration: The M.S. degree typically requires 2 years of study, with the Ph.D. requiring an additional 3 years for completion.

Advisors: Many of the graduate faculty are funded for their research by federal, nonprofit, or industrial sponsors. Eight of the faculty are currently engaged in biotechnology related research.

Degree Awarded: M.S., Ph.D.

Institution: University of Illinois, Urbana-Champaign

Title: Biochemistry

Description: The research and education programs include protein and enzyme purification mechanisms, regulation of both procaryotic and eucaryotic development and metabolism, gene cloning, nucleic acid synthesis, and gene expression.

Admission Requirements: General undergraduate background in organic and physical chemistry, biology, and mathematics through calculus. Generally, minimum undergraduate GPA of 4.2 (5.0 = A) for bachelor's degree equivalent to UIUC. Minimum 520 TOEFL score for applicant where native language is not English.

Degree Awarded: M.S., Ph.D.

Institution: University of Kansas, School of Medicine

Title: Biochemistry

Description: Minimum of 30 semester hours for M.A.; one-half, course work; one half, research and thesis. Combined M.D./Ph.D. available. B average required. Students required to gain teaching experience. Original research and dissertation required for Ph.D. Courses include topics in immunology, photometry, isotopes and immunochemistry, macromolecules, molecular genetics, cellular biochemistry, enzyme chemistry, physical biochemistry.

Admission Requirements: Bachelor's degree with B GPA minimum from KU or a regionally accredited university or foreign university with substantially equivalent requirements. If non-English speaking, TOEFL score of 570 required; courses in mathematics and chemistry recommended.

Starting Date: Variable

Advisor: J.F. Halsey

Degree Awarded: M.A., Ph.D., M.D./Ph.D. Option

Technical Skills or Practical Procedures Acquired: M.A. leads to advanced technical positions in research. Ph.D. leads to positions in industry, government, teaching, independent research.

Institution: University of Louisville

Title: Biochemistry

Description: Biotechnology areas represented within these programs are enzymology, hybridoma technology, immunology, molecular genetics, monoclonal antibody technology.

Admission Requirements: B.S. or B.A. with GPA of 3.0 or more; chemistry through physical chemistry, 1 year of biological science, mathematics through integral calculus, 1 year of physics

Advisors: 16 full-time faculty members in the Department

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Skills and procedures common to those holding advanced degrees in biochemistry.

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Institution: University of Missouri, Columbia

Title: Biochemistry

Description: Methods of mutagenesis, design of selection procedures, identification of Tn 5 induced mutants, selection of gene from library, cloning of desired gene, sequence analysis, physiological testing of mutants, enzyme profile, and 2-D gel analysis.

Admission Requirements: B.S. from accredited institution; acceptable scores on Graduate Record Exam and Test of English as Foreign Language

Starting Date: August, January, June

Advisors: D.W. Emerick, J.D. Wall

Degree Awarded: M.S., Ph.D.

Institution: University of Missouri, Kansas City

Title: Biochemistry

Description: Basic aim is to train students to work independently in the field of biochemistry. Student receives broad, flexible base of course work for future building and self-education. The Ph.D. program places greater emphasis on original research.

Admission Requirements: B.S. in chemistry. Adequate scores on TOEFL examination for foreign applicants. Adequate scores on placement examinations given by the Department.

Advisors: Drs. Paul Blatz, Ron MacQuarrie, Bob Yang, and others.

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Biochemical techniques; enzymology; genetic engineering; immobilized systems; electrode systems; analytical techniques.

* * *

Institution: University of North Carolina at Chapel Hill, Department of Biochemistry

Title: Biochemistry

Description: Research programs are being conducted in molecular biology, genetics, proteins, mechanism and regulation of enzymes, physical biochemistry, cellular membranes and ion transport, nucleic acids, lipids, steroids, metabolic control mechanisms and diseases, chromatin, antibiotics, neurochemistry, blood coagulation, biochemical toxicology, and cancer research. Candidates for a graduate degree in biochemistry must be trained in the fundamentals of chemistry, physics, biology, and mathematics, as well as in biochemistry. Departmental requirements vary with the needs of individual students. The most important requirement is a thesis or dissertation on original research carried out independently by the candidate. Some teaching experience is required of all candidates for a graduate degree.

Advisor: Dr. Fred E. Bell, Director of Graduate Studies

Degree Awarded: M.S., Ph.D.

Institution: University of Pennsylvania

Title: Biochemistry Ph.D. Also, a combined M.D./Ph.D. program is available and requires separate applications to the School of Medicine and to the Graduate Group.

Description: Research supervision and teaching of formal courses are provided by faculty members with a broad spectrum of research interests, drawn mostly from the Department of Biochemistry and Biophysics in the School of Medicine but also from other departments in the School and in the University as well as from facilities such as the Institute for Cancer Research and the Wistar Institute.

Admission Requirements: GRE General Test required; Subject Test (biology, chemistry, or physics) recommended. Undergraduate training in chemistry, mathematics, physics, and biology preferred.

Advisors: N.G. Avadhani, R.L. Barchi, J.K. Blasie, W.D. Bommner, Jr., H.J. Bright, B. Chance

Degree Awarded: Ph.D., M.D./Ph.D.

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Institution: University of South Dakota

Title: Biochemistry

Description: Special emphasis is on the biochemistry of the nucleic acids.

Admission Requirements: Admission as a degree student requires undergraduate transcripts and the TOEFL when English is not the native language. The Graduate Record Examination is normally required.

Degree Awarded: M.A., Ph.D.

Institution: University of Wisconsin, Madison, Graduate School

Title: Biochemistry

Description: Comprehensive plant, animal, and microbial biochemistry

Admission Requirements: Baccalaureate, 3.0 grade point average, TOEFL, English proficiency required

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Research skills in modern biochemistry in major field of choice.

* * *

Institution: Virginia Commonwealth University, School of Basic Sciences

Title: Biochemistry

Description: Training in analytical biochemistry, enzymology, immobilized enzymes (and cells)

Admission Requirements: Baccalaureate or equivalent in a relevant field of study; satisfactory Graduate Record Examination score. TOEFL score of 550.

Starting Date: June, August, or January

Advisors: Individual advisor for each student

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Biotechnical biochemistry.

Institution: Brandeis University

Title: Biology

Description: Designed to encourage and train students to develop their abilities to carry out independent research. Each student is expected to become familiar with the major areas of research currently being conducted within the Department: molecular genetics and development, neurobiology, immunology, and cell and structural biology.

Admission Requirements: General requirements for admission to graduate school, GRE, TOEFL, undergraduate biology concentration or equivalent courses

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Cell and tissue culture; enzymology; nutrition; genetic engineering; hybridomas; immunology; molecular genetics; monoclonal antibodies; plant molecular biology.

* * *

Institution: California Institute of Technology*

Title: Biology

Description: A student may pursue major work in biophysics, cell biology, developmental biology, genetics, immunology, molecular biology, neurobiology, or psychobiology.

Admission Requirements: Contact Institute

Advisor: Professor C.J. Brokaw

Degree Awarded: Ph.D.

*Information from Institute catalog

Institution: Central Michigan University

Title: Biology

Description: The Department of Biology offers both Plan A and B Master of Science degrees. Plan A requires completion of 6 credit hours in B10 798-Thesis and is recommended to graduate students preparing for nonteaching professional careers or doctoral study. Plan B requires completion of 6 credit hours in B10 790-Research in Biology. Additional requirements for Plan A and Plan B are outlined in the Biology Graduate Student Handbook available from the Biology office. The M.S. in Biology can be tailored to emphasize environmental quality as the students plan their program.

Admission Requirements: Applicants should, in general, have completed an undergraduate degree with a major in the biological sciences with a 3.0 or better GPA in their major. In addition, chemistry, including organic, mathematics, and physics are recommended. TOEFL/Michigan test score or a complete academic year's attendance at a U.S. accredited college/university with demonstrated satisfactory performance.

Degree Awarded: M.S.

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Institution: College of William and Mary, Department of Biology

Title: Biology

Description: 24 credits, passing various examinations, and a thesis are required. Expertise and equipment are available in the following areas that have special relevance to biotechnology: mammalian cell and tissue culture; human cytogenetics and chromosome banding; higher plant tissue culture; radioimmune assay, chromatography, electrophoresis; differential centrifugation, autoradiography; gene mapping in *E. coli*; generation and analysis of heat shock proteins.

Admission Requirements: B.S. in biology. Graduate Record Examination results. (Write for details and application materials.)

Advisors: 19 faculty members

Degree Awarded: M.A.

Institution: Duquesne University

Title: Biology (possible concentration in microbiology)

Description: 30 credits required; thesis or non-thesis tracks. Courses: Biotechnology--Laboratory Techniques. Biotechnology--Research Skills; Cell and Electron Microscopy; Molecular Genetics; Immunology; Microbial Metabolism; Microbial Physiology; Microbial Genetics; Pathogenic Microbiology; Biology of Fungi; Virology; Cell Culture and Virology Laboratory

Admission Requirements: Undergraduate major in biology; application forms; 3 letters of recommendation; official transcripts of academic education; TOEFL scores and speaking test

Starting Date: August, January

Duration: About 2 years

Advisors: Drs. Peter A. Castric, Aris S. Sideropoulos, Kenneth R. Boyd

Degree Awarded: M.S.

* * *

Institution: George Washington University

Title: Biology, Botany, or Zoology

Description: Ecology, evolution, and systematics; plant biology; genetics; cell and molecular biology; developmental biology; vertebrate and invertebrate anatomy and physiology; marine and freshwater biology.

Admission Requirements: B.S. in biology or its equivalent; a B average in the undergraduate program; TOEFL scores or English placement test at the University.

Starting Date: Fall, Spring, and Summer sessions

Duration: Variable. M.S., 2-3 years; Ph.D., 4-6 years

Advisor: Dr. Randall Packer

Degree Awarded: M.S., Ph.D.

Institution: Idaho State University

Title: Biology

Description: This is a research-oriented degree program, usually requiring 2 years for completion of M.S. including course work, thesis research, and defense. Ph.D. usually requires 3-5 years. Specific project areas depend on the interests of the faculty.

Admission Requirements: Minimum GPA of 2.75 (scale of 4.0) over last 2 years of undergraduate work; average GRE score of 50th percentile or above in verbal and quantitative portions of aptitude test; 3 letters of recommendation; TOEFL, 550 minimum; transcripts.

Starting Date: Fall semester--about August 24; Spring semester--about January 6

Advisors: Drs. Richard Bowmer, Daryl Bunde, Edwin House, Rod Seeley, Richard Spall, Trent Stephens, James Tullis, Alexander Urfer

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Radioisotope use; microtechnique; electrophoresis; immunological techniques; small animal surgery; ultra-centrifugation; electron microscopy; gas chromatography; tissue grafting and transplants; artificial materials; chick and frog embryo manipulation; prostaglandin analysis; tissue culture.

Institution: Indiana University, Bloomington

Title: Plant Sciences

Description: Traditional areas include physiology, anatomy and morphology, taxonomy and systematics, paleobotany, and mycology. Current faculty research also includes plant development, biochemistry, photosynthesis, molecular biology, and genetics. Well-equipped laboratories and support facilities.

Admission Requirements: Minimum entrance requirements consist of an undergraduate major in one of the biological sciences and course work in the program in which a degree is sought.

Advisor: Dr. Carlos O. Miller

Degree Awarded: M.A., Ph.D.

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Institution: Johns Hopkins University, School of Arts and Sciences

Title: Biology

Description: Institution and research opportunities include biochemistry and biophysical chemistry, cell biology, development biology, developmental genetics, molecular genetics, neurochemistry, and immunology. Collaborative programs with National Institutes of Health and the Carnegie Institute of Washington

Admission Requirements: TOEFL minimum 560 for foreign students

Starting Date: Spring and Fall semesters

Advisors: Members of the faculty

Degree Awarded: Ph.D.

Institution: Lamar University

Title: Biology

Description: Biology program provides research opportunities in animal reproduction, cell and tissue culture studies via electron microscopy, marine biology, genetics.

Admission Requirements: B.S. in appropriate discipline

Starting Date: August, January

Degree Awarded: M.S.

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Institution: Northeastern University, Department of Biology

Title: Biology (with concentration in marine biology, microbiology, biochemistry, and molecular biology)

Description: The M.S. in Biology is a research-oriented degree offered on a part-time or full-time basis. The program offers opportunity for concentration both in course work and research in the areas of study shown above. The Ph.D. in Biology is a research-oriented degree offered primarily on a full-time basis.

Admission Requirements: To be enrolled in the graduate program, an applicant must submit a complete official transcript indicating the award of a bachelor's degree from a recognized institution. In addition, applicants should have 1 year each of organic chemistry, physics, and mathematics and courses equivalent to 6 quarter hours in biology, including ecology, genetics, and biochemistry. In addition to transcripts, 3 letters of recommendation and Graduate Record Examination scores, including the Advanced Test in Biology, must be submitted.

Starting Date: Flexible

Advisors: Program supervised by the Graduate Director

Degree Awarded: M.S., Ph.D.

Institution: St. Thomas Institute

Title: Biology and Experimental Medicine

Description: M.S. and Ph.D. programs in Biology and Experimental Medicine include research in microbiology, experimental infectious diseases, and cancer employing animal and tissue culture techniques. Courses are taken at St. Thomas Institute and universities of the Greater Cincinnati Consortium of Colleges and Universities. Program is tailored as far as possible to individual interests and needs.

Admission Requirements: B.S. in appropriate science

Advisors: Student assigned to advisor. All faculty available for assistance

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Experimental techniques in microbiology and animal research.

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Institution: University of Detroit

Title: Biology

Description: Plan A: 26 hours of formal course work plus a thesis based on laboratory research. Plan B: 30 hours of course work plus 2 term papers.

Admission Requirements: B.S. in Biology from an accredited institution and/or approval by the University of Detroit International Student Office and the Biology Department Graduate Committee

Starting Date: September, January

Advisors: Biology Faculty

Degree Awarded: M.S.

Institution: University of Guam*

Title: Biology

Description: The graduate program in biology is designed to serve students pursuing a research-oriented career in fisheries biology, public health, or environmental protection.

Admission Requirement: Contact University

Degree Awarded: M.S.

*Information from University catalog

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Institution: University of Illinois, Urbana-Champaign

Title: Interdepartmental Biology Programs in the School of Life Sciences

Description: Interdepartmental study programs leading to the Ph.D. in cell biology, ecology, neural and behavioral biology, parasitology, and plant physiology.

Admission Requirements: GPA of 4.0 (5.0=A) on last 60 hours of undergraduate and any graduate work completed. Baccalaureate degree in forestry or related field. For Ph.D., additional background in general biology, physics, biochemistry, and calculus. Minimum 520 TOEFL score for applicant where native language is not English.

Degree Awarded: M.S. and Ph.D. in Biology, and M.S. in the Teaching of Biological Sciences and General Science

Institution: University of Illinois, Urbana-Champaign

Title: Plant Biology

Description: Areas of specialization include anatomy, bioenergetics, biophysics, embryology, circadian rhythms, development, ecology, genetics, mycology, paleobotany, paleoecology, photosynthesis, physiology, phytochemistry, plant molecular biology, population biology, systematics, and ultrastructure.

Admission Requirements: GPA of 4.0 (5.0 = A) on last 60 hours of undergraduate and any graduate work completed. Some undergraduate training in botany or biology and related sciences. Graduate Record Examination required. Minimum 520 TOEFL score for appliant where native language is not English.

Degree Awarded: M.S., Ph.D.

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Institution: The University of Kansas

Title: Biology (Systematics and Ecology)

Description: Courses, original research, thesis, dissertation. Study of animal behavior, aquatic ecology, community ecology, physiological ecology, population and evolutionary ecology, population and ecological genetics, systematics, tropical biology, vertebrate biology, vertebrate paleontology and paleoecology.

Admission Requirements: Bachelor's degree, B average, accredited university or foreign university with equivalent requirements. TOEFL of 570+ required. GRE required. Program admits approximately 15 percent of its applicants.

Starting Date: Variable

Advisor: W. John O'Brien, Graduate Advisor

Degree Awarded: M.A., M. Phil., Ph.D.

Institution: University of Kansas

Title: Biology (Biochemistry)

Description: Courses, original research, thesis, dissertation. Courses include: cell and tissue culture, cellular regulatory mechanisms, actions of vitamins and hormones, plant biochemistry, gene expression, endocrinology and metabolism, biological membranes, physical biochemistry, research topics in plant physiology and biochemistry, quantum biochemistry, protein chemistry, chemical mechanisms, or biological reactions.

Admission Requirements: Bachelor's degree with B average. TOEFL of 570+ required. Credits required in calculus, biology, physics, general chemistry, physical chemistry, mathematics/physical sciences.

Starting Date: Variable

Advisor: Richard H. Himes

Degree Awarded: M.A., Ph.D.

* * *

Institution: University of Kansas School of Medicine

Title: Biology (Botany)

Description: Courses include: plant physiology, plant ecology, systematic botany, physiology of plant growth and development, ecological plant physiology, plant anatomy, plant kingdom, mucology, cytology and cytogenetics, plant pathology, algal ecology, phycology, paleobotany, plant population biology, plant biochemistry, advanced tropical botany, plant genetics, vegetation geography.

Admission Requirements: B average, GRE, credits in basic courses in biological sciences, letters of recommendation, statement of goals, evidence of achievement. TOEFL of 570+.

Starting Date: Variable

Advisor: Robert Lichtwardt, Graduate Advisor

Degree Awarded: M.A., M. Phil., Ph.D.

Institution: University of Miami, Rosenstiel School of Marine and Atmospheric Science*

Title: Biology and Living Resources

Description: Studies include biological oceanography, fisheries science, mariculture, marine biochemistry, and biology of marine mammals.

Admission Requirements: Strong undergraduate preparation in the life sciences with additional training in mathematics, physics and chemistry

Advisor: Peter Lutz

Degree Awarded: M.S., Ph.D.

*Information from University catalog

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Institution: University of North Carolina at Chapel Hill

Title: Biology

Description: In association with the Program in Molecular Biology and Biotechnology, the Department of Biology offers Ph.D. and M.S. programs of study in cell and tissue culture, genetic engineering, hybridomas, marine biology, molecular genetics, monoclonal antibodies, natural pesticides, protein processing, and molecular biology.

Admission Requirements: GRE, selection by admissions committee

Starting Date: Open

Advisor: L.I. Gilbert, Ph.D. Chairman

Degree Awarded: M.S., Ph.D.

Institution: University of Pennsylvania

Title: Biology

Description: Students are required to gain 2 semesters of teaching experience in introductory courses. As a further part of the formal program, students are required to take a comprehensive examination based on the literature in their general field, and a preliminary examination based on a thesis proposal, usually in the second year.

Admission Requirements: GRE General Test, required; 2 of the required letters of recommendation should be from biologists with whom the applicant has worked; college-level mathematics, physics, and organic and inorganic chemistry.

Advisors: N. Adler, A.N. Binns, W.D. Bonnmer, Jr., and others

Degree Awarded: Ph.D. (No terminal Master's degrees)

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Institution: University of Puerto Rico, Mayaguez*

Title: Biology

Description: The program in biology can include botany, ecology, entomology, genetics, marine biology, plant pathology, zoology, and radiobiology.

Admission Requirements: Contact Graduate School

Language of Instruction: Spanish

Degree Awarded: M.S., Ph.D.

*Information from University catalog

Institution: University of Puerto Rico, Mayaguez*

Title: Marine Sciences

Description: The program in Marine Sciences can include biological, chemical, geological, or physical oceanography

Admission Requirements: Contact Graduate School

Language of Instruction: Spanish

Degree Awarded: M.S., Ph.D.

*Information from University catalog

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Institution: University of South Dakota

Title: Biology

Description: Emphasis on allelopathy (biochemical interactions among plants) and the effect of pollution on plants

Admission Requirements: Admission as a degree student requires undergraduate transcripts and the TOEFL when English is not the native language. The Graduate Record Examination is normally required.

Degree Awarded: M.A.

Institution: Utah State University

Title: Biology (Microbiology)

Description: Emphasis can be on genetic engineering or molecular biology. Current areas of expertise are in plant pathogens, bacterial photosynthesis, plant toxins, and lactic fermentations.

Admission Requirements: Bachelor's degree or equivalent from an accredited institution

Starting Date: Any regular quarter--September, January, March, June

Advisors: F.J. Post, N. Van Alfen, G.H. Richardson, J.R. Takemoto, J.K.K. Li

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Skills for genetic engineering and molecular biology applied to plant pathogens and lactic acid bacteria or other areas; ability to plan and carry out a research project.

Institution: Washington State University

Title: Biology/Cell Biology

Description: Department offers a variety of courses leading to M.S. or Ph.D. degrees. Shorter nondegree or post-doctoral programs may be arranged. Closely allied with Departments of Chemistry and Biochemistry/Biophysics. Genetics, cell biology, immunology are all included through courses offered by these departments. Research is complemented by the Institute for Biological Chemistry in the College of Agriculture.

Admission Requirements: Foreign applicants must present a superior academic record, evidence of adequate ability in English (TOEFL), and sufficient financial resources. A complete application must be made at least 6 months in advance of the expected date of enrollment.

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Experience in independent research. Skills in modern bioanalytical techniques, including amino acid analysis, electron microscopy, absorption spectrometers, radioisotopes, and scintillation counters.

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Institution: Carnegie-Mellon University

Title: Biological Sciences

Description: The Department of Biological Sciences offers research-oriented programs, leading to the Ph.D. degree. Major research activities encompass biochemistry, biophysics, developmental biology, genetics, and molecular biology.

Admission Requirements: B.S. in biological sciences, chemistry, mathematics, or physics, and 3 letters of recommendation. Results of the GRE and TOEFL.

Degree Awarded: Ph.D.

Institution: Fordham University

Title: Biological Sciences

Description: Research may be done in botany; entomology; cytology; cytogenetics; ultrastructure; cell physiology; molecular, micro-, or neurobiology; or limnology. Developing country students may be particularly interested in 1 of 4 areas of research in the entomology area that includes biological control of insect pests, insect physiology, insect taxonomy, and medical entomology.

Admission Requirements: Students should have undergraduate training sufficient to pursue their graduate program. Deficiencies may be made up through undergraduate courses for which no graduate credit will be given.

Starting Date: Fall, Spring

Advisors: Advisors are assigned according to the student's research interests.

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Students may expect to achieve proficiency in the use of laboratory equipment and instruments standard to their chosen areas of specialization. Well-equipped and newly renovated laboratories for the program are housed in Larkin Hall. Students also have access to the University's DEC-20 Computer System.

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Institution: Michigan Technological University

Title: Biological Sciences

Description: Program emphasis in microbiology and biochemistry applied to wood residues and forest biotechnology

Admission Requirements: B.S. from 4-year university in Life or Agricultural Science; B or better grade average or equivalent

Degree Awarded: M.S., Ph.D.

Institution: North Carolina State University

Title: Biotechnology

Description: Animal Biotechnology--Petters Techniques: Embryo manipulation and transfer; Special problems in tissue culture and cytogenetics--Reed and Stalker--Tissue culture in plant breeding; Food proteins and enzymes--Swaisgood Techniques: Immobilized enzymes and whole cells; Microbiology of Food Fermentation--Klaenhammer Techniques: Biotechnology in Food Fermentation; Laboratory on Molecular Genetics--Sederoff Techniques: Recombinant DNA research. Experimental Microbial Genetics--Melton Techniques: Recombinant DNA research. Molecular Biology of Plant Viruses--Dougherty Techniques: Molecular analysis of RNA viruses.

Admission Requirements: Set by individual departments

Degree Awarded: Ph.D.

Technical Skills or Practical Procedures Acquired: Genetic engineering, plant molecular biology, plant tissue culture techniques; embryo manipulation and transfer; hybridomas/monoclonals; immobilized enzymes and whole cells; bioprocess engineering; food fermentation.

Institution: Purdue University, Department of Biological Sciences

Title: Biological Sciences

Description: The Department has active research groups in molecular and cellular aspects of biology in addition to other areas of the biological sciences. There are active programs in the structure, function, and biosynthesis of biologically significant molecules, the production and transformation of energy, and in the regulation of prokaryotic and eukaryotic gene expression, all of which are basic to work in biotechnology.

Admission Requirements: Students holding a baccalaureate (or equivalent) with strong backgrounds in chemistry and the life sciences will be considered for admission. Applicants are required to take the GRE.

Starting Date: September or January of each year

Advisor: Laurie E. Iten

Degree Awarded: Ph.D.

Institution: State University of New York at Binghamton

Title: Biological Sciences

Description: The program leading to the degrees of Master of Arts, Master of Science, and Doctor of Philosophy train students broadly in chemistry and require original investigation in a specialized area. The Ph.D. places major emphasis on training in depth, with the expectation of a singificant contribution in the specialized area. Practical experience in teaching chemistry is also a recognized objective both in Masters' and Ph.D. programs.

Admission Requirements: A baccalaureate from any college or university of recognized standing, or the equivalent. Official transcripts of all previous college work. At least 2 letters of recommendation. Test scores for the Graduate Record Examination. TOEFL score of at least 550 for foreign applicants whose native language is not English. Recommendation for admission from the program unit and approval by the Provost for Graduate Studies and Research.

Starting Date: Late August for the Fall semester; mid-January for the Spring semester

Duration: 2 years for M.S.; 4 to 5 years for Ph.D. beyond baccalaureate, depending on the length and complexity of dissertation

Advisors: Professors James A. Dix, David C. Doetschman, Michael F. Starzak, Eugene Stevens

Degree Awarded: M.A., M.S., Ph.D.

Institution: University of Illinois, Chicago

Title: Biological Sciences

Description: Both M.S. and Ph.D. programs are traditional programs designed to train graduate students in various areas of biology. Students may specialize in environmental sciences, molecular biology, or genetics.

Admission Requirements: Undergraduate grade point average of B or better, including 33 quarter hours in biology, 2 quarters of organic chemistry, 3 quarters of physics and mathematics, including introductory calculus.

Advisor: Director of Graduate Studies

Degree Awarded: M.S., Ph.D.

* * *

Institution: Virginia Commonwealth University, School of Basic Sciences

Title: Biophysics

Description: Training in immobilized systems, membrane biology, enzymology, biosensors

Admission Requirements: Baccalaureate or equivalent in a relevant field of study; satisfactory Graduate Record Examination score. TOEFL score of 550.

Starting Date: June, August, or January

Advisors: Advisor for each student

Degree Awarded: M.S., Ph.D.

Institution: Virginia Commonwealth University, School of Basic Sciences

Title: Gene Regulation (Biotechnology)

Description: Training in genetic engineering, enzymology, molecular genetics

Admission Requirements: Baccalaureate or equivalent in a relevant field of study; satisfactory Graduate Record Examination score. TOEFL score of 550.

Starting Date: June, August, or January

Advisors: Advisor for each student

Degree Awarded: M.S. or Ph.D.

Technical Skills or Practical Procedures Acquired: Microbial biotechnology; genetic biotechnology; cellular biotechnology

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Institution: Wayne State University, Department of Biological Sciences

Title: Biological Sciences

Description: Courses offered in the following areas: animal reproduction; cell and tissue culture; food science; genetic engineering; microbiology; molecular genetics; plant molecular biology; protein processing.

Admission Requirements: B.A. or B.S. needed for advanced degree work plus approval by the Graduate Committee.

Starting Date: Ongoing

Advisor: Dr. Harold Rossmoore

Degree Awarded: M.S., Ph.D.

Institution: Worcester Polytechnic Institute

Title: Biotechnology

Description: Program covering areas of recombinant DNA, fermentation, and molecular and cell biology are in biochemical engineering, and genetics, etc. Courses are in biology and chemical engineering department.

Admission Requirement: B.S. in biology or chemical engineering

Advisor: J. Bugshaw, Department Head, Department of Biology and Biotechnology

Degree Awarded: M.S.

Technical Skills or Practical Procedures Acquired: Background in chemical engineering; lab techniques in fermentation, genetics, cells, recombinant DNA.

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Institution: Howard University, Graduate School of Arts and Sciences

Title: Botany

Description: Cell biology and ultrastructure; plant growth and development; mycology; environmental biology; genetics and molecular genetics; applied microbiology; plant physiology; plant systematics.

Admission Requirements: Undergraduate degree in biological sciences or closely related fields, 2 years of chemistry, 1 year of physics, mathematics through precalculus, 2 years of a foreign language, official transcript, 3.0 grade point average, 3 letters of recommendation

Degree Awarded: M.S.

Advisors: Faculty advisors assist students in designing their programs of study and guide them in their thesis research.

Institution: Louisiana State University, Agricultural and Mechanical College

Title: Botany

Description: Cytology; phycology; mycology; marine botany

Admission Requirements: Contact University

Starting Date: Ongoing

Advisor: Dr. Thomas Moore

Degree Awarded: M.S., Ph.D.

* * *

Institution: Oklahoma State University, College of Arts and Sciences

Title: Botany/Microbiology

Description: Monoclonal antibody production for agricultural research, plant viruses, insect bloodmeals, bacterial plant pathogens, plant tissue culture with laboratory offered at graduate level; food microbiology --spoilage of food (microbes), transmission of diseases by microbes found in food, food fermentations; industrial microbiology (fermentation technology, biological waste disposal, and other topics).

Admission Requirements: Contact Registrar

Starting Date: Contact Registrar

Advisors: Drs. Mark Sanborn, Becky Johnson, Mary Grula

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Laboratory skills.

Institution: Oregon State University

Title: Botany and Plant Pathology

Description: Graduate programs are offered in Pathology, Physiology, Systematics and Ecology, and Structural Botany.

Admission Requirements: B.S., 3.0 GPA (American B average), TOEFL score of 500

Starting Date: Beginning of Fall, Winter, Spring, or Summer quarter

Advisor: Dr. Thomas Moore, Head, Department of Botany and Plant Pathology

Degree Awarded: M.S., Ph.D.

Institution: University of Florida

Title: Botany

Description: Specific areas of specialization in botany include anatomy/morphology with emphasis of tropical ferns, aquatic and woody plants, and orchids; bryology; development of seed plants, protoplast, cell and tissue culture; ecology and environmental studies; cellular and molecular genetics; mycology with emphasis on morphology, systematics, and development; algology with emphasis on algae of brine ponds; physiology and biochemistry with emphasis on ion uptake, photosynthesis and photorespiration, sugar metabolism and transport, hormonal control of fungal reproduction and cell wall synthesis; systematics with emphasis on monographic and floristic studies; tropical botany.

Admission Requirements: Credits equivalent to those required for undergraduate majors in the department. Undergraduate major requirements include 24 credits in botany, a course in genetics with laboratory, mathematics through differential calculus, 1 year of college physics, and chemistry through organic. Those admitted without full equivalents of an undergraduate major will be required to make up the deficiencies by passing appropriate courses early in their graduate programs.

Degree Awarded: M.S., Master of Agriculture, Master of Science in Teaching, and Ph.D.

Institution: University of Georgia, Department of Botany

Title: Botany

Description: Specializations in use of monoclonal antibodies, plant molecular biology, protein processing and transport into organelles, nucleic acid, and protein synthesis.

Admission Requirements: Graduate standing

Starting Date: Any quarter

Duration: M.S., 2-3 years; Ph.D., 3-5 years

Advisor: Dr. B.E. Michel

Degree Awarded: M.S., Ph.D.

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Institution: George Washington University

Title: Genetics

Description: An interdepartmental program directed by a committee whose members are drawn from the Departments of Anatomy, Biochemistry, Biological Sciences, Microbiology, Obstetrics and Gynecology, and from government agencies and private industry.

Admission Requirements: A baccalaureate that includes the following: 8 semester hours each in biology, organic chemistry and inorganic chemistry; 6 semester hours in physics; 6 semester hours in English composition and literature; a B average in the undergraduate program; TOEFL scores or English placement test at the University.

Starting Date: Fall and/or Spring semesters and Summer session

Duration: Variable. M.S., 2-3 years; Ph.D., 4-6 years

Advisor: Dr. Stefan O. Schiff

Degree Awarded: M.S., Ph.D.

Institution: Indiana University, Bloomington

Title: Genetics

Description: Areas range from viral genetics and hybrid DNA techniques to formal transmission genetics of maize and Drosophila, as well as genetics of populations. Strong support facilities. Faculty research interests include microbial physiology and biochemistry, fungal ecology, bacterial photosynthesis, microbial genetics, tissue culture and tumor viruses, and microbial development.

Admission Requirements: Minimum entrance requirements consist of an undergraduate major in one of the biological sciences and course work in the program in which a degree is sought.

Advisor: Dr. Thomas C. Kaufman

Degree Awarded: Ph.D.

Technical Skills or Practical Procedures Acquired: Genetics of higher organisms; cytogenetics; molecular genetics; population genetics.

* * *

Institution: Iowa State University

Title: Genetics

Description: Courses that can be taken include: laboratory/lecture in Genetic Engineering, DNA Sequencing, and Cytogenetics; lectures in Molecular Genetics, Somatic Cell Genetics, Advanced Plant Genetics, Regulation of Gene Expression, and Bacterial Genetics. Research programs primarily utilize plants and include: Maize Genetics and Molecular Genetics, Nitrogen Fixation, Soybean Genetics and Molecular Genetics, and Photosynthesis.

Admission Requirements: Applications are considered in February and March. Graduate Record Examination scores are required and applicant's transcripts must be furnished.

Degree Awarded: M.S., Ph.D.

Institution: New Mexico State University

Title: Genetics

Description: Specific training in plant molecular biology; plant genetic engineering; plant cell and tissue culture; molecular genetics of plants, microorganisms, and animals; pursued as an interdisciplinary program of study or through the individual Departments of Horticulture, Biology, Chemistry, Crop and Soil Sciences, or Range Science. Emphasis on adaptation of crop plants to desert agriculture production systems.

Admission Requirements: Maintenance of 3.0 or better GPA; satisfaction of Graduate School admission requirements including TOEFL competency

Starting Date: Any time during academic year

Advisors: Professors G.C. Phillips, S.D. Tanksley, G. Cunningham, J. Botsford, J.H. Hageman, J.H. Fowler, J.R. Barow

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Fundamentals of basic and applied genetic science.

* * *

Institution: Oregon State University

Title: Genetics

Description: This is an integrated program that coordinates graduate degrees in genetics. Faculty from the various related disciplines across the campus participate in the Genetics Program.

Admission Requirements: B.S.; 3.0 GPA (American B average); TOEFL score of 500

Starting Date: Beginning of Fall, Winter, Spring, or Summer quarter

Advisor: Dr. W.D. Hohenboken, Department of Animal Science

Degree Awarded: M.S., Ph.D.

Institution: The University of Arizona, Committee on Genetics

Title: Genetics

Description: The Committee on Genetics, comprising geneticists from various departments, offers programs leading to M.S. and Ph.D. degrees with a major in genetics. Concentrations are available in animal and plant genetics; cytologenetics; and ecological, human, microbial, molecular, physiological, population, and statistical genetics.

Admission Requirements: B.S. with undergraduate credit in general biology; 4 units each in ecology, genetics, physiology, developmental biology; 6 units of organic chemistry; 8 units of general physics; math through integral calculus and introductory statistics

Starting Date: Fall or Spring semester

Advisor: Dr. Oscar G. Ward, Chairman

Degree Awarded: M.S., Ph.D.

Institution: University of California, San Diego

Title: Molecular Genetics with application to biotechnology. Postdoctoral programs associated with proposed Center for Molecular Genetics.

Description: Basic lecture and laboratory courses involving fundamentals of molecular genetics with application to the genetic engineering of animal viruses, bacteria, fungi, and plant and animal cells.

Admission Requirements: Applications should be summitted to the Department of Biology.

Starting Date: Current

Advisors: Drs. Suresh Subramani, Donald R. Helinski

Degree Awarded: Ph.D.

Technical Skills or Practical Procedures Acquired: Basic skills in molecular genetics and genetic engineering.

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Institution: University of Georgia, Department of Molecular and Population Genetics

Title: Molecular and Population Genetics

Description: This program provides graduate training in molecular genetics, plant molecular biology, genetic engineering and enzymology. The program is designed to provide incoming graduate students with the scientific background and laboratory research skills to become successful independent scientists.

Admission Requirements: Aptitude GRE, 3 letters of recommendation, equivalent of a 4-year college degree

Advisors: Department faculty

Degree Awarded: M.S., Ph.D.

Institution: University of Illinois, Urbana-Champaign

Title: Genetics and Development

Description: Graduate study leading to a Ph.D. in biology, genetics and development area of specialization. Major areas of research interest include molecular, cellular, developmental, and evolutionary genetics; pattern formation in development; morphogenesis and regeneration; immunology; and molecular evolution. Biological systems are studied at many levels of integration and with a wide variety or organisms.

Admission Requirements: GPA of 4.0 (5.0 = A) on last 60 hours of undergraduate and any graduate work completed. GRE score above the 60th percentile. College level courses in calculus, inorganic and organic chemistry, biochemistry, physics, statistics, and a foreign language. Minimumm TOEFL score for applicant where native language is not English.

Degree Awarded: Ph.D.

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Institution: University of North Carolina at Chapel Hill

Title: Genetics

Description: Interdepartmental curriculum leading to a Ph.D. in Genetics. Emphasis on molecular genetics, recombinant DNA technology.

Admission Requirements: B.S. or equivalent. Previous research experience is helpful.

Advisor: Dr. Kenneth F. Bott, Director

Degree Awarded: Ph.D.; M.S. in special circumstances

Technical Skills or Practical Procedures Acquired: Basic research concepts required for independent research and teaching in an academic or industrial environment.

Institution: University of Wisconsin, Madison, Graduate School

Title: Genetics

Description: Genetics at organism, cell, and molecular level for man, animal, plants, insects, viruses, and microorganisms. Immunology, medical genetics, gene expression, recombinant DNA technology, genetic engineering.

Admission Requirements: Baccalaureate, 3.0 GPA, TOEFL. English proficiency required.

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Modern genetic research skills for plant and animal breeding, biotechnology, and genetic engineering.

Institution: Washington State University

Title: Genetics

Description: The program in Genetics is a cooperative one involving faculty from biology, biochemistry, plant sciences, mathematics, chemistry, statistical services, and animal sciences. It is interdisciplinary in nature. Current faculty specialize in plant and animal breeding; DNA structure and function; gene function associated with fungal, viral, and bacterial disease; mutagenesis; plant and animal improvement, especially of cereal grains and legumes. Cell biology is stressed. Coursework can lead to an M.S. or Ph.D. degree. Shorter study programs or postdoctoral programs can be arranged.

Admission Requirements: Foreign students must present a superior academic record, evidence of adequate ability in English (TOEFL), and sufficient financial resources. A complete application must be made at least 6 months in advance of the expected date of enrollment.

Advisors: Regular graduate advisors are assigned to each student upon admittance.

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Experience in independent research. Familiarity with modern bioanalytical techniques, cell biology, electron microscopy, statistical methods. Specialized training in genetic engineering of plant or animal species useful to man.

Institution: East Tennessee State University

Title: Microbiology

Description: A traditional program on the M.S. level in Microbiology including the following areas: general microbiology, microbial genetics, and microbial physiology; medical microbiology, including pathogenic microbiology, medical mycology, and virology; biochemistry, including proteins, nucleic acids, carbohydrates, lipids; applied microbiology, including food, dairy, and sanitary microbiology, virology, and mycology.

Admission Requirements: Prospective M.S. candidates must hold a baccalaureate and have a 3.0 overall quality point index (4.0 system) in math and science courses and a major in a biological science discipline with supporting courses in mathematics and chemistry. Applying students must submit GRE scores. Foreign students must submit scores on the Test of English as a Foreign Language (TOEFL).

Advisors: Graduate faculty includes: Dr. Charles E. Clark, Biochemistry; Dr. Dean R. Blevins, Physiology; Dr. Arthur H. Hougland, Virology; Dr. Richard N. Kinsley, Jr., Mycology; Dr. Lee M. Pike, Biochemistry; Dr. David L. Groves, Immunology; Dr. Robert Samuels, Parasitology.

Degree Awarded: M.S.

Technical Skills or Practical Procedures Acquired: It is recommended that students select courses that would permit them to satisfy requirements for the American Academy of Microbiology National Registry Examination if they plan to apply for registry in microbiology, including the following fields of specialization: pathogenic bacteriology; immunology and serology; mycology; virology; parasitology; food, dairy, and sanitation microbiology; agricultural and industrial microbiology.

Institution: George Washington University

Title: Microbiology

Description: Clinical microbiology, determinative bacteriology, mycology, immunology, microbial genetics, microbial physiology, and virology.

Admission Requirements: Baccalaureate in biological or physical sciences or equivalent; B average in undergraduate program; TOEFL scores or English placement test at the University

Duration: Variable. M.S., 2-3 years; Ph.D., 4-6 years

Advisor: Dr. Melvin Reich

Degree Awarded: M.S., Ph.D.

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Institution: Idaho State University

Title: Microbiology

Description: This is a research-oriented degree program, usually encompassing 1 year of course work and 1 year of laboratory research, with completion and defense of a thesis describing the research. Specific project areas depend on the interests of the faculty members.

Admission Requirements: Minimum GPA, 2.75 (scale of 4.0 over last 2 years of undergraduate work); GRE score of 35th percentile or above on 1 section of aptitude test; minimum TOEFL score of 550; transcripts; 3 letters of recommendation

Starting Date: Fall semester, about August 24; Fall entry recommended. Spring semester, about January 6.

Advisors: Drs. Larry D. Farrell, Joan H. McCune, Ronald D.W. McCune, Gene M. Scalarone, Vern D. Winston

Degree Awarded: M.S.

Technical Skills or Practical Procedures Acquired: Radioisotope use; virological techniques (both bacterial and animal viruses); cell/tissue culture; immunological techniques (ELISA, hybridoma/monoclonal antibody production); electrophoresis; ultracentrifugation; electron microscopy, etc. Not all techniques will be extensively used by all students.

Institution: Indiana University, Bloomington

Title: Microbiology

Description: The 4 formal areas of study include microbial diversity, medical microbiology, molecular and biochemical genetics, and microbial physiology. Special support facilities. Faculty research interests include microbial physiology and biochemistry, fungal ecology, bacterial photosynthesis, microbial genetics, tissue culture and tumor viruses, and microbial development.

Admission Requirements: Minimum entrance requirements consist of an undergraduate major in one of the biological sciences and course work in the program in which a degree is sought.

Advisor: Dr. George D. Hegeman

Degree Awarded: M.A., Ph.D.

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Institution: Indiana University Graduate School, Indianapolis

Title: Microbiology and Immunology

Description: The Department of Microbiology and Immunology is part of the Indiana University School of Medicine. Research areas of general bacteriology, immunology, medical microbiology, medical genetics, microbial physiology, mycology, and virology.

Admission Requirements: Undergraduate courses in basic biology, including cell biology and genetics; general organic and physical chemistry; physics; and mathematics, including calculus and statistics. Graduate Record Examination.

Advisor: Robert H. Schloemer

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Cell and tissue culture; hybridomas; immunology; microbiology; monoclonal antibodies.

Institution: Louisiana State University, Agricultural and Mechanical College

Title: Microbiology

Description: Microbial physiology; immunology and serology; pathogenic microbiology; genetics of bacteria and bacteriophage; biology of eukaryotic microorganisms; soil microbiology; microbiology of water, sewage, and industrial wastes; microbiology of dairy and food industries; industrial microbiology; cell culture; introductory virology; marine microbial anatomy and ultrastructure; higher bacterial electron microscopy; technology of molecular biology.

Admission Requirements: Contact University

Starting Date: Ongoing

Advisor: Dr. Marion Socolofsky, Department of Biochemistry

Degree Awarded: M.N.S., M.S., Ph.D.

Institution: Miami University

Title: Microbiology

Description: The Department of Microbiology offers graduate degree programs with research programs and formal courses in which students can be trained in areas applicable to biotechnology. The faculty currently direct programs in recombinant DNA research, microbial genetics, immunology (including hybridoma applications), and virology cancer research.

Admission Requirements: Acceptable undergraduate and graduate academic performance, Graduate Record Examination scores, and 3 letters of recommendation. The Department accepts students having a good background of study in the biological sciences and chemistry with a foundation in microbiology.

Starting Date: Students normally begin degree studies in the Fall semester. Students have been admitted mid-year.

Advisors: Drs. J.K. Bhattacharjee, R.J. Brady, D.C. Cox, I. Kochen, J.M. Libby, J.R. Stevenson, R.W. Treick

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Students in this program have the opportunity to develop a wide variety of genetic, immunological, and tissue culture techniques applicable to modern biotechnology.

Institution: Michigan State University

Title: Microbiology, Biochemistry. Entomology, Pathology, Physiology, Neuroscience, Genetics, Botany and Plant Pathology, Horticulture, Crop and Soil Science, Forestry, Animal Science, Food Science, Veterinary Medicine, and Zoology

Description: In each department or interdepartmental study area there are program options for advanced study which represent state-of-the-art research of pertinence to genetic engineering and other biotechnologies.

Admission Requirements: 2 copies of official transcripts substantiating completion at a grade average of 3.0 (B), baccalaureate in a pertinent major from an accredited institution, 3 letters of recommendation, evidence of financial ability to pursue a graduate program at MSU, and a completed application for admission. Some programs also require acceptable scores on the GRE. Satisfactory performance on the Test of English as a Foreign Language (TOEFL), and an interview with English Language Center faculty are necessary for enrollment.

Starting Date: September for Fall Term; some programs also admit students in Winter or Spring quarters. Applications should be received nearly 1 year prior to date of preferred enrollment.

Advisors: Significant leaders are: Dr. Charles Arntzen, Plant Research Laboratory; Dr. Paul Magee, Microbiology and Public Health; Dr. James Hanover, Forestry; Dr. David Reicosky, Crop and Soil Sciences; Dr. Thomas Friedman, Zoology; Dr. Jerry Dodgson, Biochemistry; Dr. Kenneth Sink, Horticulture; and Dr. Christo Sommerville, Botany and Plant Pathology

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Depends on the program. Can range from very applied to very basic.

Institution: State University of New York, Upstate Medical Center, College of Graduate Studies

Title: Microbiology

Description: Areas of research include the biology of oncogenic viruses; RNA-phage-directed protein synthesis; protozoan and helminth biochemistry; regulation of cell associations; the fine structure of chromosomes; transplantation immunology; microbial and human genetics; immunochemistry; RNA virus structure; and formal aspects of polymer structures.

Admission Requirements: Applicant must have completed sufficient work in biology to have a general comprehension of its disciplines and its methods and must have taken courses in chemistry, physics, and mathematics. GRE scores. Official undergraduate transcripts. 3 letters of recommendation (from college professors).

Advisor: George G. Holz, Jr.

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Training will enable the trainee to become an independent investigator.

Institution: University of Florida

Title: Microbiology and Cell Science

Description: Graduate study is offered leading to the M.S. and Ph.D. degrees in microbiology and cell science, with emphasis in one or more of the disciplines of biochemistry, cell biology, and microbiology. Instruction and guidance are collaborative among faculty in the Colleges of Agriculture, Liberal Arts and Sciences, and Medicine. Areas of research include anaerobic metabolism; biomass conversion and low energy technology; nitrogen fixation; membrane and cell wall chemistry and biochemistry; immunology; virology; microbial ecology; bacterial and phase genetics; DNA, RNA, and protein synthesis; molecular aspects of development of procaryotic and eucaryotic systems; cell ultrastructure.

Admission Requirements: Prerequisites for admission to graduate study, in addition to those of the Graduate School, are a broad educational background including mathematics; physics; and organic, analytical, and physical chemistry; basic courses in botany and zoology; and prefer at least 1 course in microbiology. An undergraduate major in physical or chemical science, engineering or general biology is usually acceptable.

Degree Awarded: M.S., Ph.D.

Institution: University of Georgia, Department of Microbiology

Title: Microbiology

Description: Specialization in physiological, immunological, pathogenic, taxonomic, ecological, ultrastructural, and genetic aspects of microbiology.

Admission Requirements: B.S., 3.0 GPA, 1100 minimum GRE total score, 500 minimum TOEFL score

Starting Date: Any quarter

Advisor: Dr. Anne O. Summers

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Course work and research in speciality and related areas.

Institution: University of Illinois, Chicago Health Sciences Center

Title: Microbiology and Immunology

Description: The graduate program in Microbiology and Immunology provides both a solid foundation in microbiology and instruction in new techniques associated with cellular and molecular immunology, medical and molecular bacteriology (plasmic genetics and recombinant DNA), and virology. Specializations based on faculty research interests include: molecular and cellular immunmology; molecular and cellular virology; microbial genetics and biochemical genetics; viral oncology; tumor immunology; clinical immunology; and pathogenic bacteriology and mycology. Regular course offerings address such areas as gene structure and function, regulation of protein synthesis, cell techniques, and methods and applications of cell somatic hybridization.

Admission Requirements: Applicants with majors in biology and chemistry are eligible. Preference for admission is given to students who intend to complete a doctoral program. Graduate Record Examination scores for the Aptitude Test are required. Foreign applicants whose native language is other than English must pass (550 minimum score) the Test of English as a Foreign Language.

Starting Date: September for Fall quarter but later starting dates are possible

Advisors: The Department of Microbiology and Immunology has 27 graduate faculty members, many of whom are well-known for their research programs. Examples include Dr. Katherine Knight's work with monoclonal antibodies, Dr. Amanda Chakrabarty's research on developing new microorganisms for secondary oil recovery and degrading known persistant pollutants as PCBs and pentachlorophenol, and Dr. Sheldon Dray's efforts in the area of tumor growth and development.

Degree Awarded: M.S., Ph.D.

Institution: University of Illinois, Urbana-Champaign

Title: Microbiology

Description: For both the M.S. and Ph.D., strong basic background in microbiology, biochemistry, molecular genetics, and molecular biology. Major research areas: the genetics and molecular biology of DNA replication; gene expression and regulation in prokaryotes and eukaryotes; photosynthesis; viral function and development, including virus host-cell interactions; membrane biogenesis, including protein insertion; fatty acid and phospholipid synthesis; bacterial pathogenesis and bacterial-host interactions; immunoglobulin chemistry, structure, and expression; anaerobic microbiology, including rumen microbiology; biochemistry of methane formation and microbial physiology; cell biology and biochemistry of development and differentiation of transformed cells muscle tissue and photosynthetic organelles.

Admission Requirements: GPA of 4.0 (5.0 = A) on last 60 hours of undergraduate and any graduate work completed. In addition to training in general biology or microbiology, chemistry through quantitative analysis and organic chemistry, 15 credit hours of physical or biological sciences, and mathematics through calculus. Minimum 520 TOEFL score for applicant where native language is not English.

Starting Date: Usually about August 21

Degree Awarded: M.S., Ph.D.

Institution: University of Kansas

Title: Microbiology

Description: Courses, original research, thesis, dissertation. Study of microbial physiology, applied microbiology, microbial genetics, ultrastructure, host-parasite relationships, immunology, molecular virology.

Admission Requirements: Baccalaureate, B average, accredited university or foreign university with equivalent requirements. TOEFL of 570+ required; GRE recommended. Undergraduate credits in physics, calculus, chemistry.

Starting Date: Variable

Advisor: James M. Akagi

Degree Awarded: M.A., Ph.D.

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Institution: University of Kansas School of Medicine

Title: Microbiology

Description: Courses, original research, thesis, dissertation. Courses include: medical microbiology; procaryotic/eucaryotic systems; immunology; medical bacteriology; mucoses and parasitoses of humans; microbial genetics; molecular virology; cellular immunology; molecular immunology; parasitic protozoa; advanced microbial and molecular genetics; advanced virology; advanced laboratory techniques.

Admission Requirements: Baccalaureate with B GPA from KU or other regionally accredited university or foreign university with equivalent requirements. TOEFL of 570+ required. Math, chemistry, biology, physics credits required. GRE required.

Starting Date: Variable

Advisor: R.E. Amelunxen

Degree Awarded: M.S., Ph.D.

Institution: University of Louisville

Title: Microbiology and Immunology

Description: Biotechnology areas represented within these programs include fermentation, hybridoma technology, immunology, microbiology, molecular genetics, and monoclonal antibody technology.

Admission Requirements: B.S. or B.A. with GPA of 3.0 or more, biological science, 2 semesters organic chemistry, 1 semester analytical chemistry, 1 year physics, 1 semester calculus

Advisor: Contact University

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Skills and procedures common to those holding advanced degrees in microbiology and immunology.

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Institution: University of Missouri, Columbia

Title: Microbiology

Description: Doctoral program involves formal coursework in microbiology and related disciplines, seminars, journal clubs, research rotations and original research involving multiple subdisciplinary approaches to the solution of important medically relevant problems (e.g., pathogenesis, immunology, molecular biology, virology).

Admission Requirements: Acceptable bachelor's degree with substantial background in chemistry, biology; undergraduate GPA: 3.0; respectable GRE scores, letters of recommendation indicative of aptitude for science and research

Degree Awarded: Ph.D.

Technical Skills or Practical Procedures Acquired: Knowledge of current methodology in microbial pathogenesis, animal and cell culture models, protein/toxin purification and characterization, membranes, immunology, cellular microbiology, monoclonal antibodies, immunoassays, cloning, molecular biology, innovative rapid diagnostic techniques, vaccine development.

Institution: University of Missouri, Kansas City

Title: Microbiology

Description: Program will prepare students by laboratory and classroom training. Students are trained to isolate, cultivate, and identify microorganisms. Original research project and thesis required.

Admission Requirements: Bachelor's degree with specific course requirements in chemistry, physics, and mathematics. Appropriate background in microbiology.

Advisors: Drs. Thomas Alms, Ron Hirschberg, Marvin Rogolski, and others.

Degree Awarded: M.S.

Technical Skills or Practical Procedures Acquired: Cell and tissue culture; fermentation; genetic engineering; molecular genetics.

* * *

Institution: University of Pennsylvania

Title: Microbiology

Description: The program emphasizes the cellular and molecular aspects of microbial systems, particularly bacteria and viruses, with related consideration of eukaryotic cell biology. Students are exposed to a wide variety of research areas through a series of laboratory rotations and advanced seminars.

Admission Requirements: GRE General Test required. Solid undergraduate preparation in both biological and physical sciences, including organic and physical chemistry, calculus, and physics recommended.

Degree Awarded: Ph.D.

Institution: University of South Dakota

Title: Microbiology

Description: Special emphasis on molecular genetics and the chemistry of natural substances.

Admission Requirements: Adequate background in chemistry is necessary. Admission as a degree student requires undergraduate transcripts and the TOEFL when English is not the native language. The GRE is normally required.

Degree Awarded: M.A., Ph.D.

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Institution: University of Texas, Austin, Department of Microbiology

Title: Microbiology

Description: The program encompasses topics concerning the cell and molecular biology, genetics, physiology, and biochemistry of microorganisms and cells of higher organisms. Students are offered a broad choice of formal course work in addition to seminars on contemporary topics. Students select a professor who supervises their thesis research after the first semester.

Admission Requirements: Bachelor's degree. Minimum GPA: 3.2. Minimum GRE: 1150. Students who have not achieved at least a B average in a foreign language as an undergraduate must pass a foreign language test or take a formal course.

Starting Date: August, January, and June of each year

Advisor: Dr. Henry R. Bose, Jr., Graduate Advisor

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: This is a flexible program of study designed to provide excellent training and research opportunities individually tailored to each student's needs. The focus of the graduate training program is on solving fundamental problems of biology through modern molecular, biochemical, and immunology approaches.

Institution: University of Wisconsin, Madison, Graduate School

Title: Bacteriology

Description: Broad range of research training in bacterial, fungal, and viral genetics; development; gene expression; biotechnology; recombinant DNA technology; industrial processes; bioconversion of wastes; plant pathogenesis; and nitrogen fixation.

Admission Requirements: Bachelor's degree; 3.0 GPA, TOEFL English proficiency required

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Research skills in bacterial sciences prepare student for university teaching, government and industry research, and for leadership in fermentation, biomass, and biotechnology industries.

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Institution: Virginia Commonwealth University, School of Basic Sciences

Title: Microbiology

Description: Training in cell and tissue culture, fermentation, general microbiology, medical microbiology, molecular microbiology.

Admission Requirements: Baccalaureate or equivalent in a relevant field of study; satisfactory GRE score; TOEFL score of 550

Starting Date: June, August, or January

Advisors: Advisor for each student

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Cell culture, general microbiological techniques.

Institution: Washington State University

Title: Bacteriology and Microbiology

Description: Department offers variety of courses leading to M.S. or Ph.D. degrees. Shorter nondegree, or postdoctoral programs may be arranged. Current faculty specialize in immunology, genetics, molecular basis of microbial interactions, viral and rickettsial diseases, and mode of action and environmental microbiology.

Admission Requirements: Foreign students must present a superior academic record, evidence of adequate ability in English (TOEFL), and sufficient financial resources. A complete application must be made at least 6 months in advance of the expected date of enrollment.

Advisors: Regular graduate advisors are assigned to each student upon admittance.

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Experience in independent research; skills in microbiological techniques; use of modern bioanalytical instrumentation; electron microscopy; recombinant DNA work; computers, etc.

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Institution: Case Western Reserve University

Title: Molecular Biology and Microbiology or Cellular and Molecular Biology.

Description: Research-intensive program emphasizing the molecular details of prokaryotic and eukaryotic gene expression and regulation. Recombinant DNA technology, molecular genetics, bacterial physiology, host/virus interaction, carcinogenesis.

Admission Requirements: GRE averaging 600, 3 letters of reference, application information, good undergraduate performance in hard science curriculum

Degree Awarded: Ph.D., M.D./Ph.D.

Technical Skills or Practical Procedures Acquired: Most biotechnology techniques on bench scale.

Institution: Catholic University of America

Title: Cell and Microbial Biology

Description: M.S. can be obtained with or without thesis research. The Ph.D. requires an original research project and dissertation. The faculty provides research guidance in many specializations falling under the degree programs.

Admission Requirements: B.A. or B.S. degree (transcript must be submitted) plus GRE scores (aptitude and advanced biology) plus recommendations

Starting Date: September or January

Advisors: All faculty may serve as advisors

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Knowledge of cell and microbiology with an emphasis in molecular biology. Several laboratory courses are required.

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Institution: Colorado State University*

Title: Cell and Molecular Biology

Description: This interdisciplinary graduate program is a cooperative effort among various colleges and departments of the University. Current research areas include the molecular basis of hormone action, cell life cycle and its control, virus replication and infection, biochemistry of plant growth, and cell ultrastructure.

Admission Requirements: Contact Dean of Graduate School

Degree Awarded: M.S., Ph.D.

*Information from University catalog

Institution: John Hopkins University, School of Medicine

Title: Molecular Biology and Genetics

Description: Programs in the Department of Molecular Biology and Genetics are designed to meet the needs of medical students, doctoral candidates in molecular biology, and postdoctoral students

Admission Requirements: Appropriate undergraduate training plus GRE and GAT. TOEFL required for foreign students.

Starting Date: Spring and Fall semesters

Degree Awarded: Ph.D.

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Institution: Indiana University, Bloomington

Title: Molecular, Cellular, and Developmental Biology

Description: Function, structure, and biosynthesis of macromolecules, as well as molecular genetics, cell biology, and biochemistry of development. Strong instrument center and other support facilities. Particular strengths in mechanism and regulation of transcription and translation in both procaryotic and eucaryotic organisms, gene control during development, and organelle biogenesis.

Admission Requirements: Minimum entrance requirements consist of an undergraduate major in one of the biological sciences and course work in the program in which a degree is sought.

Advisor: Dr. William H. Klein

Degree Awarded: Ph.D.

Institution: Iowa State University, Department of Biochemistry and Biophysics

Title: Molecular, Cellular, and Developmental Biology

Description: M.S. and Ph.D. programs. Experimental theses are required in both.

Admission Requirements: B.S. or B.A. with a strong background in modern biology and adequate training in chemistry. GPA and GRE scores and letters of recommendation are carefully considered.

Degree Awarded: M.S., Ph.D.

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Institution: New Mexico State University

Title: Microbiology and Cell Biology

Description: Graduate programs are available in virology, microbial physiology, microbial ecology, and cell biology.

Admission Requirements: Bachelor's degree, TOEFL score of 500

Starting Date: August and January each year

Advisors: Drs. C. Barrera, J. Botsford, C. McCarthy, R. O'Brien, K. Suberkropp, and V. Villa

Degree Awarded: M.S., Ph.D.

Institution: Princeton University

Title: Molecular Biology

Description: Molecular biology at Princeton University consists of courses and research in fundamental areas of the subject. They include the possibility of learning special techniques, such as tissue culture, genetic recombination, monoclonal antibodies, and many of the other basic techniques involved in molecular genetics and modern cell and developmental biology.

Admission Requirements: A bachelor's degree in biology or molecular biology

Advisor: Director of Graduate Studies in Molecular Biology

Degree Awarded: Ph.D.

* * *

Institution: San Diego State University

Title: Molecular Biology

Description: Degree program emphasizes laboratory research in molecular and cell biology and biochemistry. Course work in these areas is required, as is a thesis describing the student's laboratory research. Research takes place in the lab of one of the members of the Molecular Biology Institute.

Admission Requirements: Bachelor's degree in a biological or physical scicence with a Bor better grade point average. Three letters of reference are required from individuals familiar with student's capabilities.

Starting Date: Fall or Spring semesters

Advisors: Dr. A. Stephen Dahms, Department of Chemistry; Dr. Skaidrite Krisans, Department of Biology

Degree Awarded: M.S.

Technical Skills or Practical Procedures Acquired: Training in cell and molecular biology and biochemistry. Specialization depends upon choice of research advisor.

Institution: State University of New York at Albany

Title: Department of Biological Sciences

Description: Plant Molecular Biology

Admission Requirements: Molecular Biology Core Program includes advanced molecular biology, chemical biology, molecular genetics, and structural analysis of nucleic acids and proteins, plus seminar and other courses, depending on the student's special interest.

Starting Date: Anytime

Advisor: Dr. Joseph Mascarenhas

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Ability to carry out scholarly work and applied research in plant molecular biology, including molecular genetics.

Institution: University of Alabama, Birmingham

Title: Molecular Cell Biology

Description: Areas of specialization for dissertation research include prokaryotic and eukaryotic molecular and cell biology; molecular virology; viral, microbial, and mammalian cell genetics; immunogenetics and cellular development and tumor immunology; immunochemistry; chemistry, biosynthesis, and structure of biological macromolecules and membranes; and host-parasite relationships, phagocytosis, and infectious disease.

Admission Requirements: A combined score of above 1250 on the verbal and quantitative portions of the GRE General Test and a personal interview. Applications for the doctoral program will be considered from prospective students who present evidence of a B.S. degree and superior scholarship.

Advisor: Dr. Richard Compans

Degree Awarded: Ph.D.

All students admitted to the Molecular Cell Biology Program receive support through national or state granting agencies in the amount of $7,500 plus tuition and fees. In addition, the large Medical Center and proximity to downtown Birmingham offer excellent work opportunities for spouses of students.

Institution: University of Massachusetts

Title: Molecular and Cellular Biology: Biochemistry

Description: Course work and research experience in several areas of contemporary molecular and cellular biology and biochemistry.

Admission Requirements: Not indicated

Advisors: Dr. M.J. Fournier, Acting Director, Molecular and Cellular Biology; Dr. T.L. Mason, Graduate Program Director, Biochemistry

Degree Awarded: Ph.D. program is emphasized but an M.S. program is also available in special cases

Technical Skills or Practical Procedures Acquired: Training for career as independent research scientist in several areas of biotechnology including DNA cloning, monoclonal antibody production, microbial genetics, membrane technology, bioenergetics, plant biochemistry.

Institution: University of Pennsylvania

Title: Molecular Biology

Description: Molecular biology involves, inter alia, correlations between structures, properties, and reactivities at the molecular level on the one hand, and the functioning of living systems on the other. These functions entail either interrelated biochemical processes within the cell, gross physiological actions, or more complex biological phenomena at even higher levels of organization. An integrated program of training with flexibility to accommodate students of diverse backgrounds and research interests.

Admission Requirements: GRE General Test and Subject Test (biology) required. Completion of two semesters of undergraduate work in biochemistry, biology, calculus, physical chemistry, and physics recommended.

Advisors: N.R. Advadhani, R. Barchi, L.J. Bello, R.L. Brinster, V.J. Cristofalo, C. Croce, P. Curtis, R.E. Davies, R. Eisenberg, G.W. Ellis, R.E. Forster, F.R. Frankel, J.J. Furth, P. George, M.C. Glick, S.H. Goodgal, J.S. Gots, J. Higgins, R.M. Hochstrasser, H. Holtzer, M.R. Iyengar, A. Katy, N.R. Kallenbach, F. Karush, A. Kleinzeller, A.W. Kozinski, D. Kritchevsky, P.A. Liebman, L. Manson, G. Maul, F.A. McMorris, M.M. Nass, D.J. O'Kane, R.P. Perry, J.L. Rabinowitz, J.H. Rockey, S. Roth, G. Rovera, R.J. Rutman, S. Segal, A.P. Somlyo, R.L. Stambaugh, Y. Suyama, K.G. Tatchell, R.S.C. Tuan, L. Warren, R. Weinmann, S. Winegrad

Degree Awarded: Ph.D.

Institution: University of Wisconsin, Madison, Graduate School

Title: Molecular Biology

Description: Interdepartmental graduate research training including genetic, biochemical, development, and molecular biology. Very broad range of courses covering all aspects of biotechnology including plant, animal, and microbial systems. Monoclonal antibody and recombinant DNA techniques are used regularly.

Admission Requirements: Baccalaureate, 3.0 grade point average, TOEFL English proficiency required

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Research skills in biotechnology area of choice.

* * *

Institution: University of Georgia, Department of Chemistry

Title: Chemistry of Natural Products of Biological Interest (Pharmacognosy)

Description: Instruction is available leading to a Ph.D. in the Chemistry of Natural Products of Biological Interest. Projects involve research on alkaloids, terpenes, sex pheromones, antitumor agents, synthetic methods, and the applications of spectroscopic techniques to the elucidation of structures of complex natural products.

Admission Requirements: As per Graduate School Bulletin

Starting Date: Any quarter

Advisor: Professor S. William Pelletier

Degree Awarded: Ph.D.

Technical Skills or Practical Procedures Acquired: Experience in separation techniques utilizing HPLC, DCC chromatography, vacuum liquid chromatography. Structure elucidation techniques utilizing ^{1}H, and ^{13}C.N.M.R. spectroscopy, and mass spectrometry. Synthesis of natural products.

Institution: University of Florida

Title: Zoology

Description: The Department of Zoology offers the degrees of Master of Science in Teaching, Master of Science, and Doctor of Philosophy, with specialization in animal behavior, ecology, genetics, paleontology, physiology, and systematic biology. Specific areas of specialization include evolutionary biology, marine biology, population biology, and tropical biology.

Admission Requirements: New graduate students should have completed undergraduate courses in ecology, embryology, comparative anatomy, invertebrate and vertebrate zoology, genetics, physiology, 1 year of physics, chemistry through organic, and a sequence in mathematics or statistics.

Degree Awarded: M.S. in Teaching, M.S., Ph.D.

* * *

Institution: Oregon State University

Title: Zoology

Description: Graduate programs are offered in Cell and Developmental Biology, Organismal Biology, Population Biology, and Ecology.

Admission Requirements: B.S.; 3.0 GPA (American B average), TOEFL score of 500

Starting Date: Beginning of Fall, Winter, Spring, or Summer quarter

Advisor: Dr. Charles King, Head, Department of Zoology

Degree Awarded: M.S., Ph.D.

Institution: Oklahoma State University, College of Agriculture

Title: Animal Science

Description: Can include animal breeding, physiology of reproduction, genetics. Generally 90 hours above B.S.

Admission Requirements: B.S. in Animal Science or equivalent. TOEFL of 550 or above.

Starting Date: Late August or early January

Degree Awarded: Ph.D.

* * *

Institution: Oregon State University

Title: Animal Science

Description: Graduate programs are offered in Animal Genetics, Meat Science, Animal Nutrition, and Animal Physiology

Admission Requirements: B.S.; 3.0 GPA; TOEFL score of 500

Starting Date: Beginning of Fall, Winter, Spring, or Summer quarter

Advisor: Dr. Steve Davis, Head, Department of Animal Science

Degree Awarded: M.S., Ph.D.

Institution: Texas Tech University

Title: Animal Breeding

Description: A Master's program using genetic and physiological principles, the latest techniques in fertilization/embryo transplant, and similar biotechnology.

Admission Requirements: Standard admission requirements to Master's program is 800 minimum on GRE. Appropriate degree (i.e., B.S.) is needed.

Starting Date: Normally around September 1, January 20, and June 1 of each year

Advisors: Faculty of the College serve as instructors and program advisors.

Degree Awarded: M.S.

Technical Skills or Practical Procedures Acquired: The ability to perform appropriate animal breeding techniques and to apply genetic principles for animal improvement.

* * *

Institution: Texas Tech University

Title: Animal Nutrition

Description: A Master's program which provides the basic principles of nutrition for domestic livestock.

Admission Requirements: Standard admission requirements to Master's program is 800 minimum on GRE. Appropriate degree (i.e., B.S.) is needed.

Starting Date: Normally around September 1, January 20, and June 1 of each year

Advisor: Faculty of the College serve as instructors and program advisors.

Degree Awarded: M.S.

Technical Skills or Practical Procedures Acquired: Ration formulation, range feed supplementation, how to improve feed/grain ratios, and similar application of principles.

Institution: Texas Tech University

Title: Animal Science

Description: A Ph.D. program utilizing basic animal science principles and current state-of-the-art biotechnology in the field of animal science.

Admission Requirements: 1000 minimum on GRE. Appropriate degree (i.e., B.S. and M.S.) is needed.

Starting Date: Normally around September 1, January 20, and June 1 of each year

Advisors: Faculty of the college serve as instructors and program advisors.

Degree Awarded: Ph.D.

Technical Skills or Practical Procedures Acquired: The usual skills afforded a Ph.D., which provides the ability to conduct research and teaching as needed.

* * *

Institution: University of Connecticut, Animal Industries Department

Title: Reproductive Physiology, Meat Science.

Description: Present emphasis is on cattle, sheep, and horses relative to estrus synchronizaion, increasing fertility, embryo transfer, and improved understanding of the mechanisms involved.

Admission Requirements: Regular admission to the Graduate School

Starting Date: Preferably September 1, but may be 2nd semester

Advisor: W.A. Cowan

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Animal handling and applied biological technology.

Institution: University of Hawaii, Manoa*

Title: Animal Sciences

Description: Concentrations in genetics, animal diseases, nutrition, and physiology are possible. Specialty areas include management of cattle in a hot climate, freshwater shrimp breeding, swine management, and aquaculture pond and production systems.

Admission Requirements: Sound background in biological sciences, mathematics, and statistics

Advisor: R.W. Stanley

Degree Awarded: M.S.

*Information from University catalog

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Institution: Washington State University

Title: Animal Science

Description: Department offers a variety of courses leading to M.S. or Ph.D. degrees. Current faculty specialize in embryo transplantation in small ruminants; animal nutrition, especially emphasizing trace minerals and elements; genetic improvement of dairy and beef cattle, swine, sheep, and poultry; animal physiology and metabolism; and production practices.

Admission Requirements: Foreign students must present a superior academic record, evidence of adequate ability in English (TOEFL), and sufficient financial resources. A complete application must be made at least 6 months in advdance of the expected date of enrollment.

Advisors: Regular graduate advisors are assigned to each student upon admittance.

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Independent research, design of experimental procedures, expertise with modern bioanalytical equipment, special skills in embryo transplant, proximate analysis of feed, metabolic studies, etc., are emphasized, depending on area of study.

Institution: Iowa State University, Department of Animal Science

Title: Poultry Immunogenetics

Description: The major histocompatibility complex (MHC) in chickens is closely linked to genes which control immune response, tumor resistance, reproductive performance, body weight gain, and disease resistance. Research efforts are directed towards eliciting the details of the structure and function of the chicken MHC. Techniques utilized include: hybridoma technology for production of monoclonal antibodies, enzyme-linked immunosorbent assays, cell and tissue culture, and molecular cloning of genes.

Admission Requirements: Baccalaureate; top quarter of class rank, competency in written and spoken English, good undergraduate record, excellent references

Starting Date: Open

Advisors: S.J. Lamont, and faculty of the Interdepartmental Immunobiology Program.

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Techniques learned in research may include: tissue culture, hybridoma production, monoclonal antibody production, immunological assays and procedures, and molecular genetic engineering.

Institution: Oregon State University

Title: Poultry Science

Description: Graduate programs are offered in nutrition, reproductive physiology, breeding and genetics, and poultry management.

Admission Requirements: Baccalaureate (B.S.); 3.0 GPA (American B average), TOEFL score of 500

Starting Date: Beginning of Fall, Winter, Spring, or Summer quarter

Advisor: Dr. George Arscott, Head, Department of Poultry Science

Degree Awarded: M.S., Ph.D.

* * *

Institution: Louisiana State University, Agricultural and Mechanical College

Title: Veterinary Microbiology and Parasitology

Description: Veterinary virology; veterinary immunobiology; veterinary mycology; veterinary helminthology; veterinary protozoology; chemotherapy and control of animal parasites; pathogenic veterinary bacteriology; diseases of marine and aquatic animals; antimicrobial and chemotherapeutic agents; veterinary immunochemistry.

Admission Requirements: Contact University

Starting Date: Ongoing

Advisor: Dr. Johannes Storz

Degree Awarded: M.S., Ph.D.

Institution: Oregon State University

Title: Veterinary Medicine

Description: Graduate programs areas of study include Pathology, Parasitology, Microbiology, Wildlife Disease, and Toxicology.

Admission Requirements: Baccalaureate (B.S.); 3.0 GPA (American B average), TOEFL score of 500

Starting Date: Beginning of Fall, Winter, Spring, or Summer quarter

Advisor: Dr. Edward Wedman, Dean, College of Veterinary Medicine

Degree Awarded: M.S., Ph.D.

* * *

Institution: University of Florida, College of Agriculture

Title: Veterinary Medicine

Description: Veterinary Medicine-Institute of Food and Agricultural Sciences offers programs for the degree of Master of Science. Areas of emphasis include microbiology, parasitology, pathology, pharmacology, physiology, toxicology, and laboratory animal diseases. Programs leading to the Doctor of Philosophy with emphasis on animal disease problems may be obtained through other departments including Animal Science, Microbiology and Cell Science, and Zoology with faculty members from the Veterinary Medicine-IFAS directing the program

Admission Requirements: A sound background in basic sciences

Degree Awarded: M.S., Ph.D.

Institution: University of Florida, College of Medicine

Title: Veterinary Medicine

Description: Veterinary Medicine offers a program leading to the degree of Doctor of Philosophy in the medical sciences with specialization in veterinary medicine. Training includes appropriate course work and research in areas such as biochemistry, animal metabolism, microbiology and immunology, comparative toxicology, veterinary public health, epidemiology, pathophysiology, and parasitic diseases.

Admission Requirements: A broad educational base of mathematics, physics, organic and analytical chemistry, genetics, physiology, and statistical methods. GRE (Q&V score of 1150 or higher). Preference given to the admission of veterinary graduates.

Advisor: John T. Neilson

Degree Awarded: Ph.D.

* * *

Institution: University of Georgia, Department of Veterinary Parasitology

Title: Veterinary Parasitology

Description: Graduate degrees in veterinary parasitology involve the study of morphology, physiology, biochemistry, chemotherapy, host-parasite relationships, and epidemiology of those parasites affecting domestic and wild animals and those transmissible from animals to man. Formal instruction is provided in the disciplines of protozoology, helminthology, and entomology as they relate to veterinary and human medicine.

Admission Requirements: 3.0 grade point average, GRE scores totaling 1000, TOEFL score of 600 desirable

Starting Date: Fall, Winter, or Spring quarters (preferably Fall quarter)

Advisors: Five faculty members in the Department of Parasitology

Degree Awarded: M.S., Ph.D.

Institution: University of Missouri, Columbia

Title: Veterinary Medicine-Microbiology

Description: Graduate degree research may be integrated into ongoing projects: Development of vaccines against bovine babesiosis and human malaria using principles of immunology, molecular genetics, monoclonal antibody. Detection of latency in procine pseudorabies using DNA probes. Study of immune parasitology in various parasitic diseases of animals. Bovin interferon characterization. Comparison of worldwide rabies virus isolates using monoclonal antibody.

Admission Requirements: B.S. degree from accredited institution; acceptable scores on graduate record exam and test of English as foreign language

Starting Date: August, January, June

Advisors: Drs. C.A. Carson, T.J. Green, R.M. Corwin, D.G. Thawley, G.M. Buening, D.C. Blenden, M. Torres, G.D. Grothaus

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Current techniques and procedures in immunology, immunoparasitology, and molecular genetics.

* * *

Institution: University of Illinois, Urbana-Champaign

Title: Veterinary Biosciences

Description: Areas of specialization include anatomy, bioengineering, physiology, pharmacology, toxicology, and nuclear medicine. Each specialty area has a core of required courses supplemented by other courses within the Department of Veterinary Biosciences and from other departments of the Graduate College.

Admission Requirements: GPA of 4.0 (5.0 = A) on last 60 hours of undergraduate and graduate work completed, or on the entire DVM degree program. Minimum 520 TOEFL score for applicant where native language is not English.

Degree Awarded: M.S., Ph.D.

Institution: University of Wisconsin, Madison, Graduate School

Title: Veterinary Science

Description: Embryo transplant; genetic engineering of animals; immunology; animal diseases; disease control.

Admission Requirements: Bachelor's degree, 3.0 grade point average, TOEFL, English proficiency required

Starting Date: August

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Research skills on animal health, reproduction, and disease control.

* * *

Institution: Washington State University

Title: Immunology

Description: WSU has a number of faculty members who specialize in the study of immunological responses in health and various disease states. Many are internationally known leaders in their field. There is no department or program in immunology. However, courses are offered in the College of Veterinary Medicine, Biochemistry/Biophysics Department, Biology, and Pharmaceutical Sciences. Specialized training in the most modern techniques in immunological research are available through these courses.

Admission Requirements: Foreign students must present a superior academic record, evidence of adequate ability in English (TOEFL), and sufficient financial resources. A complete application must be made at least 6 months in advance of the expected date of enrollment.

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: Experience in independent research, training in specialized research techniques for immunological studies. Coursework and laboratory work relating to specific immunological diseases, i.e., combined immunodeficiency disease in horses, feline leukemia, etc.

Institution: University of Rochester

Title: Dual Degree Program: Ph.D. in Science, plus M.S. in Business Administration

Description: Successful applicants will be guaranteed a stipend and tuition for a period not to exceed 5 years.

Admission Requirements: Not indicated

Advisor: Dr. Ronald E. Yasbin

Degree Awarded: M.S., Ph.D.

Technical Skills or Practical Procedures Acquired: All necessary laboratory techniques and management skills.

INSTITUTIONS

Institution: ARCO Plant Cell Research Institute

Mailing Address: 6560 Trinity Court
Dublin, CA 94568-2685

Telephone: (415) 833-3400

Contact for Further Information: J. Eugene Fox, Director

Contact for Admission: Same

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: ARCO has business activities in numerous countries, including China, Indonesia, Brazil, Mexico, Abu Dhabi, Norway, etc. We have a State Department authorized Exchange Visitor Program.

Previous Experience With Developing Country Students: We have postdoctoral researchers from Peru, India, and other more prosperous countries: Switzerland, Israel, Norway, France. We have recently offered a position to a scholar from China.

Institution: American Society for Microbiology

Mailing Address: 1913 I Street, N.W.
Washington, D.C. 20006

Telephone: (202) 833-9680

Contact for Further Information: Dr. Helen Bishop
American Society for Microbiology
or
Dr. Morris Shaffer
Louisiana State University
(Medical School)
New Orleans, LA 70112

Contact for Admission: Depending on the individual program or course, the contact for admission varies.

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: To date, the visiting professors are supported by the Foundation for Microbiology, a private philanthropic entity. In addition to the foundation support, the participating faculty are indirectly supported by their current employers. In 1984-85 these are McMaster University (Canada), Oklahoma State University, Hoffmann-LaRoche, Tufts University, Pittman-Moore, Inc.

Previous Experience With Developing Country Students: The American Society for Microbiology has been involved in Latin American Professorship Programs since 1970. The program's objective is to assist Latin American colleagues to foster high-quality microbiological research and practice in their region.

Institution: Bova Transplant Division, Northwest Veterinary Clinic

Mailing Address: 8500 Cedarhome Drive
Stanwood, WA 98292

Telephone: (206) 629-2242

Contact for Further Information: Dr. Nels Konnerup
74 No. Sunrise Blvd.
Camano Island, WA 98292

Contact for Admission: Dr. H. E. Warsinske
8500 Cedarhome Drive
Stanwood, WA 98292

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: American Embryo Transfer Association, Association Building, Ninth and Minnesota, Hastings, Nebraska 68901; 402-462-9032.

Previous Experience With Foreign Students: Japan

Institution: Brandeis University

Mailing Address: 415 South Street
Waltham, MA 02254

Telephone: (617) 647-2826

Contact for Further Information: Dr. Arthur H. Reis, Jr., Director of Science Resources and Planning, Irving 104

Contact for Admission: David Kaplan, Dean of the Graduate School, Rabb 104

Previous Experience With Developing Country Students: Many students from developing countries attend graduate school in the Departments of Biochemistry, Biology, Chemistry, Physics, Photobiology, and Psychology.

Institution: California Institute of Technology*

Mailing Address: Pasadena, CA 91125

Telephone: 213-356-6811

Contact for Further Information: Dean of Graduate Studies

Contact for Admission: Same

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Environmental Quality Laboratory, Jet Propulsion Laboratory, Scripps Institution of Oceanography.

*Information from Institute catalog

Institution: Carnegie-Mellon University, Department of Biological Sciences

Mailing Address: 4400 Fifth Avenue
Pittsburgh, PA 15213

Telephone: 412-578-3179

Contact for Further Information: Dr. Eric Grotzinger

Contact for Admission: Same

Institution: Case Western Reserve University

Mailing Address: University Circle
Cleveland, OH 44106

Telephone: 216-368-2000

Contact for Further Information: Lucille S. Mayne, Dean, Graduate Studies

Contact for Admission: Office of Graduate Admissions

Institution: Catholic University of America

Mailing Address: 620 Michigan Avenue, N.E.
Washington, D.C. 20064

Telephone: 202-635-5000

Contact for Further Information: John P. McCarthy, Assistant Dean, Graduate Division, Arts and Sciences

Contact for Admission: Robert J. Talbot, Director, Admissions and Financial Aid, 104 McMahon Hall

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: The Consortium of Universities of the Washington Metropolitan Area.

Previous Experience With Developing Country Students: Extensive.

Institution: Central Michigan University

Mailing Address: Department of Biology
315 Brooks Hall, CMU
Mt. Pleasant, MI 48859

Telephone: 517-774-3227

Contact for Further Information: Biotechnology Programs: Dr. Lawrence Koehler, Biology Department Chairperson. Michigan Materials and Processing Institute and Michigan Molecular Institute as identified below: Dr. John Cantelon, Provost, Warriner 1212; 517-774-3931

Contact for Admission: School of Graduate Studies, 107 Warriner Hall

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: 1) Michigan Materials and Processing Institute: A consortium of six Michigan educational and research institutions (Central Michigan University, Michigan State University, Michigan Technological University, Michigan Molecular Institute, University of Michigan, and Wayne State University) to provide an advanced materials and processing program as an economic development effort for Michigan. 2) Michigan Molecular Institute: A proposed affiliation with Central Michigan University which will provide a Ph.D. program in polymer science.

Previous Experience With Developing Country Students: About 8 students from developing countries have completed the CMU Master of Science in Biology in the past 10 years.

Institution: Cold Spring Harbor Laboratory

Mailing Address: Cold Spring Harbor, NY 11724

Contact for Further Information: W.R. Udry, Administrative Director

Contact for Admission: Same

Institution: College of William and Mary

Mailing Address: Williamsburg, VA 23185

Telephone: General: 804-253-4000
Dean of Graduate Studies: 804-253-4682

Contact for Further Information: General Biology: Director of Graduate Studies, Biology Department, College of William and Mary, Williamsburg, VA 23185; 804-253-4240. Marine Science: Associate Dean, School of Marine Science, College of William and Mary, Gloucester Point, VA 23062; 804-642-2111

Contact for Admission: Same

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: The School of Marine Science is essentially the same agency as the Virginia Institute of Marine Science, which is part of the Sea Grant Consortium and advises industry and government officials on all aspects of marine resources. It is an excellent training ground for researchers, managers and officials.

Previous Experience With Developing Country Students: In biology and in marine science, as well as in most other fields at William and Mary, there have been and there are students from developing countries, both in degree programs and in short-term courses.

Institution: Colorado State University*

Mailing Address: Fort Collins, CO 80523

Contact for Further Information: Office of the Graduate School

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Environmental Resources Center (coordinates programs in use of land, water, and atmosphere), Genetics Institute (develops programs in animal breeding and genetics and plant breeding and genetics).

Previous Experience With Developing Country Students: The CSU Office of International Services provides visa and immigration services to foreign students, as well as prearrival information, on-campus orientation, housing assistance, and general assistance.

*Information from University catalog

Institution: Columbia University*

Mailing Address: School of Engineering and Applied Science
510 Seeley W. Mudd Building
Columbia University
New York, NY 10027

Telephone: 212-280-2993

Contact for Further Information: Office of Engineering Admissions

Contact for Admission: Same

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Bioengineering Institute.

*Information from University catalog

Institution: Cornell University*

Mailing Address: Sage Graduate Center
Ithaca, NY 14853

Telephone: 607-256-4884

Contact for Further Information: Graduate Center

Contact for Admission: Same

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: The Boyce Thompson Institute for Plant Research is affiliated with Cornell University. Graduate students have completed their thesis research at this Institute.

Previous Experience With Developing Country Students: About 1,000 foreign students are currently enrolled in the Graduate School.

*Information from University catalog

Institution: Council for Research Planning in Biological Sciences, Inc.

Mailing Address: Suite 600
1717 Massachusetts Avenue
Washington, D.C. 20036

Telephone: 202-462-4475

Contact for Further Information: Alexander Hollaender, President

Contact for Admission: Same

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Extensive relationships with colleges, universities, and research institutes involved with research on genetic engineering.

Institution: Drexel University

Mailing Address: 32nd and Chestnut Streets
Philadelphia, PA 19104

Telephone: 215-895-2000

Contact for Further Information: J. William A. Curley

Contact for Admission: Joseph Hare

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Drexel is a 100 percent Cooperative Education Institution. All programs place students in paying professional positions in both the private and public economic sectors as an integral part of their Degree Program.

Previous Experience With Developing Country Students: At present, all undergraduate and graduate programs enroll students from developing countries, and hundreds of our graduates are from developing countries.

Institution: Duquesne University

Mailing Address: 600 Forbes Avenue
Pittsburgh, PA 15282

Telephone: See below

Contact for Further Information: Chemistry:
Dr. Andrew J. Glaid, Chairman, Department of Chemistry;
412-434-6340. Biology: Dr. H.G. Ehrlich, Department of
Biological Science; 412-434-6332

Contact for Admission: Dean, Graduate School

Previous Experience With Developing Country Students:
Over the past 10 years, about 35 percent of our full-time
graduate students in the Department of Chemistry were
from foreign countries. Foreign countries represented
among this group include: Egypt, China, Ghana, Nigeria,
Pakistan, Taiwan, Kuwait, Korea, England, Kenya, Japan,
and Sri Lanka. In the Department of Biological Sciences
it has been rather minimal.

Institution: East Tennessee State University

Mailing Address: The School of Graduate Studies
P.O. Box 24
East Tennessee State University
Johnson City, TN 37614-002

Telephone: 615-929-4221 or 4302

Contact for Further Information: Dr. Elizabeth L. McMahan, Dean; Dr. Fred J. Alsop, Chairman; Drs. Charles E. Clark, Arthur E. Hougland, Dean R. Blevins, Richard Kinsley, Lee M. Pike, and the Graduate Committee and faculty.

Contact for Admission: Dr. Elizabeth L. McMahan, Dean, School of Graduate Studies

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Veterans Administration Hospital at Mountain Home, Johnson City, Tennessee; Johnson City Medical Center Hospital, American Pharmaseal Laboratories, Johnson City, Tennessee.

Previous Experience With Developing Country Students: M.S. degree recipients from Greece, Hong Kong, India, Iran, Korea, Nigeria, and Taiwan.

Institution: Fordham University

Mailing Address: Bronx, NY 10458

Telephone: 212-579-2000

Contact for Further Information: Rev. Richard E. Doyle, S.J., Dean, Graduate School of Arts and Science

Contact for Admission: Ms. Rita Kristoff, Graduate Admissions Office

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: New York City Doctoral Consortium (Fordham, Columbia University, New York University, City University of New York, The New School); Calder Conservation Center; New York Botanical Garden; N.Y. Zoological Society; New York Ocean Science Laboratory; Eastern Fish Disease Laboratory; W. Alton Jones Cell Science Center. Faculty also maintain individual affiliation with research centers in their interest areas.

Previous Experience With Developing Country Students: There are currently enrolled over 200 international students from more than 45 countries, of which 30 are developing countries.

Institution: Fogarty International Center

Mailing Address: National Institutes of Health
Bethesda, MD 20205

Contact for Further Information: Mark S. Beaubien, M.D., Acting Director

Contact for Admission: Same

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: The resources of the National Institutes of Health.

Previous Experience With Developing Country Students: Extensive.

Institution: George Washington University

Mailing Address: Graduate School of Arts and Sciences
801 22nd Street, N.W.
Room #T-212
Washington, D.C. 20052

Telephone: 202-676-8096

Contact for Further Information: Professor E.A. Caress

Contact for Admission: Same

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: African-American Institute, Egyptian Peace Fellowship Program; Institute for International Education; and Consortium of Universities of the Washington Metropolitan Area.

Previous Experience With Developing Country Students: We have a substantial international student population, many of whom are from developing countries.

Institution: Georgetown University

Mailing Address: 37th and "O" Street, N.W.
Washington, D.C. 20057

Telephone: 202-625-0100

Contact for Further Information: Specific Department, Graduate School or Medical School

Contact for Admission: Director of Admission, Graduate School or Medical School

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: The Consortium of Universities of Washington.

Previous Experience With Developing Country Students: Georgetown University has many international students and our Office of International Programs is available to serve students from all nations.

Institution: Georgia Institute of Technology

Mailing Address: School of Applied Biology
Atlanta, GA 30332

Telephone: 404-894-3735

Contact for Further Information: Thomas G. Tornabene

Contact for Admission: Director of Admissions

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Multifaceted programs exist; e.g., 5 minority universities in Atlanta, Georgia. Engineering Experiment Station of Georgia Institute of Technology and the Research Center on Biotechnology, which encompasses all phases of the industrial sector.

Previous Experience With Developing Country Students: Exchange students with the European block and those from South America, Puerto Rico, Israel, Egypt, and Africa.

Institution: Gorgas Memorial Laboratory

Mailing Address: P.O. Box 935
APO Miami, FL 34002

Telephone: Panama; 25-4366, 27-4111

Contact for Further Information:

Dr. F.S. Wignall, Director
Training and Education
Gorgas Memorial Laboratory
APO Miami, FL 34002
or
Aptdo 6991
Panama 5
REPUBLIC OF PANAMA

Contact for Admission: Same

Previous Experience With Developing Country Students: At least 1 foreign national in each class of "Medicine in the Tropics". Many Pan American Health Organization and World Health Organization trainees in the past 20 years.

Institution: Harvard University, Department of Biochemistry and Molecular Biology

Mailing Address: 7 Divinity Avenue
Cambridge, MA 02138

Telephone: 617-495-1800

Contact for Further Information: Dr. Thomas Bazzone

Contact for Admission: Judy Bromley

Previous Experience With Developing Country Students: In the recent past we have had a number of graduate students from the People's Republic of China, 1 from India, and 1 from Iran.

Institution: Howard University, Graduate School of Arts and Sciences

Mailing Address: 2400 6th Street, N.W.
Washington, D.C. 20059

Telephone: 202-636-6800

Contact for Further Information: Dr. Edward W. Hawthorne, Dean

Contact for Admission: Mrs. Adrienne Price, Director, Graduate Admissions Office; 202-636-6515

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Howard University holds membership in the Consortium of Universities of the Washington Metropolitan Area and in the Potomac River Basin Consortium.

Previous Experience With Developing Country Students: Howard University has been training students from developing countries for three-quarters of a century. Various units of the University have trained students from Africa under the AFGRAD Program and have active ties with the African-American Institute, Africare, and the Phelps-Stokes Foundation.

Institution: Idaho State University

Mailing Address: Pocatello, ID 83209

Telephone: 208-236-3765 or 2375

Contact for Further Information: Dr. Edwin House or Dr. Ronald McCune

Contact for Admission: Same as above and Dean, Graduate School

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Training of M.S. and Ph.D. students from several developing countries (e.g., Nigeria, India).

Institution: Illinois Institute of Technology

Mailing Address: 10 West 33rd Street
Chicago, IL 60616

Telephone: See below

Contact for Further Information: Dr. William A. Weigand, 312-567-5980 or 3489

Contact for Admission: Dr. Geoffrey T. Higgins, 312-567-3024

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Illinois Institute of Technology Research Institute, Institute of Gas Technology.

Previous Experience With Developing Country Students: The Institue traditionally has a significant population of foreign students in its graduate programs, particularly from developing countries.

Institution: Indiana University Graduate School

Mailing Address: Bloomington, IN 47405
or
I.U. Medical School
1100 West Michigan
Indianapolis, IN 46202

Telephone: Graduate School: 812-335-9343
Medical School: 317-264-8157

Contact for Further Information: Same

Contact for Admission: Individual programs

Previous Experience With Developing Country Students:
In 1983-84 Indiana University enrolled over 2,100 foreign students with about 200 from Africa, 200 from South America, and 400 from the Middle East. About 18 percent of the graduate student body consisted of foreign students. Average GPA of foreign students is slightly higher than average GPA of U.S. citizens. There are many high-quality applicants, but financial constraints significantly reduce the number who matriculate.

Institution: Iowa State University

Mailing Address: Dr. J.T. Scott
115 Curtiss Hall
Ames, IA 50011

Telephone: 515-294-4866

Contact for Further Information: Dr. J.T. Scott

Contact for Admission: Patricia J. Parker, Assistant Director of Admissions, 7 Beardshear Hall

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Association of U.S. University Directors of International Agricultural Programs (AUSUNDIAP); National Association for Foreign Student Affairs (NAFSA); Mid-America State Universities Association (MASUA); Mid-America International Agricultural Consortium (MIAC); National Association of State Universities and Land Grant Colleges (NASULGC).

Previous Experience With Developing Country Students: Iowa State University has welcomed foreign students for many years. As of the Fall 1983, there were 2,150 foreign students on our campus. These students came from 100 different countries.

Institution: Johns Hopkins University

Mailing Address: 34th and Charles Street
Baltimore, MD 21218

Telephone: 301-338-8000

Contact for Further Information: Office of Registrar

Contact for Admission: Office of Graduate Admissions, 140 Garland Hall

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Numerous domestic and international collaborating institutions in health and medicine.

Previous Experience With Developing Country Students: Extensive

Institution: Lamar University

Mailing Address: College of Arts and Sciences
P.O. Box 10058
Beaumont, TX 77710

Telephone: 409-838-8508

Contact for Further Information: John P. Idoux, Dean, College of Arts and Sciences

Contact for Admission: Same

Previous Experience With Developing Country Students: Training of M.S. level students from developing countries for 20 years.

Institution: Louisiana State University

Mailing Address: Room 128
David Boyd Hall
Baton Rouge, LA 70803

Telephone: 504-388-3193

Contact for Further Information: Dean William J. Cooper, Jr., Office of Admission, Rm. 131, David Boyd Hall

Contact for Admission: Same

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Organization for Tropical Studies (OTS), a nonprofit scientific and educational corporation, was formed in 1963 by a group of more than 25 American educational institutions, including LSU, having a long history of interest in developing tropical science. The member institutions are dedicated to developing an educational and research program to provide the basis for solving problems in tropical science. Emphasis is on biological sciences and closely allied fields. Even though LSU is no longer a member, graduate students are eligible to apply for courses offered by OTS.

Institution: Louisiana Tech University

Mailing Address: Dr. John Murad, Director
Division of Life Sciences Research
Reese Hall 108
Louisiana Tech University
Ruston, LA 71272

Telephone: 318-257-4331

Contact for Further Information: Same

Contact for Admission: Dean Patsy Lewis, Office of Admissions

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Louisiana Tech University and Tulane University School of Public Health and Tropical Medicine (LATGUCO); Louisiana Tech University and The Autonomous University of San Luis Potosi (Mexico) for cultural and scientific exchanges.

Previous Experience With Developing Country Students: Central Americans, South Americans, North Africans.

Institution: Maplehurst Ova Transplants, Inc.

Mailing Address: R.R. 1, Box 124
Keota, IA 52248

Telephone: 515-636-3811

Contact for Further Information: Dr. R. A. Carmichael, D.V.M.

Contact for Admission: Same

Previous Experience With Developing Country Students: Have trained individuals for various parts of embryo transfer from the following countries: Korea, Hungary, France, Turkey, India, and New Zealand.

Institution: Massachusetts Institute of Technology*

Mailing Address: Cambridge, MA 02139

Telephone: 617-253-1000

Contact for Further Information: Director of Admissions, Room 3-103

Contact for Admission: Same

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Cooperative cross-registration agreements exist between MIT and Harvard, Woods World Oceanographic Institution, Boston University, Brandeis University, and Tufts University for various graduate programs and courses.

*Information from Institute catalog

Institution: Miami University

Mailing Address: Oxford, OH 45056

Telephone: 513-519-2161

Contact for Further Information: Donavan Auble, Associate Vice President for Academic Affairs; 513-519-6721

Contact for Admission: Dean of the Graduate School

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Greater Cincinnati Consortium of Colleges and Universities; Central States Universities.

Previous Experience With Developing Country Students: Approximately 115 non-U.S. students in residence each semester.

Institution: Michigan Biotechnology Institute

Mailing Address: 276 Bessey Hall
Michigan State University
East Lansing, MI 48824

Telephone: 517-355-2277

Contact for Further Information: Same

Contact for Admission: Same

Institution: Michigan State University

Mailing Address: East Lansing, MI 48824

Telephone: 517-355-2350

Contact for Further Information: Dr. David D. Horner, Director, Office of International Students and Scholars, 211 International Center

Contact for Admission: Office of Admissions and Scholarships

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Midwest University Consortium for International Assistance (MUCIA) and Cooperative Research Support Program (CRSP), Bean and Cowpea Program.

Previous Experience With Developing Country Students: Extensive international graduate student training from virtually every country in the world. Heavy emphasis in agricultural and natural resource science and technologies.

Institution: Michigan Technological University

Mailing Address: Houghton, MI 49932

Telephone: 906-487-2025

Contact for Further Information: Dr. Bert K. Whitten, Head, Department of Biological Sciences, Director, BioSource Institute

Contact for Admission: Dr. David Karnosky, University-Industry Consortium, Center for Intensive Forestry

Institution: NPI, Inc.

Mailing Address: 417 Wakara Way
Salt Lake City, UT 84108

Telephone: 801-582-0144

Contact for Further Information: C. M. McKell, Vice President, Research

Contact for Admission: Same

Institution: New Mexico State University

Mailing Address: Box 3567
Las Cruces, NM 88003

Telephone: 505-646-4735 or 2018

Contact for Further Information: Dr. Harold R. Matteson, Director, or Dr. Paul E. Huntsberger, Coordinator, Center for International Programs

Contact for Admission: Sandra Basgall, Foreign Student Advisor

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Consortium for International Development.

Previous Experience With Developing Country Students: Nearly all countries of Latin America, Europe, Asia, Africa, Middle East, and Australia have enrolled undergraduates and graduates at NMSU for many years. Current enrollment of foreign students is approximately 500.

Institution: North Carolina State University

Mailing Address: P.O. Box 7101
Raleigh, NC 27695-7101

Telephone: 919-737-2195

Contact for Further Information: Dr. Frank B. Armstrong, Director, Biotechnology Program, Department of Biochemistry; 919-737-2581

Contact for Admission: Appropriate department

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Consortium for International Crop Protection, Southeastern Consortium for International Development, Soil Management--Collaborative Research Support Program.

Previous Experience With Developing Country Students: Extensive--Fall '83--832 international students from about 90 different countries, of which about 650 are graduate students, principally studying engineering and the sciences.

Institution: Northeastern University

Mailing Address: 360 Huntington Avenue
Boston, MA 02115

Telephone: 617-437-2443

Contact for Further Information: Ms. Ann Kellner, Administrative Assistant, 108 Hayden Hall

Contact for Admission: Dr. David Wharton, Department of Biology; Dr. John Neumeyer, Graduate School of Pharmacy and Allied Health Professions

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: None for these particular programs, although Boston is rich in scientific activity in terms of research, academic institutions, hospitals, and private industry.

Previous Experience With Developing Country Students: Northeastern University has a large foreign student population (1,290 undergraduates and 555 graduates) and a foreign student office.

Institution: Northwestern University

Mailing Address: 633 Clark Street
Evanston, IL 60201

Telephone: 312-491-3741

Contact for Further Information: Vice President for Research and Dean of Science

Contact for Admission: Graduate School

Institution: Ohio State University

Mailing Address: Columbus, OH 43210-1321

Telephone: 614-422-1582

Contact for Further Information: Thomas L. Sweeney, Associate Vice President for Research, Administration

Contact for Admission: Office of Graduate Admissions, 1800 Cannon Drive; 614-422-3980

Institution: Oklahoma State University, College of Agriculture

Mailing Address: 136 Agricultural Hall
Oklahoma State University
Stillwater, OK 74078

Telephone: 405-624-5395

Contact for Further Information: Dr. Paul D. Hummer

Contact for Admission: Graduate College

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Mid-America International Agricultural Consortium (MIAC).

Previous Experience With Developing Country Students: The University programs have served graduate students from most parts of the free world.

Institution: Oklahoma State University, College of Arts and Sciences

Mailing Address: 201 Life Sciences East
Oklahoma State University
Stillwater, OK 74078

Telephone: 405-624-5663

Contact for Further Information: Dr. Glenn Todd, Botany/Microbiology; 405-624-5559

Contact for Admission: Registrar

Previous Experience With Developing Country Students: Many international students serve as laboratory assistants and research assistants.

Institution: Oregon State University

Mailing Address: Corvallis, OR 97331

Telephone: 503-754-4881

Contact for Further Information: Dr. Lyle Calvin, Dean, Graduate School

Contact for Admission: Wallace E. Gibbs, Director of Admissions

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: The Consortium for International Development; The Consortium for International Fisheries and Aquaculture.

Previous Experience With Developing Country Students: Long experience with international programs, AID, The Rockefeller Foundation, and others.

Institution: Princeton University

Mailing Address: Graduate School Office
205 Nassau Hall
Princeton, NJ 08544

Telephone: 609-452-3035

Contact for Further Information: Professor Austen Newton, Director, Graduate Studies in Molecular Biology

Contact for Admission: Ms. Suzanne L.B. Brookes, Director of Admission

Previous Experience With Developing Country Students: Currently there are students from Bangladesh, Taiwan, People's Republic of China, Malaysia, Morrocco, Nepal, Nigeria, and Sri Lanka.

Institution: Purdue University

Mailing Address: West Lafayette, IN 47907

Telephone: 317-494-2595

Contact for Further Information: Stanley L. Hem, Assistant Dean, Graduate School

Contact for Admission: Same

Previous Experience With Developing Country Students: The Department of International Education and Research, D. Woods Thomas, Director, has a long history of experience with students from developing countries.

Institution: Roche Institute of Molecular Biology

Mailing Address: Nutley, NJ 07110

Contact for Further Information: George J. Cardinale, Assistant Director, Scientific Affairs

Contact for Admission: Applications are addressed to individual staff members.

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Approximately 70 postdoctoral fellows, both American and foreign, are supported by the Institute.

Previous Experience With Developing Country Students: There are 5 current research fellows are from India; previous research fellows have come from Mexico, Chile, Argentina, Brazil, and India.

Institution: Rutgers University*

Mailing addresss: New Brunswick, NJ 08903

Telephone: 201-932-7711

Contact for Further Information: Graduate Admissions Office, 542 George Street

Contact for Admission: Same

*Information from University catalog

Institution: San Diego State University

Mailing Address: College of Sciences
San Diego, CA 92182

Telephone: 619-265-5142

Contact for Further Information: Dr. Donald R. Short, Dean, College of Sciences

Contact for Admission: Admissions and Records Office (undergraduate); Graduate Division (graduate admissions)

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Several biotechnology companies in the San Diego area train interns in the Recombinant DNA Technology Program.

Previous Experience With Developing Country Students: American Language Institutes (prepares students from foreign countries for English language test and develops their language skills).

Institution: Solar Energy Research Institute

Mailing Address: 1617 Cole Boulevard
Golden, CO 80401

Telephone: 303-231-1283

Contact for Further Information: Marilyn J. Webb, Manager, Human Resources Office

Contact for Admission: Same

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: The Solar Energy Research Institute is operated for the U.S. Department of Energy by the Midwest Research Institute.

Institution: St. Thomas Institute

Mailing Address: 1842 Madison Road
Cincinnati, OH 45206

Telephone: 513-861-34650

Contact for Further Information: Dr. Elton S. Cook

Contact for Admission: Same

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Member, Greater Cincinnati Consortium of Colleges and Universities.

Previous Experience With Developing Country Students: Students from Nigeria, Zaire, and India completed M.S. and Ph.D. programs.

Institution: State University of New York, Albany

Mailing Address: Department of Biological Sciences
1400 Washington Avenue
Albany, NY 12222

Telephone: 518-457-8282

Contact for Further Information: Dr. Henry Tedeschi, Chairman

Contact for Admission: Jeffrey Collins, Assistant to the Dean of Graduate Studies; Henry Tedeschi, Chairman, Department of Biological Sciences

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Interinstitution Graduate Programs in Plant Molecular Biology.

Previous Experience With Developing Country Students: Chinese Scholar Exchange Program; at present, there are 8 foreign students enrolled in the graduate program including 2 from Ghana, 1 from Korea, and 1 from China. The Department also participates in the Wurzburg Exchange Program.

Institution: State University of New York, Binghamton

Mailing Address: Vestal Parkway East
Binghamton, NY 13901

Telephone: 607-798-2000

Contact for Further Information: Gary D. Keller, Provost for Graduate Studies and Research; 607-798-2151

Contact for Admission: Same

Previous Experience With Developing Country Students: SUNY-Binghamton's Departments of Biological Sciences and Chemistry have enrolled a number of matriculated graduate students from developing countries, including Afghanistan, India, Kenya, and South Africa.

Institution: State University of New York, Upstate Medical Center, College of Graduate Studies

Mailing Address: 766 Irving Avenue
Syracuse, NY 13210

Telephone: 315-473-4538

Contact for Further Information: Office of Graduate Studies

Contact for Admission: Charles R. Ross, Ph.D., Dean

Previous Experience With Developing Country Students: We have trained a few students from developing countries.

Institution: Sybron Chemicals, Inc.

Mailing Address: P.O. Box 808
Salem, VA 24153

Telephone: 703-389-9361

Contact for Further Information: Louis Davis

Contact for Admission: Same

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Virginia Polytechnic Institute and State University.

Institution: Texas Tech University, College of Agricultural Sciences

Mailing Address: P.O. Box 4169
Lubbock, TX 79409

Telephone: 806-742-2808

Contact for Further Information: Dr. S.E. Curl

Contact for Admission: Dr. W.F. Bennett

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Consortium for International Development, Agricultural Consortium of Texas, plus individual memberships in Association of United States University Directors of International Agricultural Programs.

Previous Experience With Developing Country Students: For the past 12-15 years, the College has cooperated with United States Department of Agriculture--Office of International Cooperation and Development (with Agency for International Development, Food and Agricultural Organization, World Bank, and African-American Institute sponsorship) on academic training programs for B.S., M.S., and Ph.D. students primarily from developing countries in Africa--average 20-25 per year. Also non-sponsored students (approximately 25 per year) from Mexico, Central America, and the Caribbean. Also short-term training programs in specified subject matter fields.

Institution: Tufts University

Mailing Address: Medford, MA 02155

Telephone: 617-628-5000

Contact for Further Information: Dr. Stanley E. Charm, Chemical Engineering Department; 617-628-2580

Contact for Admission: Admissions Office: Michael C. Behnke, Dean. 617-381-3170; Graduate School: George S. Mumford, Dean. 617-381-3395

Previous Experience With Developing Country Students: Many students from developing countries attend Tufts University.

Institution: United States Department of Agriculture

Mailing Address: Office of International Cooperation and Development
Washington, D.C. 20250

Telephone: 202-447-4711

Contact for Further Information: David P. Winkelmann

Contact for Admission: Same

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: The USDA has cooperative relationships with hundreds of colleges, universities, research institutes, and agribusiness companies.

Previous Experience With Developing Country Students: Extensive.

Institution: University of Alabama, Birmingham

Mailing Address: University Station
Birmingham, AL 35294

Telephone: 205-934-8227 (Graduate School)

Contact for Further Information: The Graduate School, Room 511, University Center

Contact for Admission: Same

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: The UAB Sparkman Center for International Public Health Education has collaborative agreements for educating and training health professionals in public health with the World Health Organization in Geneva, Switzerland; the Department of Social and Preventive Medicine of the University of the West Indies in Kingston, Jamaica; and the Universidad Peruana Cayetano Heredia in Lima, Peru.

Previous Experience With Developing Country Students: UAB has enrolled a number of students from developing countries (e.g., India, Zaire, Somalia, Thailand, Nigeria, Netherlands Antilles) in its graduate programs, including programs in public health.

Institution: University of Arizona

Mailing Address: Tucson, Arizona 85721

Telephone: 602-621-2211

Contact for Further Information: David Bulter, Registrar

Contact for Admission: Same

Institution: University of California, Berkeley*

Mailing Address: Berkeley, CA 94720

Telephone: 415-642-7405

Contact for Further Information: Graduate Admissions Office

Contact for Admission: Same

Previous Experience With Developing Country Students: Extensive.

*Information from University catalog

Institution: University of California, Davis*

Mailing Address: Davis, CA 95616

Telephone: 916-752-1011

Contact for Further Information: Graduate Division

Contact for Admission: Same

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Institute of Marine Resources, Bodega Marine Laboratory, Agricultural Alternative Development Program, Appropriate Technology Program.

*Information from University catalog

Institution: University of California, San Diego

Mailing Address: Mail Code Q-003
La Jolla, CA 92093

Telephone: 619-452-6654

Contact for Further Information: Richard Attiyeh, Dean of Graduate Studies and Research

Contact for Admission: Graduate Admissions Office; 619-452-3555

Previous Experience With Developing Country Students:
UCSD has approximately 600 undergraduate, graduate, and postdoctoral students and visiting scholars from developing countries. We offer a wide variety of services to facilitate the student's adjustment to university life and American culture.

Institution: University of Connecticut

Mailing Address: Box U40
Storrs, CT 06268

Telephone: 203-486-2413

Contact for Further Information: W.A. Cowan

Contact for Admission: Same

Previous Experience With Developing Country Students:
Have had or have Asian, Latin American, and African students in graduate programs.

Institution: University of Detroit

Mailing Address: Department of Biology and Health Sciences
4001 West McNichols
Detroit, MI 48221

Telephone: 313-927-1180

Contact for Further Information: Dr. David Pieper

Contact for Admission: Same

Previous Experience With Developing Country Students:
A number of students from developing countries have received an M.S. in Biology from our department.

Institution: University of Florida

Mailing Address: Graduate School
223 Grinter Hall
University of Florida
Gainesville, FL 32611

Telephone: 904-392-4646

Contact for Further Information: International Programs, Center for Tropical Agriculture, Institute of Food and Agricultural Sciences, 3028 McCarty Hall

Contact for Admission: Office of the Registrar, Admission Section, 135 Tigert Hall; 904-392-1965

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Association of Caribbean Universities and Research Institutes, The South East Consortium for International Development, and The Farming System Support Projects.

Previous Experience With Developing Country Students: About 18 percent of the total first-time-enrolled graduate students are foreign. Many of these foreign students are from developing countries. A majority of the foreign students are enrolled in the Colleges of Agriculture and Engineering.

Institution: University of Georgia

Mailing Address: Athens, GA 30602

Telephone: 404-542-2925 (The Graduate School)

Contact for Further Information: Dr. H. Branch Howe, Jr., Associate Dean, Graduate School

Contact for Admission: Mrs. Mary Ann Keller, Director of Graduate Admissions

Consortium Memberships, Affiliated Institutions, or Industrial Collaborations: Southeastern Consortium for International Development, U.S. Agency for International Development, AMIDEAST, an agreement with France in Ecology, and agreement with Burkina, etc.

Previous Experience With Developing Country Students: Numerous graduate students have attended from developing countries in South America, Africa, and Asia.