

You can't beat the best

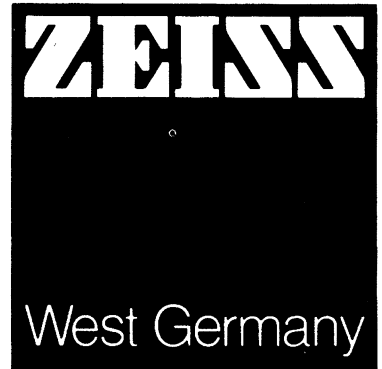
Aberration-free wide-field optics

It's the Axiomat, of course. With the first complete line of strain-free Planapochromats for all microscope techniques in transmitted and reflected light. With the most versatile phase system. With a Nomarski system that has resolving power far superior to that of any other microscope. With superbly corrected objectives for crisp, detail-filled images.

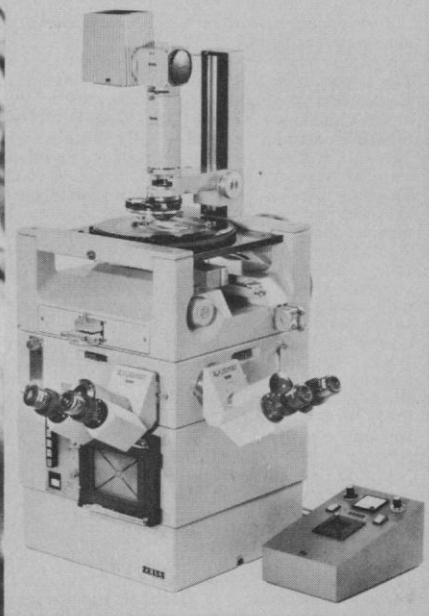
The most stable, most versatile

It's the ideal instrument for all fields of critical microscopy. No other microscope has its stability: it's the only one where the optical axis goes right down the middle. Ideal for all modes of image documentation, with two fully integrated, automatic cameras (35mm and 4x5"), two auxiliary ports, and dual observation. **Nationwide service.**

The great name in optics

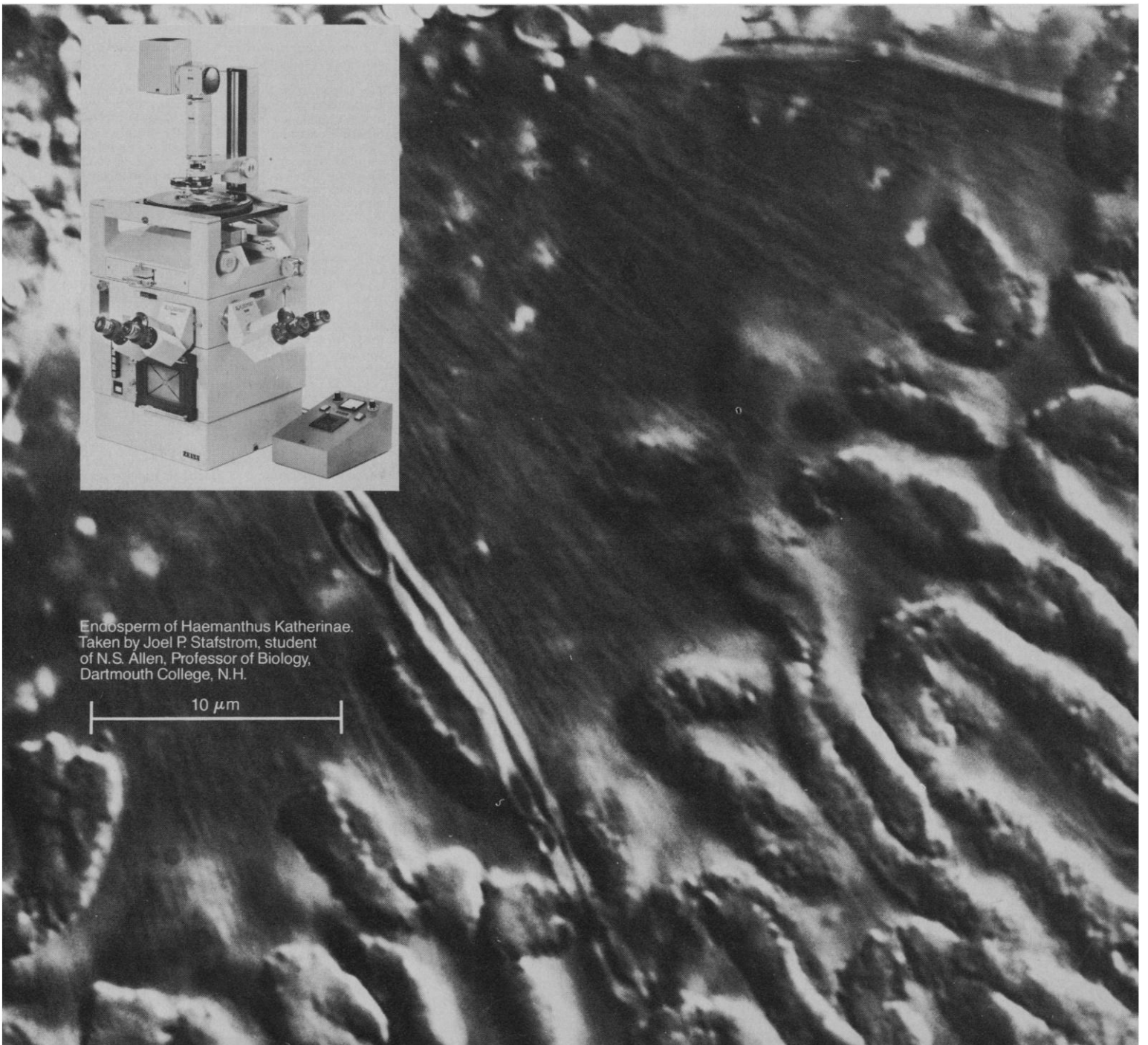


Carl Zeiss, Inc., 444 5th Avenue, New York, N.Y. 10018 (212) 730-4400. Branches: Atlanta, Boston, Chicago, Houston, Los Angeles, San Francisco, Washington, D.C. In Canada: 45 Valleybrook Drive, Don Mills, Ontario, M3B 2S6. Or call (416) 449-4660.



Endosperm of *Haemanthus Katherinae*.
Taken by Joel P. Stafstrom, student
of N.S. Allen, Professor of Biology,
Dartmouth College, N.H.

10 μm



Personnel Placement

SCIENCE publishes each Friday, except the last Friday of the year. Advertising closing for a particular Friday issue is Wednesday, 3 1/2 weeks before. Advertising is accepted only in writing; no abbreviations. Also, personnel advertising is accepted only with the understanding that the advertiser does not discriminate among applicants on the basis of race, sex, religion, age, color, national origin, or handicap.

POSITIONS WANTED: 40¢ per word, plus \$4 for use of box number, per insertion. \$10 minimum, per insertion. Prepayment required. This rate is available only to individuals seeking jobs.

DISPLAY (POSITIONS OPEN, COURSES, FELLOWSHIPS, MARKET PLACE, and so forth): \$6.40 per millimeter; \$160 minimum, per insertion (minimum charge covers 25 millimeters on a single column; 25 millimeters equals 10 lines of 50 spaces per line). No charge for use of box number. No agency commission for ads less than 103 millimeters (4 inches). No cash discount. Prepayment required for all foreign ads. Purchase orders and billing information required for all other advertising.

Send copy for all **Positions Wanted** ads and **Display** ads less than 1/6 page in size (125 millimeters) to:

SCIENCE, Room 207
1515 Massachusetts Ave., NW
Washington, D.C. 20005
Telephone: 202-467-4456

Send copy for **Display** ads 1/6 page and larger to:

Scherago Associates, Inc.
1515 Broadway
New York, N.Y. 10036
Telephone: 212-730-1050

Blind ad replies should be addressed as follows:

Box (give number)
SCIENCE
1515 Massachusetts Ave., NW
Washington, D.C. 20005

Effective 1 January 1980, the display rate for SCIENCE will be \$180 per 25 millimeters, minimum, per insertion.

POSITIONS WANTED

Academic/Clinical Pathologist, M.D., Ph.D. Broad interests. Available January 1980. Box 328, SCIENCE. X

Biochemist/Microbiologist. Ph.D. 1972. Experience in carbohydrate, glycoprotein chemistry; enzyme purification, immunochemistry, analytical biochemistry, separation techniques. Some instrumentation. Microbial, metazoan physiology. Publications, references. Industry, government, academia, research institute. No postdoctorals. Box 329, SCIENCE. X

Bioengineer. Ph.D. 1974, M.S.M.E. Diversified research experience; numerous publications. Seeks challenging interdisciplinary position. Box 321, SCIENCE. 11/30; 12/7

Environmental Biologist/Biochemist. B.S. plus work towards M.S. Currently chemist for small town. Has experience with EPA and personnel management. Seeks position in research, laboratory, or field. R. Wattinger, Route 1, Box 39-D, Reva, Virginia 22735. 11/30; 12/7

Mathematical Biologist/Health Physicist. Ph.D., 26 years of experience in health physics at Oak Ridge National Laboratory. Seeks consulting job in kinetics problems-pharmacokinetics-metabolic models, and so forth. Telephone: 615-574-6261 during the day, or 615-482-4532 at night. Or write: S. R. Bernard, 109 Packer Road, Oak Ridge, Tennessee 37830. 11/30; 12/7, 14

Immediate position wanted. Ph.D. **Pharmacologist** with physiology teaching experience and chemistry background. Write, giving job description. 5556 North Wayne, Chicago, Illinois 60640. 11/30; 12/7, 14, 21

POSITIONS WANTED

Nutritionist/Physiologist. Ph.D. Major interests are in diet-endocrine interactions in carbohydrate, lipid, and energy metabolism during postnatal development of animal models of obesity and diabetes. Publications. Grants. Seeks industrial research position in the New Jersey region. Box 325, SCIENCE. 11/30; 12/7

Pharmacologist. Ph.D., industrial experience. Seeks position in drug regulatory affairs or licensing. Box 330, SCIENCE. X

Physiologist/Biochemist. Ph.D. Experienced endocrinologist-embryologist; developed highly sensitive tissue culture techniques for studies on differentiation and abnormal development with teratogens and carcinogens; obtained research funding from NIH; numerous publications on hormones, oogenesis, tissue culture, and on early embryonic development. Seeks research/teaching position. Available immediately. Box 331, SCIENCE. 11/30; 12/7

POSITIONS OPEN

ANALYTICAL RADIOCHEMISTRY LABORATORY SUPERVISOR

Research laboratory in Southwest seeks experienced laboratory supervisor to direct daily activities of 10 to 15 radiochemical analysts performing analyses for actinides and fission product radionuclides in tissues and excreta of laboratory animals. Duties include maintenance of quality assurance programs, productivity and performance evaluations and conduct of formal training programs for new analysts. In addition, will conduct complex, nonroutine assignments as needed to support routine activities. B.S. chemist plus at least 8 years of relevant laboratory experience which must include supervisory responsibilities. Qualified applicants will have demonstrated the ability to develop and perform specialized technical procedures with a sound understanding of basic chemical principles, and will be able to supervise effectively and communicate clearly in written and verbal form. Position offers competitive salary and excellent benefits. **Lovelace Inhalation Toxicology Research Institute, P.O. Box 5890, Albuquerque, N.M. 87115.** Telephone: 505-264-9431, Personnel Unit. An Equal Opportunity/Affirmative Action Employer.

DEPARTMENT OF BIOLOGICAL AND ALLIED HEALTH SCIENCES

Faculty position: **ANIMAL PHYSIOLOGIST**—tenure-track. Primary responsibilities: to teach undergraduate courses in vertebrate physiology. Expertise to teach one or more of the following undergraduate and graduate courses is desirable: anatomy and physiology, endocrinology, and comparative animal physiology. Supervise undergraduate research. Ph.D. preferred.

Send letter of application, résumé, transcripts, and three letters of reference by 15 February 1980 to: **Dr. Louis V. Mingrone, Chairperson, Search Committee, Department of Biological and Allied Health Sciences, Bloomsburg State College, Bloomsburg, Pa. 17815.** An Equal Opportunity/Affirmative Action Employer.

ASSISTANT FACULTY FELLOW. To perform research on ongoing projects in the biochemistry of blood coagulation and fibrinolytic proteins. At least 3 years of experience at the post-Ph.D. level in studying the physical chemistry of proteins is required. Salary: \$20,000 per annum. Send curriculum vitae, publications, and names of three references to: **Dean, College of Science, University of Notre Dame, Notre Dame, Indiana 46556.** Notre Dame is an Equal Opportunity Employer.

ASSISTANT PROFESSOR: BIOCHEMISTRY

A faculty position at the rank of **assistant professor** will become available 1 July 1980. The primary requirement is promise in teaching and research. Applications will be accepted irrespective of the specific area of biochemical research.

Applicants should submit curriculum vitae with a list of publications, a brief description of their proposed research program, and the names of three references to: **Dr. Robert L. Hill, Chairman, Department of Biochemistry, Duke University Medical Center, Durham, North Carolina 27710.**

Duke University is an Equal Opportunity/Affirmative Action Employer.

POSITIONS OPEN

ANATOMY: ASSISTANT AND ASSOCIATE PROFESSORS

The Department of Anatomy, Tufts University Schools of Medicine, Dental Medicine and Veterinary Medicine, invites applications for two tenure-track positions at the assistant and associate professor levels beginning July 1980. Applicants should hold the Ph.D. in anatomy and/or the M.D., D.M.D., or D.V.M. Applicants should be qualified to teach either gross anatomy/embryology or microscopic anatomy to medical, dental, and graduate students. Applicants for the assistant professor level should have at least 1 or 2 years of postdoctoral experience and show promise of developing an active and independent research program. Applicants for the associate professor level must have an established research program and extensive teaching experience. Current research areas in the department include: pulmonary cell biology, reproductive biology and neuroendocrinology, comparative immunology, mechanisms of hormone action, cell biology (especially secretory mechanisms), and the effects of aging and/or alcohol on the CNS. Salary and rank are dependent upon qualifications and experience. Applicants are invited to submit curriculum vitae, names of three references, and a letter describing research and teaching interests to: **Dr. Karen Hitchcock, Chairman, Department of Anatomy, Tufts University Schools of Medicine, Dental Medicine and Veterinary Medicine, 136 Harrison Avenue, Boston, Massachusetts 02111.** Deadline for receipt of applications is 10 February 1980.

Tufts University is an Equal Opportunity/Affirmative Action Employer.

The Department of Economics and the Institute for Environmental Studies (IES), University of Washington, announce a joint **ASSISTANT PROFESSORSHIP** starting September 1980. Successful applicant is to engage in scholarly research on relationship of economics to environmental problems. Teaching involves two courses per year in each of the academic units, including natural resource economics, upper division; social sciences and environment, lower division; and advanced course on research interests of individual. Completed applications should include résumé, copies of publications, and names of three persons for professional evaluation. Submit to: **Institute for Environmental Studies, University of Washington, Seattle, Wash. 98195,** by 31 December 1979. For further information, telephone: **Gordon Orians (IES) at 206-543-1812** or **Gardner Brown (Economics) at 206-543-5945.** The University of Washington is an Equal Opportunity Employer.

ASSISTANT PROFESSOR IN COMPUTER ENGINEERING Thayer School of Engineering Dartmouth College

A tenure-track position will be available beginning in September 1980. Applicants should have a doctorate and a background in electrical engineering and computer systems, be prepared to teach at both the undergraduate and graduate levels, and develop a strong research program. Competence is desired in at least two of the following areas: digital systems architecture, networks and distributed processing, and digital process control. Opportunities exist for collaboration in Thayer School, the Kiewit Computation Center, and the undergraduate and graduate Computer Science programs.

Submit a résumé and arrange to have at least three reference letters and a graduate transcript sent directly to: **Associate Dean John Strohbehn, Thayer School of Engineering, Dartmouth College, Hanover, N.H. 03755.** Closing date for applications is 1 February 1980. *Dartmouth College is an Equal Opportunity/Affirmative Action Employer and encourages applications from women and members of minority groups.*

ASSISTANT PROFESSOR—MICROBIOLOGY

Tenure-track position available August 1980 to develop courses in medical microbiology and area of specialization. Research interests should be in immunology, pathogenic mechanisms, or virology. Must have demonstrated research productivity in area of specialization. Postdoctoral experience is required. Salary: \$16,000; application deadline: 15 February 1980. Send résumé and three letters of recommendation to: **William T. Northey, Ph.D., Chairman, Search Committee, Department of Botany and Microbiology, 368 Life Science Building, Arizona State University, Tempe, Arizona 85281.** Arizona State University is an Equal Opportunity/Affirmative Action Employer.

POSITIONS OPEN

ASSISTANT PROFESSOR OF AGRONOMY. Position includes up to half-time teaching mostly at the undergraduate level and research in the area of grain crop production. Courses include introductory crops, crop production, and related courses. Research related to plant stress associated with water, salinity, and fertility. Possibility of tenure-track later. Ph.D. in agronomy with experience and/or training in crop production. Contact: **Dr. Merle H. Niehaus, Head, Agronomy Department, Box 3Q, New Mexico State University, Las Cruces, N.M. 88003. Telephone: 505-646-3405. An Equal Opportunity/Affirmative Action Employer.** Deadline for applications: 15 February 1980.

ASSISTANT PROFESSORS IN BIOCHEMISTRY

The Department of Biochemistry and Molecular Biology of the College of Medicine of the University of Florida is seeking qualified applicants for two tenure-track positions at the level of assistant professor. The successful applicant must have a Ph.D. in biochemistry or a related science and, minimally, 1 year of postdoctoral training in his/her area of research specialization. We are seeking individuals with excellent training in physical aspects of biochemistry who are working in areas of current biologic interest. We are particularly seeking individuals whose areas of research expertise include either biochemically oriented endocrinology, developmental biochemistry, or immunochemistry. Successful applicants will be expected to participate in both undergraduate and graduate teaching as well as to maintain an excellent research program.

The position is to be filled 1 September 1980. The minimum salary for the position is \$22,000, while the maximum is negotiable and will be commensurate with qualifications. Applicants should, prior to 1 February 1980, submit curriculum vitae, a description of proposed research, and the names of three or more references to: **Dr. K. D. Noonan, Biochemistry Search Committee, Department of Biochemistry and Molecular Biology, College of Medicine, Box J-245, JHM Health Center, University of Florida, Gainesville, Florida 32610.**

Equal Opportunity/Affirmative Action Employer

POSITIONS OPEN

ASSISTANT RESEARCHER POSITION available January 1980, for study of mechanisms of slow regenerative responses in invertebrate motor networks. Ph.D., 2 years of postdoctoral experience, and background in area of research required. Send curriculum vitae and names of three references by 15 December to: **Dr. Daniel Hartline, Bekesy Laboratory of Neurobiology, 1993 East-West Road, Honolulu, Hawaii 96822. Equal Opportunity Employer.**

ASSISTANT RESEARCH SCIENTISTS—Postdoctoral positions.

DEPARTMENT OF PHARMACOLOGY. Ph.D. biochemist to work in hormonal regulation of secretion.

DEPARTMENT OF PATHOLOGY.

1) Ph.D. immunology-genetic control hybrid resistance to tumors and regulation of secretory immune system, and

2) Ph.D. biochemistry, protein and amino acid chemistry, with interest in peptide purification.

DEPARTMENT OF PSYCHIATRY. Ph.D. biochemistry with interest in enzyme and protein research. Also position for:

ASSOCIATE RESEARCH SCIENTIST. Ph.D. protein chemistry plus 2 to 3 years of postdoctoral experience in isolation of enzymes to work in field of blood coagulation.

Please send résumé with salary history and requirements, indicating which position you are applying for, to: **M. Kerans, Personnel Department, NEW YORK UNIVERSITY MEDICAL CENTER, 560 First Avenue, New York, N.Y. 10016. An Equal Opportunity/Affirmative Action Employer, M/F.**

The Sidney Farber Cancer Institute and the Harvard Medical School seek an **ASSOCIATE OR FULL PROFESSOR OF PHARMACOLOGY** to head a division of pharmacology at the Institute. The incumbent should have research interests and accomplishments related to pharmacology or biochemistry. Candidates should send curriculum vitae and a statement of their research interests to: **Dr. Peter Goldman, Chairman of Search Committee, Department of Pharmacology, Harvard Medical School, 250 Longwood Avenue, Boston, Massachusetts 02115. An Affirmative Action/Equal Opportunity Employer.**

POSITIONS OPEN

BIOCHEMIST-PHARMACOLOGIST. The Cardiovascular Research and Training Center (CVRTC) at the University of Alabama Medical Center has available a position as **associate scientist, CVRTC**, to participate in a strong ongoing program in hypertension research. This position is open to qualified individuals fulfilling two criteria. First, the individual must hold a Ph.D. in biochemistry or pharmacology with postdoctoral training desirable. Second, the individual must have a strong background of research in enzymology and/or membrane function; experience in measurement of membrane sodium pump activity, Na, K-ATPase levels and related variables is especially desirable, but on-the-job training in these measurements is available. A faculty position in the Department of Biochemistry or Pharmacology may be possible, if the individual has a firm commitment to teaching programs oriented to medical, dental, and graduate students. Apply to: **Cardiovascular Research and Training Center, University of Alabama Medical Center, University Station, Birmingham, Alabama 35294, attention Chris Ballard, Administrative Assistant; telephone: 205-934-2580. An Equal Opportunity/Affirmative Action Employer.** Expiration date for receipt of applications: 1 January 1980.

DIVISION OF BIOLOGICAL SCIENCES CORNELL UNIVERSITY

Assistant professor to teach introductory genetics, participate in advanced instruction, and carry on a vigorous research program in modern genetics. Position available beginning 1 July 1980. Applicants with postdoctoral experience preferred. Candidates should send curriculum vitae, a statement of research interests, and the names of three references. Please arrange to have letters of reference sent directly to the Search Committee along with the other material, by 14 January 1980. Send applications to:

**S. A. Zahler, Chairman
Search Committee
Section of Botany, Genetics, and Development
Bradfield Hall
Cornell University
Ithaca, New York 14853**

Cornell University is an Equal Opportunity/Affirmative Action Employer.

ENVIRONMENTAL PROTECTION AGENCY (EPA) OFFICE OF TOXIC SUBSTANCES Washington, D.C.

The Office of Toxic Substances has a career-conditional appointment for a **PLANT PHYSIOLOGICAL ECOLOGIST (GS 11/12).**

The successful candidate will join a multidisciplinary branch concerned with the ecological effects and biological mobilization of chemicals released to natural environments. Branch responsibilities include the development of test standards, the evaluation of procedures relating to the assessment of the effects of chemicals in the environment, the evaluation of biological data to determine the relative ecological risk of chemicals, and the management of extramural projects in support of testing activities. Members of the branch assist in the preparation of Test Standards and Guidelines and Test Rules required under the Toxic Substances Control Act and the identification of appropriate research and development needs.

Candidates must have at least a bachelor's degree in biological sciences. An advanced degree and demonstrated experience with the response of whole terrestrial plants to chemical and/or environmental stress is highly desirable. U.S. citizenship is required. Salary range: \$20,617 to \$32,110, depending upon qualifications, plus civil service benefits.

LOCATION: Washington, D.C.

APPLICATION SUBMISSIONS: Please submit a completed SF-171, available at Federal Job Information Centers and federal agency personnel offices, to reach EPA no later than 2 weeks following the date of this publication to: **Dr. Frank Benenati, Office of Toxic Substances (TS-792), Environmental Protection Agency, 401 M Street, SW, Washington, D.C. 20460.** Also submit SF-171 to the Office of Personnel Management, if this has not been done previously, or if your previous submission needs to be updated.

MEDICAL TRANSLATOR/ WRITER German-English

Growing American ethical pharmaceutical company with international affiliation is seeking a specialized medical-scientific Translator/Writer beginning January, 1980.

Qualified applicant should have:

- Excellent command of both German and English
- At least 3 years experience in translating medical, pharmacological or biochemical material on a professional basis
- Degree or equivalent in one of the life sciences
- Pharmaceutical industry experience desirable but not essential

Translator will assist the Senior Medical Writer in the preparation of English translations, primarily of published or unpublished German language text. The subject matter is diverse, and at a high level of technical/scientific complexity. Employment procedures for this position will involve the submission of a specific translation sample of the company's choosing.

We are located in historic Ridgefield, Conn., next to Westchester County, N.Y. Outstanding compensation package includes competitive salary, major medical, dental and life insurance, investment savings plan, company paid pension, relocation assistance, educational reimbursement and a unique vacation plan.

Please send resume with salary history and requirements in complete confidence to: **Stuart E. Rapp, Employment Manager.**



**Boehringer
Ingelheim**

90 East Ridge, PO Box 368, Ridgefield, CT 06877

An Equal Opportunity Employer M/F

Environmental Science

Marketing Manager

The Sciences Division of Henningson, Durham & Richardson, Inc. is seeking a Business Development Manager to head its National Environmental Science Marketing Program. HDR's Science Division is one of the countries largest Environmental Research and Consulting firms and is located in Santa Barbara, California.

This individual will be responsible for the professional marketing of Environmental Science work nationwide, including development of a marketing program, client contact and proposal preparation. Position requires 5 years related consulting firm, research or governmental agency experience. Prior project management and client contact is a must. An advanced degree is required, preferable a PhD in a natural or social sciences, economics or law.

We offer a Santa Barbara location, top salary and a complete benefit package.

For immediate consideration please call collect Jim Reinhardt at (402) 399-1000 or send your detailed resume in confidence to:

Mr. J.A. Reinhardt
Corporate Headquarters
8404 Indian Hills Drive
Omaha, Nebraska 68114

HDR

An Equal Opportunity Employer M/F

POSITIONS OPEN

ASSISTANT PROFESSOR—MOLECULAR BIOLOGY (Second Announcement)

A tenure-track position is currently available in this newly developing multidisciplinary department. The candidate we seek must possess high-level commitment to research, and be prepared to initiate independent programs in own area of interest. Several years of postdoctorate experience and a background in immunochemistry are preferred. Some teaching experience in immunology, biochemistry, or both is desirable.

Candidate possessing the above prerequisites should send their curriculum vitae and the names of three references to: **B. Salafsky, Ph.D., Professor of Pharmacology and Acting Head, Department of Biomedical Sciences, Rockford School of Medicine, University of Illinois, 1601 Parkview Avenue, Rockford, Illinois 61101.**

An Equal Opportunity/Affirmative Action Employer

ASSISTANT PROFESSOR OF PHYSIOLOGY (NEUROSCIENCE)

The Department of Physiology of the Johns Hopkins University School of Medicine invites applications from neuroscientists for a position as assistant professor, open 1 July 1980. Applicants must have the Ph.D. or the M.D. degree, and a record of productivity in original research. Duties include teaching neuroscience to students of medicine, and the instruction and supervision of graduate students. Please send curriculum vitae, a narrative account of past research accomplishments and present research interests, and two letters of recommendation to: **The Director, Department of Physiology, The Johns Hopkins University School of Medicine, 725 North Wolfe Street, Baltimore, Maryland 21205. The Johns Hopkins University is an Equal Opportunity Employer.**

BIOLOGY TEACHING OVERSEAS

Research-teaching positions in biology starting fall 1980 in such specialties as: plant physiology, developmental biology, plant taxonomy, marine biology (invertebrate zoology/ecology). Ph.D. required; rank and salary dependent on experience and qualifications. Normal contract is 3 years with fringe benefits. Air mail curriculum vitae, résumé, and letters of recommendation to: **Chairman, Biology Department, American University of Beirut, Beirut, Lebanon. Review begins 1 February 1980. An Equal Opportunity/Affirmative Action Employer.**

BIOLOGIST WANTED. A field-oriented ecologist, capable of teaching general biology, parasitology, and either vertebrate anatomy or vertebrate physiology. Other duties could include marine biology, limnology, or histology. Staff member should also be willing to advise students, supervise student research, and serve on faculty committees. Ph.D. preferred. Position is currently untenured, but may be tenured in the near future. If interested, please send curriculum vitae and three letters of recommendation to: **Dr. Nancy E. Walker, Department of Biology, Rockhurst College, 5225 Troost Avenue, Kansas City, Mo. 64110. An Equal Opportunity/Affirmative Action Employer.**

BIOLOGY instructor or assistant professor, College of Sciences. Temporary 1-year appointment. Teaching responsibilities include human anatomy and physiology for nurses. M.S., A.B.D., or Ph.D. in human anatomy and physiology required. Previous experience in teaching large (120 students) lecture section with multiple laboratory sections desired. Position begins 9 June 1980 or 25 August 1980; application deadline: 1 February 1980. Send complete résumé, three letters of recommendation, and complete transcripts to: **Dr. R. G. Johnson, Chairperson, Department of Biology, Southeast Missouri State University, Cape Girardeau, Mo. 63701. An Equal Opportunity/Affirmative Action Employer, M/F.**

GENETICS instructor or assistant professor, College of Sciences. Teaching responsibilities include genetics, upper division specialty course(s), and general biology. Successful candidate will be expected to develop an active research program in genetics. Ph.D. in genetics required; previous teaching experience desirable. Position begins fall 1980; application deadline: 7 January 1980. Send complete résumé, three letters of recommendation, and complete transcripts to: **Dr. Robert G. Johnson, Chairperson, Department of Biology, Southeast Missouri State University, Cape Girardeau, Mo. 63701. An Equal Opportunity/Affirmative Action Employer, M/F.**

POSITIONS OPEN

ASSISTANT PROFESSOR OF MICROBIOLOGY

Tenure-track position open for molecular biologist (2 to 5 years of postdoctoral) to do research and teaching in areas related to developmental cell biology. Active research, graduate, and postdoctoral training programs. Send résumé to: **Chairman, Department of Microbiology, University of Virginia School of Medicine, Charlottesville, Va. 22908. An Equal Opportunity/Affirmative Action Employer.**

CHAIRPERSON, Department of Biostatistics and Epidemiology, School of Public Health and Tropical Medicine, Tulane University. Search is reopened for a chairperson of this department. Position is open to biostatisticians and epidemiologists with interests in chronic disease, health service delivery problems, environmental health, mental health, or medical sociology. The person should have a doctoral degree, recognized scholastic achievements, administrative experience, and an appropriate background for development of ongoing interdisciplinary education and research programs, and be eligible for appointment at the rank of associate professor or above with tenure. Interested individuals should send résumés to or contact

**Dr. M. D. Little
Tulane Medical Center
1430 Tulane Avenue
New Orleans, La. 70112**

no later than 15 January 1980. *An Equal Opportunity/Affirmative Action Employer.*

THE UNIVERSITY OF ILLINOIS

The Urbana-Champaign campus of the University of Illinois is seeking a DEAN for the College of Liberal Arts and Sciences. The dean is the chief executive officer of the college, responsible to the chancellor for its administration, and agent of the faculty for the execution of educational policy. Available 1 July 1980. Nominations and applications should be submitted by 15 December 1979 to: **Professor George W. Swenson, Jr., Chair, Search Committee for the Dean of the College of Liberal Arts and Sciences, c/o Office of the Chancellor, University of Illinois at Urbana-Champaign, University Station Post Office, Urbana, Illinois 61801, Attention: Marmion Walsh (telephone: 217-333-6815). The University of Illinois is an Affirmative Action/Equal Opportunity Employer.**

DEAN SCHOOL OF SCIENCE AND NURSING PURDUE UNIVERSITY CALUMET HAMMOND, INDIANA

Applications and nominations are invited for the position of dean in this school which includes Departments of Biology, Chemistry and Physics, Mathematical Sciences, and Nursing. Candidates must have an earned doctorate in an appropriate discipline from a recognized institution. Effective college or university teaching experience, a record of research or creative activity, and administrative experience are important qualifications. Starting date is 1 July 1980. Salary is competitive. Both salary and faculty rank will depend upon qualifications and experience. Deadline for applications is 15 January 1980. Nominations or applications, including résumés and three references, should be sent to:

**Professor Samuel D. Paravonian, Chairperson
Dean Search Advisory Committee
Purdue University Calumet
Hammond, Indiana 46323**

An Equal Access/Equal Opportunity University

DEVELOPMENTAL BIOLOGIST. Assistant professor, beginning fall 1980. Commitment to undergraduate teaching (including introductory level courses as well as broad training in botany) and completed Ph.D. Successful applicant expected to develop research program involving undergraduates. Send résumé, including teaching experience, research interests, and career objectives, with names of three references by 20 December to: **Dr. Kathryn M. Eschenberg, Department of Biological Sciences, Mount Holyoke College, South Hadley, Massachusetts 01075.**

ELECTRON MICROSCOPIST AND CELL BIOLOGIST. Assistant professor. Sabbatical replacement, 1980-1981, to teach cell biology, electron microscopy, and third semester course. Successful applicant responsible for management of EM laboratory, including maintenance of Phillips EM 300. Send résumé and names of three references by 20 December to: **Dr. Kathryn M. Eschenberg, Department of Biological Sciences, Mount Holyoke College, South Hadley, Massachusetts 01075.**

POSITIONS OPEN

BIOMEDICAL SCIENCES WASHINGTON UNIVERSITY

Applications are invited for two tenure-track positions in the Department of Biomedical Science, School of Dental Medicine. The individuals must be fully qualified to teach either gross anatomy or immunology, and have demonstrated a strong research capability and commitment. Preference will be given to persons amenable to collaborative investigations in areas of ongoing research (for example, bone and mineral metabolism, radiation pathology) or where future research is anticipated (for example, periodontal disease, craniofacial embryology).

Please forward résumé, the name of three referees, and a brief statement of research activities and plans to: **Dr. A. J. Kahn, Search Coordinator, Washington University, School of Dental Medicine, 4559 Scott Avenue, St. Louis, Missouri 63110. An Equal Opportunity Employer.**

DEVELOPMENTAL BIOLOGIST. The Division of Biological Sciences at the University of Kansas (Lawrence) has an anticipated opening for a person with training in developmental and cellular biology, with interests in either animal or plant cells. This will be a tenure-track appointment. The person should be broadly trained and have expertise with eukaryotic cell culture systems. Teaching will include a semester course in general undergraduate biology, a semester course in undergraduate cell biology, and advanced courses as appropriate. Individual must have the Ph.D., at least 1 year of postdoctoral training, and be interested in both research and teaching. The appointment is at the assistant professor level and the 9-month salary is in the \$17,500 to \$19,000 range, depending on experience. Application deadline is 15 February 1980. Curriculum vitae and résumé, description of research interests, and three letters of recommendation should be sent to: **Dr. Paul R. Burton, Department of Physiology and Cell Biology, Snow Hall, University of Kansas, Lawrence, Kansas 66045. The University of Kansas is an Equal Opportunity/Affirmative Action Employer.**

DIRECTOR OF ENVIRONMENTAL HEALTH AND SAFETY WAYNE STATE UNIVERSITY

The Director of Environmental Health and Safety is responsible for the implementation and administration of policy relating to biohazards control, recombinant DNA activities, and related in-service training programs related to environmental health and safety. Candidates should possess a doctoral degree, Ph.D. or Dr.P.H., in public health, epidemiologic sciences, public health microbiology (laboratory practices), occupational and environmental health sciences, or in related areas. Academic appointment in an appropriate academic unit. Salary open. Send curriculum vitae and names of three references to: **Martin Barr, Ph.D., Acting Vice President for Health Affairs, Wayne State University, Detroit, Michigan 48202. Wayne State is an Affirmative Action/Equal Opportunity Employer.**

FACULTY POSITION, ORGANIC CHEMISTRY

Applications are invited for a tenured senior appointment which the Department of Chemistry at Stanford University expects to be able to make in the near future. Applicants must have outstanding research credentials in organic chemistry and a strong commitment to teaching undergraduates as well as graduates. In applying, send curriculum vitae and bibliography to: **Professor K. O. Hodgson, Department of Chemistry, Stanford University, Stanford, California 94305. Stanford is committed to Equal Opportunity through Affirmative Action in employment and we are especially eager to identify women and minority persons with appropriate qualifications.** Applications should be received by 15 December 1979.

FACULTY POSITION in physical chemistry, assistant professor, tenure-track position, fall 1980. Ph.D. required and postdoctoral experience desirable. The successful candidate is expected to establish a strong research program in experimental physical chemistry. Candidates with expertise in the NMR area will be given preference. Teaching duties include graduate and undergraduate physical chemistry with some assignment in the general chemistry program likely. Candidates should supply a graduate transcript, curriculum vitae, résumé of future research plans, and have three letters of recommendation sent to: **Dr. Pierre Crabbe, Chairman, Department of Chemistry, University of Missouri, Columbia, Missouri 65211, before 31 January 1980. An Affirmative Action/Equal Opportunity Employer.**

POSITIONS OPEN

ELECTRON MICROSCOPIST-CELL BIOLOGIST. Position open immediately for a research associate, Georgetown University, Schools of Medicine and Dentistry. We seek a Ph.D. or equivalent with proven research capabilities to collaborate on problems related to immediate hypersensitivity and host defense mechanisms. Applicants must be capable of innovative and independent research, have a strong background in electron microscopy and cell biology, and have interests in immunology and biochemistry. Academic appointment, salary, and technical support will be commensurate with the qualifications of the applicant. Please send letters of application, curriculum vitae, representative reprints, and three professional letters of recommendation to:

**John Gerin, Ph.D.
Georgetown University
Division of Molecular Virology and Immunology
5640 Fishers Lane
Rockville, Md. 20852**

An Equal Opportunity/Affirmative Action Employer

ENTOMOLOGIST/TAXONOMIST. Tenure-track assistant or associate professor position open 1 July 1980. Curator of department's insect collection; teach graduate courses in taxonomy, morphology, principles of zoological systematics; research in insect order of choice. Submit résumé, transcripts, thesis summary, one set of reprints, and names of three references before 1 March 1980 to: **Dr. Kenneth L. Knight, Head, Department of Entomology, North Carolina State University, Raleigh, N.C. 27650.**

Equal Opportunity/Affirmative Action Employer

ENVIRONMENTAL PLANNING

The Division of Environmental and Scientific Studies, Johnson State College, Johnson, Vermont, invites applications for an **assistant/associate professorship** (tenure-track) in environmental planning. Applicant should have interests in rural planning and environments. Teaching requirement includes: introduction to environmental problems, cartography and demonstrations, demography, implementation strategies in planning, plus two or three courses in applicant's field of specialization. Ph.D. or AICP certificate required. Salary range for 9 months: \$13,500 to \$15,500, with liberal fringe benefits. Position available as early as January 1980. *Affirmative Action/Equal Opportunity Employer.*

Send résumé and letters of recommendation to:

**Dr. Robert Hinkle, Chairman
Department of Environmental Studies
Johnson State College
Johnson, Vermont 05656**

FACULTY POSITIONS (THREE) IN MICROBIOLOGY. The Genetics and Cell Biology Group in the Department of Microbiology, University of Alabama in Birmingham, has three vacancies for assistant professorships (tenure-track) for individuals with research expertise in one or more of the following areas: microbial physiology and biochemistry, genetic and biochemical aspects of pathogenicity of nonviral agents of dental or medical significance, and microbial and molecular genetics. Preference will be given to those who have strong credentials for and commitment to developing an independent research program working with prokaryotic or lower eukaryotic organisms and who have interest and aptitude for teaching graduate, medical, and dental students. Positions available during 1980. Salary commensurate with experience but not less than \$22,000 for a 12-month appointment. Send letter outlining current and future research interests, curriculum vitae, bibliography, and names and addresses of three references to: **Roy Curtiss III, Department of Microbiology, Box 11 SDB, The Medical Center, The University of Alabama in Birmingham, Birmingham, Ala. 35294. An Equal Opportunity/Affirmative Action Employer.**

FACULTY POSITION. Director of Graduate Studies in Department of Physical Therapy. Experience in administration, research interests, and clinical experience in the area of cardiopulmonary physical therapy. Adviser to graduate students and supervisor of clinical research projects. Major responsibility to graduate program; some involvement in baccalaureate program. Master's degree minimum; doctorate preferred. Salary negotiable. Contact: **Virginia C. Daniel, Chairman, Department of Physical Therapy, University of Health Sciences/Chicago Medical School, SRHS, Building 51, VA Medical Center, North Chicago, Illinois 60064. Affirmative Action/Equal Opportunity Employer.**

SENIOR TOXICOLOGIST

Established, northern New England multidisciplinary environmental consulting firm seeks experienced individual to manage and assist in development of environmental toxicological services. Position requires a Ph.D. in toxicology or a related field, plus a minimum of 3 years of experience. Familiarity with relevant regulatory requirements, proven management skills, and a willingness to accept increasing responsibility are a must.

We offer a competitive salary and fringe benefits and an excellent work environment in a semi-rural area only an hour from New Hampshire's lakes, mountains, seacoast, and from metropolitan Boston.

Send résumé and salary history to W. Bosworth.



Normandeau Associates, Inc.

25 Nashua Road
Bedford, N.H. 03102

An Equal Opportunity Employer, M/F

PROGRAM MANAGER/ DIRECTOR

The National Science Foundation, Division of Science Education Development and Research, is seeking qualified candidates who are interested in 1-, preferably 2-year assignments beginning mid-summer 1980 until 1982 for the following positions:

Program Director, Research in Science Education (RISE), (EMPB 80-6); \$34,713 to \$50,112.50 per annum. This program supports research projects dealing with the teaching and learning of science education. Applicants should have a Ph.D. or equivalent experience in a field of science or in science education with substantial experience of at least 6 years in research or development in science education. Some administrative experience is desirable. For further information contact: **Catherine Hobek at 202-632-4124.**

Program Manager, Development in Science Education (DISE) (EX 80-2); \$29,375 to \$45,126 per annum. This program supports the development of new courses, curricula, and methods of instructions in the sciences. Applicants should have a Ph.D. or equivalent experience in a field of science or in science education, and at least 3 years of experience in research or development in science education. Experience relevant to the participation of women, minority members, and/or the physically handicapped in science careers is desirable. For further information contact: **Bessie B. White at 202-632-4106.**

Salary is negotiable based on qualifications and experience within salary ranges shown above. Positions are excepted from the competitive civil service. Health and life insurance and leave benefits are available. Send résumé or SF-171 to: **National Science Foundation, DPM (to appropriate position announcement shown above), 1800 G Street, NW, Washington, D.C. 20550** by close of business 15 February 1980.

An Equal Opportunity Employer

POSITIONS OPEN

FACULTY POSITION IN BIOLOGICAL SCIENCES at the Hopkins Marine Station of Stanford University

Applications are invited for an appointment in the Department of Biological Sciences at Stanford University, to be resident at the Hopkins Marine Station in Pacific Grove, California. The position is without restriction as to rank, although some preference will be given to younger candidates. The position involves both teaching and research. The areas in which the Station wishes to expand its faculty include cellular, developmental, and neurobiology. All applications must include curriculum vitae, a statement of research interests, and a list of three people from whom letters of reference will be sought. Applications should reach: **C. S. Pittendrigh, Hopkins Marine Station, Pacific Grove, Calif. 93950** by 15 January 1980. *Stanford University is an Equal Opportunity Employer.*

FACULTY POSITIONS: Physics. With the award of a major grant from the McDonnell Aerospace Foundation, we anticipate filling several faculty positions in the Department of Physics. We are, therefore, seeking applications from experimentalists and theoreticians in the general field of astrophysics and hope to make initial appointments for fall 1980. Appointments will be at senior or junior rank, depending on experience. For assistant professorships, preference will be given to candidates who have had at least 2 years of postdoctoral experience. A brochure describing activities of the McDonnell Center is available upon request. Inquiries and applications, including names of at least three referees, should be addressed to: **Professor M. W. Friedlander, Department of Physics, McDonnell Center for the Space Sciences, Washington University, St. Louis, Mo. 63130.** *Washington University is an Equal Opportunity/Affirmative Action Employer.*

FACULTY POSITION—Biochemist/neurochemist. The University of Alabama in Birmingham invites applications from qualified biochemists for appointment at the assistant professor level in the Department of Psychiatry, carrying membership in the Neurosciences Program. Requirements include work primarily on the one-carton cycle in cell regulation with particular emphasis on enzymology in relation to schizophrenia and cancer research. The university carries on an active collaborative program in biological psychiatry research and neuroscience. Applications should include curriculum vitae, selected reprints, and three references with addresses and telephone numbers. Application and inquiries should be sent to:

Dr. John R. Smythies
The Neurosciences Program
University of Alabama in Birmingham
Birmingham, Alabama 35294

Equal Opportunity/Affirmative Action Employer

FACULTY POSITIONS IN CHEMISTRY AND BIOCHEMISTRY

The Department of Chemistry at Atlanta University has a total of five tenure-track positions open in inorganic, organic, and biochemistry at the assistant, associate, and full professor levels. Candidates should have a productive research program or, if a recent graduate, postdoctoral experience. Successful candidates will be expected to teach at the graduate level and to develop a vigorous research effort in a new Ph.D. program. Candidates should submit curriculum vitae, concise description of current and proposed research, and names of three references by 15 January 1980. Submit materials to: **Dr. Frank E. Cummings, Department of Chemistry, Atlanta University, Atlanta, Georgia 30314.**

Atlanta University is an Equal Opportunity Employer.

TWO POSTDOCTORAL POSITIONS available 1 January 1980 for studies of gene structure and expression in hemoflagellate protozoa, including mutant isolation, genetic mapping, isolation of plasmids and viruses suitable for development as cloning vectors, and the development of conditions for uptake and expression of DNA by hemoflagellate protozoa. Preference will be given to candidates with training in microbial genetics and/or molecular genetics. One-year appointments with the possibility of renewal. Salary: \$13,300. Please send résumé, reprints, and three letters of recommendation to: **Dr. Larry Simpson or Dr. Dan S. Ray, Department of Biology and the Molecular Biology Institute, University of California, Los Angeles, Los Angeles, California 90024.** *An Affirmative Action/Equal Opportunity Employer.*

POSITIONS OPEN

GENE RESEARCH WADLEY INSTITUTES OF MOLECULAR MEDICINE

Positions are available for research assistants, postdoctoral fellows, and senior scientists to study eukaryotic gene organization and regulation using genetic, biochemical, and genetic engineering techniques. Experience in molecular biology is preferred.

Wadley Institutes of Molecular Medicine is a non-profit research center which has played a prominent role in cancer research and is expanding with a new department of molecular genetics and genetic engineering. The Wadley Center, which is located approximately 3 miles from the University of Texas Health Science Center at Dallas, contains excellent research facilities and offers a stimulating environment for scientific growth. *Wadley is an Equal Opportunity Employer, M/F.*

Please send résumé, selected reprints, and at least three references to:

Dr. Arthur P. Bollon, Chairman
Department of Molecular Genetics
Director of Genetic Engineering
Wadley Institutes of Molecular Medicine
9000 Harry Hines Boulevard
Dallas, Texas 75235

GROSS ANATOMIST

Applications are invited for a gross anatomist. Applicants must have a Ph.D. degree and will be considered at the assistant professor level. Research interests in cell and molecular biology preferred. Please submit curriculum vitae and the names of three references to: **Dr. Marilyn L. Zimny, Chairman, Department of Anatomy, Louisiana State University Medical Center, 1542 Tulane Avenue, New Orleans, La. 70112.**

HEAD—DEPARTMENT OF BIOLOGY

Georgia Southern College, a 6800-student, comprehensive college of the University System of Georgia, invites nominations and applicants for position of head, Department of Biology, fall 1980. Sixteen resident departmental faculty; four adjunct faculty at Skidaway Institute of Oceanography; 180 majors; baccalaureate and master's degrees offered. Primary duties are administrative, but teaching or research also are required.

Please request three confidential letters of recommendation and send résumé and transcripts by 15 January to: **Dr. James H. Oliver, Chairman, Department Head Search Committee, Department of Biology, Georgia Southern College, Statesboro, Georgia 30458.**

An Equal Opportunity/Affirmative Action Employer

HISTOLOGY SUPERVISOR Ph.D. BIOLOGY (ANATOMIST)

Training and/or experience in histology. Histochemistry and electromicroscopy for Department of Pathology in university-affiliated, 900-bed hospital. Will participate in studies of human tumors and kidney biopsy and supervise four technicians. Opportunity for publications. Send résumé in confidence to:

Sidney Lazarus, M.D.
Chief of Pathology
Kingsbrook Jewish Medical Center
East 49th Street and Rutland Road
Brooklyn, N.Y. 11203

MEMBRANE BIOCHEMIST. A position as a postdoctoral research associate is available to study the biochemical regulation of cardiac sarcolemma and sarcoplasmic reticulum. Areas of investigation center on membrane transport ATPases (Na^+ , K^+ -ATPase and CA^{2+} -ATPase) and membrane-localized cyclic nucleotide and CA^{2+} -regulated protein kinases. Applicants must have a Ph.D. and research experience preferably in two of the following areas: purification and reconstitution of membrane proteins and enzymes, characterization of membrane transport ATPases and protein kinases, covalent labeling of membrane proteins, and spectroscopic methods for the study of macromolecular conformation. Salary commensurate with training and experience, according to the guidelines of Indiana University. Send curriculum vitae, list of publications, and names of three references to: **Dr. Larry R. Jones, Department of Pharmacology, Indiana University School of Medicine, 1100 West Michigan Street, Indianapolis, Indiana 46223.** *Indiana University is an Affirmative Action/Equal Opportunity Employer.*

POSITIONS OPEN

MICROBIAL PHYSIOLOGY AND ECOLOGY

Two postdoctoral positions, one in fungal metabolism of hydrocarbons, one in metabolism of organometals. Available 1 January 1980; \$12,500 per annum. Submit curriculum vitae and arrange for three letters of recommendation to be sent to: **Joseph J. Cooney, Head, Chesapeake Biological Laboratory, University of Maryland, Solomons, Maryland 20688.**

MICROBIOLOGY, GENETICS, BIOCHEMISTRY

Applications are being invited to fill one and possibly two positions at the assistant professor level effective 1 September 1980. Salary negotiable. The successful candidate(s) will be expected to show competency in teaching in at least two of the above areas at the undergraduate level. Ph.D. required. Applicants should send curriculum vitae, transcripts, and names of three references by 31 December 1979 to: **Dr. Aubrey Thomas, Chairman, Biology Department, Merrimack College, North Andover, Mass. 01845.**

Equal Opportunity Employer

MICROPUNCTURE RENAL PHYSIOLOGIST at assistant or associate professor level. Duties and responsibilities: teaching of physiology to medical and graduate students and postdoctoral fellows. Teaching will involve areas of micropuncture renal physiology and cardiovascular physiology. The individual will be expected to devote a substantial amount of time to research in renal physiology by use of micropuncture techniques and will be expected to apply for and obtain NIH or NSF grants to support research program. Special qualifications: Candidates must have extensive training in micropuncture physiology. Send curriculum vitae and names of three people who will support the application to: **Dr. James O. Davis, Department of Physiology, University of Missouri-Columbia, School of Medicine, Columbia, Mo. 65212.** *An Affirmative Action/Equal Opportunity Employer.*

NEURO-ONCOLOGY: POSTDOCTORAL RESEARCH ASSOCIATES (TWO)

Positions available for interdisciplinary training in cancer research with a team of engineers, physiologists, and physicians. Research involves CNS evaluation of microwave-induced focal hyperthermia, alone and in conjunction with ionizing radiation and chemotherapy both in vivo and in vitro. One position is for an individual with training and experience in neurophysiology and mammalian stereotaxic surgery. The other position is for an individual with training and experience in biochemistry/neurochemistry. Preference will be given to candidates with an undergraduate background in a physical science or engineering. Support is available for up to 3 years (\$11,000 to \$15,000). Applicants with a recent doctorate in a biomedical science should send résumé and letters of reference to: **Dr. George M. Samaras, Neuro-Oncology Research Laboratories, Department of Radiation Therapy, University of Maryland School of Medicine, 10 South Pine Street, Baltimore, Maryland 21201.** *An Equal Opportunity/Affirmative Action Employer.*

NEUROPHYSIOLOGISTS DEPARTMENT OF PHYSIOLOGY UNIVERSITY OF PITTSBURGH SCHOOL OF MEDICINE

The newly formed Division of Neurophysiology seeks applications and nominations for faculty positions in this general field. Candidates must have completed postdoctoral training, be prepared to initiate an independent research program, and participate in a one-trimester interdisciplinary neuroscience course. Appointments at the assistant professor level preferred, but appointments for qualified individuals at more senior levels will also be considered.

Please send curriculum vitae, brief descriptions of projected research program, and three letters of reference to: **Dr. J. Byrne, Chairman, Neurophysiology Search Committee, Department of Physiology, University of Pittsburgh, School of Medicine, Pittsburgh, Pa. 15261.**

An Equal Opportunity/Affirmative Action Employer

POSITIONS OPEN

NUTRITION FACULTY POSITION. The Department of Food and Nutrition, Iowa State University, invites applications for a 12-month, tenure-track position at the assistant, associate, or full professor level. A Ph.D. degree in nutrition or related field is necessary; experience in graduate education and evidence of research ability and productivity are desirable. Major responsibilities will include teaching nutrition courses at both undergraduate and graduate level; supervising graduate student research; conducting research and actively seeking research funds; academic advising and committee work. Position available 1 July 1980; application deadline: 30 January 1980 or until position is filled. Send letter of application to: **Dr. Pilar A. Garcia, Chair, Search Committee, Department of Food and Nutrition, 34A MacKay Hall, Iowa State University, Ames, Iowa 50011.** A nondiscriminatory, Affirmative Action Employer.

PEPTIDE CHEMIST

Ph.D. with at least 4 years of experience in the manufacture of biologically active peptides and amino acid derivative reagents. Applicants should have comprehensive knowledge of solid phase and classical production techniques. Superior salary and excellent benefits. Send résumé in confidence to:

United States Biochemical Corporation
P.O. Box 22400
Cleveland, Ohio 44122

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PHARMACOLOGIST-PHYSIOLOGIST. Ph.D. with evidence of postdoctoral teaching/research in areas of organ systems, pharmacology and/or physiology. Undergraduate teaching in human physiology and/or pharmacology. Tenure-track position; 1-month appointment with 1-month vacation; rank/salary commensurate with qualifications. Pharmacy baccalaureate desirable. *Equal Opportunity Employer.* Send curriculum vitae, publications list, and names of three references to: **Dr. K. K. Knapp, Physiology-Pharmacology Unit, School of Pharmacy, University of the Pacific, Stockton, California 95211.** Applications accepted until 15 February 1980.

PHARMACOLOGIST. Assistant/associate professor to teach pharmacology to student dentists and postdoctoral dentists with 50 percent time for research. Major interest in analgesics and anesthetics preferred. Send curriculum vitae and three letters of reference to: **Dr. W. L. Mealiea, Jr., Department of Basic Dental Science, Box J-424, J. Hillis Miller Health Center, Gainesville, Florida 32610.** An Equal Opportunity/Affirmative Action Employer.

PHYSICAL OCEANOGRAPHY PROGRAM COORDINATOR

Applications and/or nominations are now being received for the position of Physical Oceanography Program Coordinator, College of Marine Studies, University of Delaware. This individual will play the key role in directing and developing the physical oceanography program. The individual must be committed to the highest quality of academic excellence and research as well as being capable of developing interdisciplinary programs. This is a tenured or tenure-track position with salary and rank compatible with experience. Contact: **Dr. Jin Wu, Chairman, Search Committee, College of Marine Studies, University of Delaware, Newark, Del. 19711.** The University of Delaware is an Equal Opportunity Employer which encourages applications from qualified minority groups and women.

The Institute for Physical Science and Technology of the University of Maryland, College Park, invites applications for a tenure-track appointment in experimental aspects of either statistical physics or plasma physics. Preference will be given to those applicants who offer greatest promise of close interaction with the institute's strong theoretical groups in these areas. Within statistical physics our principal interests focus on nonequilibrium process fluids, such as nonlinear phenomena, hydrodynamic instabilities, fluctuations, and so forth. Within plasma physics, our principal interests focus on the physics of waves and instabilities in space plasma, Q-machine studies of waves and instabilities, or optical plasma diagnostics in the ultraviolet. A detailed résumé and list of references should be sent to: **Professor Joseph Silverman, Institute for Physical Science and Technology, Space Science Building, University of Maryland, College Park, Maryland 20742.** The University of Maryland is an Affirmative Action/Equal Opportunity Employer.

30 NOVEMBER 1979

SCIENTISTS

BIOCHEMICAL R & D

Ortho Instruments has several research positions available for experienced Scientists. A Ph.D. is preferred, but equivalent experience will be considered.

POLYMER CHEMIST

Requires extensive experience in emulsification polymerization and/or micro-encapsulation with a thorough understanding of basic polymer chemistry. Must be familiar with seed polymerization, surfactant and dye chemistry and biological compound encapsulation. Must have the ability to form synthetic polymers with hydrophilic characteristics. This position will be responsible for the development of particle standards.

HISTO/CYTO CHEMIST

We are seeking a background in cellular fine structure with experience in histochemical and cytochemical staining techniques. A thorough knowledge in the chemistry of fluorescent dyes, precipitant stains and immuno labeling techniques for cell identification is also desired. This position will be responsible for the development of cytological diagnostic procedures applicable to flow cytometry applications.

As a member of the respected Johnson & Johnson family of companies, Ortho Instruments employs high technology laser optics, digital and analog electronics, and microprocessor technology in the design of biomedical instrumentation. We research and market highly successful lines of hematology analyzers, cytofluorographs, and flow cytometry systems.

Our facilities are located in suburban Boston, convenient to all of the areas cultural, educational and recreation opportunities. We invite you to submit your resume to Mr. Robert S. King,



Ortho Instruments

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SCIENTIST

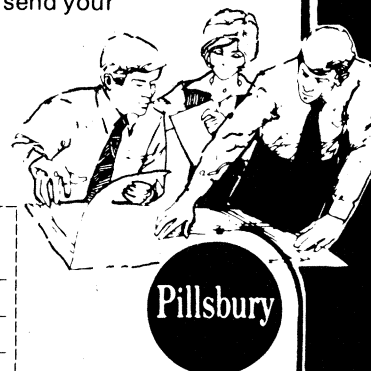
Apply Your Data Expertise to R&D

The Pillsbury Company has an immediate opening for a Scientist in R&D. Be responsible for scientific applications programming in support of R&D projects; support data management and administrative systems for R&D; and supervise the computational center. We require familiarity with FORTRAN programming, APL, and IBM equipment; 5 or more years applications programming in a research environment; and supervisory capability. A BS or MS is preferred.

The Pillsbury Company's continuous growth makes possible this career challenge. We also offer a competitive income and a range of generous benefits.

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I'm interested but I don't have a resume at this time.

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Address _____

City _____ State _____ Zip _____

Phone _____

POSITIONS OPEN

PLANT OR CROP PHYSIOLOGIST. Research position in sugarcane weed control with opportunity to participate in graduate program. Ph.D. with emphasis in plant physiology required. Rank and salary open. Position available 1 July 1980. Application deadline: 15 February 1980 or until suitable applicant identified. Send résumé to: **W. J. Martin, Head, Department of Plant Pathology and Crop Physiology, Louisiana State University, Baton Rouge, La. 70803.** *An Equal Opportunity/Affirmative Action Employer.*

PLANT MORPHOGENESIS

We are seeking applications for a position in our biology research group located in Richmond, California. The principal responsibility will be to investigate morphogenesis in cell cultures of major crop species. Cooperation and collaboration with our ongoing plant cell and tissue culture program will be expected. Applicants should have a Ph.D. in developmental botany, plant physiology, or related fields and should have research experience in *in vitro* morphogenesis. We offer a competitive salary and fringe benefits package, including relocation expenses. Applicants should send curriculum vitae, statement of research interests and experience, reprints, and the names of three referees by 15 January 1980 to: **James P. Baker, Personnel Manager, Stauffer Chemical Company, DeGuigne Technical Center, 1200 South 47 Street, Richmond, Calif. 94804.** *Stauffer Chemical Company is an Affirmative Action/Equal Opportunity Employer.*

PHYSICAL OCEANOGRAPHERS. Grant-supported positions available for two research associates for theoretical and experimental work on shelf processes. Ph.D. required. Both postdoctoral and senior applicants welcome. Submit applications with names of three referees before 15 December. Further details available. **Dr. Chris Garrett, Department of Oceanography, Dalhousie University, Halifax, Nova Scotia, Canada B3H 4J1.**

PHYSIOLOGIST. Teaching position at the assistant professor level with possibility of renewal. Ph.D. in physiology and demonstrated teaching proficiency required. Will be expected to conduct courses in physiological chemistry and human physiology. May begin January or August 1980. Send curriculum vitae, transcripts, and references to: **Dr. Grace E. Jacobs, Director of Basic Sciences, Northwestern College of Chiropractic, 1834 South Mississippi River Boulevard, St. Paul, Minnesota 55116.**

POLYMER SCIENCE/ BIOMEDICAL ENGINEERING UNIVERSITY OF FLORIDA

Tenure-track faculty appointment in Biomedical Polymer Research Program of leading Materials Science Department. Polymer and biopolymer emphasis is increasing to complement highly regarded metal and ceramic materials programs. Rank and salary commensurate with experience. Key role for further development of curriculum and for research on polymer and biomaterial surfaces. Seek person from university or industrial research with outstanding promise for surface science studies involving chemical and physical properties of polymer, tissue, and cell membrane interfaces with strong interests in fundamental property-structure relationships. Current studies deal with drug targeting, surgical materials, tissue properties, and new implant and medical device materials. *The University of Florida is an Equal Opportunity/Affirmative Action Employer.*

Please send résumé, including publications, references, and summary of future research goals, by 1 February 1980 to: **Dr. E. P. Goldberg, Department of Materials Science and Engineering, University of Florida, College of Engineering, Gainesville, Florida 32611.**

TOXICOLOGY SPECIALIST. (University of California) **DAVIS CAMPUS.** Provide expertise in dealing with problems of agriculture and the extension of educational programs in environmental, plant and livestock toxicology, and pollution. Subjects are natural toxicants (plants, heavy metals, mycotoxins), food additives, residues of pesticides in food, feed and fiber, livestock, and pesticide applications and/or residues which affect worker safety. Position requires a generalist. Ph.D. in pharmacology and toxicology and 2 years of experience are required. Contact: **Personnel Administrator, Cooperative Extension, University of California, Berkeley, Calif. 94720.** Closing date: 14 December 1979. Refer to No. 7902-Rev.

The University of California is an Affirmative Action Employer.

POSITIONS OPEN

STATE UNIVERSITY OF NEW YORK AT BUFFALO Department of Biological Sciences POPULATION GENETICIST

Beginning September 1980, a tenure-track position will be available in the Department of Biological Sciences at the assistant professor level in the area of population genetics. Applicants must have 2 to 3 years of postdoctoral experience in their area of expertise and be able to demonstrate the potential for setting up an independent research program and demonstrate the potential for superior teaching.

To apply, submit curriculum vitae, including bibliography, statement of research interests, teaching background, and have at least four referees send references directly to: **Dr. Om P. Bahl, Chairman, Department of Biological Sciences, State University of New York at Buffalo, 109 Cooke Hall, Amherst, N.Y. 14260.**

Application deadline: 15 December 1979.

State University of New York at Buffalo is an Equal Opportunity/Affirmative Action Employer.

POSTDOCTORATE—MICROBIOLOGY. Available February 1980 for 1 year. Ph.D. in microbiology or M.S. with considerable experience in aquatic microbiology. Problem entails cellulose degradation in a water purification system at Roswell, New Mexico. Submit inquiries with curriculum vitae and three letters of reference to: **Dr. W. C. Lindemann, Agronomy Department, Box 3Q, New Mexico State University, Las Cruces, N.M. 88003.** *An Equal Opportunity/Affirmative Action Employer.* Deadline for applications: 15 December 1979.

POSTDOCTORAL FELLOW. Position available in Immunology Research Unit beginning 1 July 1980. Research in immunologic aspects of occupational lung disease studying involvement of immunopharmacologic, environmental, and host factors. Send curriculum vitae, publications, and names of three references to: **Director of Training Program, Clinical Immunology Unit, Environmental Sciences Building, Tulane University Medical Center, 1700 Perdido Street, New Orleans, La. 70112.** *An Equal Opportunity Employer.*

POSTDOCTORAL FELLOWS

Two postdoctoral positions open for biochemically trained Ph.D.'s. General focus is on sugar and related vitamin (nicotinamide-thiamine) metabolism in mammalian cells in culture. The particular parameters involve (i) regulation of glucose transport; (ii) localization of membrane proteins as a function of carbon source; (iii) metabolic inhibition of enzymes of sugar metabolism accompanying co-utilization of sugars; and (iv) *in vivo* effects of dietary sugars on tumor growth in mice. Starting dates: 1 July 1980 and 1 October 1980. Application deadline: 1 February 1980. Send curriculum vitae, summary of past research, and letters of reference to: **Dr. Harold Amos, Department of Microbiology and Molecular Genetics, Harvard Medical School, Boston, Mass. 02115.** *Harvard University is an Equal Opportunity/Affirmative Action Employer.*

POSTDOCTORAL NIH FELLOWSHIP (immediate opening) to study nutrition and behavior with emphasis on basic research in metabolic controls of food intake in laboratory animals. Candidates should have prior training in nutrition and/or psychology. Please send résumé and three names of references to: **Dr. Judith S. Stern, Department of Nutrition, University of California, Davis, Calif. 95616.** Telephone: 916-752-6575/6650. *An Equal Opportunity/Affirmative Action Employer.*

POSTDOCTORAL POSITIONS available 1 July 1980 to study (i) structural organization of lipogenic enzyme complexes, (ii) purification and characterization of enzymes of carotene biosynthesis, and (iii) hormonal regulation (short- and long-term) of fatty acid and cholesterol-synthesizing enzymes. Send résumé and two letters of recommendation to: **Dr. John Porter, Department of Physiological Chemistry, University of Wisconsin, Madison, Wis. 53706.**

POSTDOCTORAL POSITIONS available in biochemistry and immunology. Study of carbohydrate and metal ion interactions with lectins using NMR spectroscopy. Investigation of hapten-antibody interactions using NMR techniques and immunological methods including cell fusion studies to produce monoclonal antibodies. Send curriculum vitae to: **Dr. C. F. Brewer, Department of Molecular Pharmacology, Albert Einstein College of Medicine, Bronx, New York 10461.**

POSITIONS OPEN

POSTDOCTORAL POSITIONS available immediately to study biochemical pharmacology, drug metabolism, and chemical mutagenesis. Send curriculum vitae and names of three references to: **Personnel Manpower Division, Department of Pharmacology, Uniformed Services University of the Health Sciences, 4301 Jones Bridge Road, Bethesda, Maryland 20014.** *An Equal Opportunity/Affirmative Action Employer.*

POSTDOCTORAL POSITION, available immediately, in protein chemistry, enzyme mechanisms, and affinity labeling of purine nucleotide sites. Recent Ph.D. in biochemistry. Apply with curriculum vitae and three references to: **Dr. Roberta F. Colman, Chemistry Department, University of Delaware, Newark, Delaware 19711.** *The University of Delaware is an Equal Opportunity Employer which encourages applications from qualified minority groups and women.*

POSTDOCTORAL POSITION AVAILABLE in lipid-protein interactions and lipoprotein structure. Electron microscopic, ultracentrifugal, and electrophoretic aspects of the problem as well as relevant biological and medical considerations are of interest. **Professor Rudy Haschemeyer, Department of Biochemistry, Cornell University Medical College, 1300 York Avenue, New York, N.Y. 10021.**

POSTDOCTORAL POSITIONS for research in protein structure and biological function available from the summer of 1980. Send inquiries to: **F. Wold, Department of Biochemistry, University of Minnesota, 1479 Gortner Avenue, St. Paul, Minn. 55108.** *An Equal Opportunity/Affirmative Action Employer.*

POSTDOCTORAL POSITION available 1 January 1980. For study of sugar transport across plasma membrane of internally perfused single giant muscle fibers. Salary: \$13,380 plus fringe benefits. Send curriculum vitae and names of three references by 12 December 1979 to: **Dr. Stanley Spangler, Department of Physiology and Biophysics, University of Alabama in Birmingham, University Station, Birmingham, Alabama 35294.** *The University of Alabama is an Equal Opportunity/Affirmative Action Employer.*

POSTDOCTORAL POSITION. Available immediately. Research in cardiovascular disease, especially hypertension. Background in histology and histochemistry and/or biochemistry, desired. Stipend dependent upon experience and qualifications. Contact: **Dr. W. E. Haensly, Department of Veterinary Anatomy, Texas A & M University, College Station, Texas 77843; telephone: 713-845-2828.**

POSTDOCTORAL POSITIONS. Two openings available: (i) biochemist with interest in toxin purification and characterization and (ii) immunologist with interest in development of new assay techniques for toxins and in production of specific antibody fractions in large quantity. Positions are for 1 year with renewal for second year, dependent on mutual agreement. Salary: minimum \$14,000. Send résumé to: **Dr. Joseph W. Burnett, Division of Dermatology, University of Maryland School of Medicine, 22 South Greene Street, Baltimore, Md. 21201.**

POSTDOCTORAL POSITIONS available immediately and in 1980-1981 in NIH training program in the physiology of exercise. Current support expires 30 June 1981; renewal to be submitted. Program designed to raise level of research accomplishment in cardiorespiratory disease research programs. Must have Ph.D. or M.D. Deadline for applications is 20 January 1980. Send résumé and names of three persons who can write a letter of recommendation to: **Steven M. Horvath, Institute of Environmental Stress, University of California, Santa Barbara, Calif. 93106.** *An Affirmative Action Employer.*

POSTDOCTORAL POSITIONS. The Division of Gastroenterology at the University of Texas Health Science Center at Houston is seeking qualified candidates for postdoctoral research. One candidate with a degree in biochemistry and one candidate with a degree in physiology are needed. The research would be in two areas: bile acid metabolism and steroid hormone research. Stipend range: \$12,000 to \$14,000. For further information, write: **Roger Lester, M.D., University of Texas Health Science Center at Houston, P.O. Box 20708, Houston, Texas 77025.** *An Equal Opportunity Employer.*

POSTDOCTORAL RESEARCH AWARDS
Sponsored by the
BALLISTIC RESEARCH LABORATORY
in association with
THE NATIONAL RESEARCH COUNCIL

The National Research Council will make awards in 1980 for research under the Resident Associateship Program which provides awardees with opportunities to conduct experimental and theoretical research as visiting scientists and engineers in fields of:

Applied Computer Sciences
Applied Mathematics
Combustion Research
Continuum Mechanics
Fluid Mechanics
Materials Sciences
Nuclear and Radiation Physics
Physical Chemistry
Probability Theory and Stochastic Processes
Quantum Chemistry

in the laboratory complex located at the head of the beautiful Chesapeake Bay country of Maryland, within easy driving distance of the metropolitan centers of Philadelphia, Baltimore, and Washington, D.C.

Some programs are open to senior investigators as well as recent doctorates. Further details on research programs can be obtained from: **Dr. L. J. Puckett, Ballistic Research Laboratory, Aberdeen Proving Ground, Md. 21005; telephone: 301-278-2236.**

For application materials and details on specific research opportunities, write promptly, giving research areas of interest, to:

**Associateship Office (JH 608-H2)
NATIONAL RESEARCH COUNCIL
2101 Constitution Avenue, NW
Washington, D.C. 20418**

Postmark deadline for application is 15 January.

DIRECTOR OF BIOLOGICAL RESEARCH (CANADA)

The Canadian affiliate of Merck & Co. Inc.'s world-wide research organization has a challenging senior research position available as Director of Biological Research in Canada. This position reports to the Canadian Executive Director of Research, and is responsible for the effort of a team of approximately 25 scientists involved in CNS and respiratory research.

The ideal candidate we are seeking will have a Ph.D. degree in the biological sciences, 10-15 years industrial or university research experience and a proven record of scientific achievement and recognition. Additionally, the candidate will possess strong leadership and communication skills and a demonstrated ability for creative thinking.

This senior research position offers an exceptional opportunity for growth and development within one of the most progressive industrial research organizations in the health care field in Canada. Excellent salary and full range of employee benefits.

Our research laboratories are located in modern facilities in Kirkland, Quebec, a suburb 15 miles from downtown Montreal.

Please send a curriculum vitae, a list of publications and the names of three references to:

**THE EMPLOYMENT MANAGER
MERCK FROSST LABORATORIES
P.O. BOX 1005
POINTE CLAIRE-DORVAL, QUEBEC
CANADA
H9R 4P8**



Laboratoires Merck Frosst Laboratories

**FACULTY POSITIONS OPEN
COLLEGE OF AGRICULTURAL
SCIENCES AND FOODS
KING FAISAL UNIVERSITY
HOFUF, SAUDI ARABIA
Academic Year 1980-1981**

The expanding College of Agricultural Sciences and Foods of King Faisal University invites inquiries from qualified applicants for the 1980-1981 academic year in the following fields: Agronomy, Horticulture, Beekeeping, Poultry Science, Biology, Chemistry, Physics, Botany, Biochemistry, Agricultural Extension, Plant Pathology, Agricultural Economics, Animal Science, Animal Ecology, Dairy Science, Agricultural Engineering, and Water Resources and Climatology.

PREREQUISITES: Master's or equivalent degree; practical and/or teaching experience. Knowledge of Arabic is helpful but not required. Language of instruction is English. Positions available September 1980; interviews scheduled with the dean in Houston, London, and Ottawa in April/May 1980.

SALARY RANGES: Approximate annual U.S. equivalent: professor, \$25,469 to \$33,965; associate professor, \$22,779 to \$28,973; assistant professor, \$18,570 to \$27,487; and lecturer, \$11,611 to \$16,035. Salaries are paid monthly in Saudi riyals. Substantial increase in these salaries is being considered for 1980-1981.

BENEFITS: Free, furnished accommodations; substantial educational allowance for up to four children. Air tickets to and from Saudi Arabia once per year for family of four. Sixty-day paid summer holiday; yearly bonus; overweight allowance. No Saudi income tax. Contracts are for 1 year and are renewable.

Send curriculum vitae with current telephone number and the names, addresses, and telephone numbers of three references to:

**Dr. Hussein M. Elarosi
Dean, College of Agricultural Sciences and Foods
King Faisal University**

c/o Saudi Arabian Educational Mission, 2221 West Loop South, Houston, Texas 77027;

OR

c/o P.O. Box 2, Sudbury-on-Thames, Middlesex TW16 5JP England.

CHIEF PREVENTION, EDUCATION, AND MANPOWER BRANCH Division of Lung Diseases

The National Heart, Lung, and Blood Institute is seeking applicants for the position of Chief, Prevention, Education, and Manpower Branch of the Institute's Division of Lung Diseases. The Prevention, Education, and Manpower Branch is responsible for design and management of programs which facilitate or implement the transfer of knowledge gained through research and development in the program area into clinical practice through educational measures, demonstrations, control programs, and planning and directing a program for the development of manpower trained in research pursuits.

Applicants must have a broad knowledge in one of the following fields: education, epidemiology, public health or preventive medicine, and have experience in administering, supervising, and performing scientific work in programs supported by grants-in-aid and by contract research. Applicants must have as a minimum, an M.D., or formal training through the Ph.D. or its equivalent. Additionally, the applicant must show evidence of having ability in program planning.

Salary range GS-14 to GS-15, dependent upon qualifications. Interested persons should submit curriculum vitae, bibliography, and a completed form SF-171 (Personal Qualifications Statement) by February 11, 1980 to Mr. Herb Jones, NHLBI Personnel Office, NATIONAL INSTITUTES OF HEALTH, Public Health Service, 9000 Rockville Pike, Building 31, Room 5A-32, Bethesda, Maryland 20205. For additional information please call (301) 496-6477. Equal Opportunity Employer.

NATIONAL INSTITUTES OF HEALTH

POSITIONS OPEN

POSTDOCTORAL POSITION for person with training in isolation of protoplast and/or chloroplast from terrestrial plants for use in electron transport and phosphorylation studies. Research is aimed at analyzing high-temperature inhibition of photosynthesis, thus some experience with measuring whole plant photosynthesis is desired. Job open: 1 March 1980. Salary: \$12,000 per year. Reply with résumé and three letters of recommendation to: **Dr. George J. Williams and Dr. Ernesto G. Uribe, Department of Botany, Washington State University, Pullman, Washington 99164.** We encourage minority, women, handicapped, Vietnam era and disabled veterans, and/or aged persons to apply and identify themselves on their applications.

POSTDOCTORAL RESEARCH SPECIALIST POSITION available immediately to work with a multidisciplinary group studying mercury toxicology. Individual should have training in heavy metal biochemical or biophysical analytical techniques. Candidates with experience in epidemiology will also be considered. Salary to \$14,000. Please send curriculum vitae and references to: **Dr. Irving M. Shapiro, Department of Biochemistry, School of Dental Medicine, University of Pennsylvania, Philadelphia, Pa. 19104.** An Equal Opportunity/Affirmative Action Employer.

POSTDOCTORAL RESEARCH ASSOCIATE position available 1 January to participate in interdisciplinary study of synaptic plasticity initiated by experimental brain damage. Recent Ph.D. and training in electrophysiological techniques are essential. Send curriculum vitae and at least two reference names to: **Dr. J. Victor Nadler, Department of Pharmacology, Duke University Medical Center, Durham, North Carolina 27710.**

Duke University is an Affirmative Action/Equal Opportunity Employer.

POSTDOCTORAL RESEARCH ASSOCIATE, recent assistant professor or research associate professor, for position in the laboratory of neurobiology in the Department of Neurology. Available December 1979. Ph.D. or D.V.M. in virology or microbiology with strong background in electron microscopy, cell tissue culture techniques and/or molecular biology of viruses. Opportunity to work on basic neurobiological problems with other neuroscientists. Competitive salary; excellent facilities. Interested applicants should submit curriculum vitae with bibliography and three letters of reference to: **T. S. Elizan, M.D., Department of Neurology, THE MOUNT SINAI SCHOOL OF MEDICINE, One Gustave L. Levy Place, New York, N.Y. 10029.** An Equal Opportunity Employer.

ST. THOMAS' HOSPITAL LONDON, ENGLAND

POSTDOCTORAL RESEARCH FELLOW £5805 to £6252

To work for 3 years from April 1980 in the Vision Research Unit of the Rayne Institute, on neurochemical transmission in the mammalian retina.

Please write, giving full curriculum vitae and names and addresses of two referees, to: **Dr. H. Ikeda, Head of Vision Research Unit, The Rayne Institute, St. Thomas' Hospital, London, SE1 7EH England.**

RESEARCH ASSOCIATE

A 3-year position is available immediately for a Ph.D. biochemist or molecular biologist to pursue research on the purification and characterization of sperm enzymes. Special consideration will be given to applicants with experience in proteinase chemistry. Salary commensurate with relevant research experience. Send curriculum vitae and names of two references to: **Dr. L. J. D. Zaneveld, Department of Physiology and Biophysics, University of Illinois Medical Center, P.O. Box 6998, Chicago, Ill. 60680.**

The University of Illinois is an Equal Opportunity/Affirmative Action Employer and encourages applications from women and minorities.

SOMATIC CELL GENETICIST

An assistant professorship is available for a somatic cell geneticist (M.D. or Ph.D.) with demonstrated experience in research and clinical cytogenetics. Send curriculum vitae and letter of inquiry by 1 March 1980 to:

**Dr. Jean Priest
Post Office Drawer AM
Medical Genetics
Emory University
Atlanta, Georgia 30322
Telephone: 404-329-5840**

POSITIONS OPEN

VANDERBILT UNIVERSITY SCHOOL OF MEDICINE

POSTDOCTORAL RESEARCH TRAINEE POSITIONS are available in the Biochemistry Department for studies of molecular mechanisms in cancer. Qualified candidates are sought for research on the biochemistry of cellular membranes, glycopeptides, and glycoproteins. Additional areas of faculty expertise include molecular endocrinology, regulation of growth initiation, growth factors, and biochemistry of chromatin and its constituents. Only U.S. citizens or permanent residents will be considered. Salaries conform to the DHEW scale. Send résumé and three letters of reference to: **Dr. Lubomir S. Hnilica, Department of Biochemistry, Vanderbilt University School of Medicine, Nashville, Tennessee 37232.** Vanderbilt University is an Affirmative Action/Equal Opportunity Employer.

The University of California at Davis invites applicants for the position of **PROFESSOR AND CHAIR**, Department of Internal Medicine. Applicants should have distinguished records in investigation, teaching, clinical service, and should have proven ability and experience in administration. Must be able to provide leadership for a large and diverse faculty of ten sections operating in a university hospital with VA and community hospital affiliations. Individuals should be licensable in California. Applications will be received until position is filled. Send curriculum vitae and bibliography, plus names of at least four references, to: **Hamilton S. Davis, M.D., Chair, Search Committee, c/o Department of Anesthesiology, TB 170, University of California, Davis, Calif. 95616.** An Equal Opportunity/Affirmative Action Employer.

DEPARTMENT OF ANESTHESIOLOGY WASHINGTON UNIVERSITY SCHOOL OF MEDICINE (BARNES HOSPITAL, ST. LOUIS)

Searching for **PROFESSOR AND HEAD** of Department of Anesthesiology at Washington University School of Medicine and **ANESTHESIOLOGIST-IN-CHIEF** at Barnes Hospital. Research accomplishments particularly important. Submit curriculum vitae with complete bibliography to:

**M. K. King, Dean
Washington University School of Medicine
Box 8106
660 South Euclid Avenue
St. Louis, Missouri 63110**

PROFESSOR/ASSOCIATE PROFESSOR IN PHYSIOLOGICAL/COMPARATIVE PSYCHOLOGY. The Department of Psychology at the University of Florida seeks a faculty member with an active research program, teaching capabilities in the physiological/comparative area, and strong interests in interacting with other members of our active and extensive neurobiological science community. The position is available immediately; salary is highly competitive. Applicants should send curriculum vitae, a summary of research plans, and three letters of reference to: **Dr. Carol Van Hartesveldt, Psychology Department, University of Florida, Gainesville, Florida 32611.** An Equal Opportunity/Affirmative Action Employer.

RESEARCH SCIENTISTS BIOLOGICAL SCIENCES

The Life Sciences Division of IIT Research Institute, a not-for-profit Chicago-based research organization, has several staff positions for biologists. Requisite are Ph.D. in physiology, toxicology, nutrition, or experimental pathology. Preference will be given to candidates with postdoctoral research experience and interest in long-term toxicity, carcinogenicity bioassay, and carcinogenesis studies in rodents. Opportunity is available to develop independent research projects in own field of expertise. Salary commensurate with experience and qualifications.

Please submit résumés, including salary history, to:

**L. Amft
Professional Staffing
IIT RESEARCH INSTITUTE
10 West 35 Street
Chicago, Ill. 60616**

IIT Research Institute is an Equal Opportunity/Affirmative Action Employer and encourages applications from women and members of minority groups.

POSITIONS OPEN

PHYSIOLOGIST. Research associate (Ph.D. or equivalent) to join group studying control of blood pressure by arterial baroreceptors. Experience in physiological recording procedures necessary. Knowledge of mathematics and computer techniques desirable. Position available early 1980. Salary dependent on qualifications. Grant support guaranteed for 2 years with possibility of extension. Send curriculum vitae and names of three references before 1 January 1980 to: **Dr. Allen M. Scher, Department of Physiology and Biophysics, SJ-40, University of Washington, Seattle, Wash. 98195.** University of Washington is an Equal Opportunity/Affirmative Action Employer.

PROGRAM DIRECTOR (AERONOMY)

\$34,713 to \$45,126 per annum

The National Science Foundation, Division of Atmospheric Sciences, is seeking qualified candidates for a 1- or 2-year appointment as program director for aeronomy beginning midsummer 1980. Responsibilities include directing program activities including allocation of resources, establishing overall goals and objectives, evaluating proposals, preparing recommendations for grants, and monitoring the progress of funded projects. Salary is negotiable based on qualifications and experience within above salary range. Position is excepted from the competitive civil service. Health and life insurance and leave benefits are available. Candidates should have a Ph.D. or its equivalent in physics/chemistry of the upper atmosphere and have in addition at least 5 years of research experience. Send résumé to: **National Science Foundation, DPM, EMPB 80-2, 1800 G Street, NW, Washington, D.C. 20550** by 31 December 1979. For further information, telephone: **Catherine Hobek at 202-632-4124.**

RESEARCH ASSOCIATE POSITIONS open immediately in the fields of molecular biology, cellular and molecular immunology. Please send résumé and a list of three references to: **Search Committee, Department of Microbiology and Immunology, University of Illinois at the Medical Center, 836 South Wolcott Street, Chicago, Ill. 60612.**

RESEARCH ASSOCIATE position available for Ph.D. in biochemistry, cellular or molecular biology, virology, and related areas of specialization. Research involves the study of molecular basis of antiviral and antiproliferative activity of human interferon [see for references: *Cell* 17, 255-264 (1979)]. Salary commensurate with experience and competitive with postdoctoral fellowships. Send curriculum vitae and names of references to: **Dr. Corrado Baglioni, Department of Biological Sciences, State University of New York at Albany, Albany, N.Y. 12222.** An Affirmative Action/Equal Opportunity Employer. Applications from women, minorities, and the handicapped are especially welcome.

RESEARCH ASSOCIATE/POSTDOCTORAL FELLOW—Background in physiological psychology or behavioral pharmacology to work on behavioral and neuropharmacological aspects of alcohol. Knowledge and/or experience with catecholamines, alcohol, and especially behavioral techniques. Ph.D. required. Send résumé to: **Center of Alcohol Studies, Busch Campus, Rutgers University, New Brunswick, N.J. 08903.** An Affirmative Action/Equal Opportunity Employer.

SENIOR SCIENTIFIC PROGRAMMER

A Washington University research program in molecular modeling and graphics has a position available for a senior staff member to assist in the development of application software and support of a National Collaborative community. The community currently involves ten research groups who are using the MMS-X Computer Graphics System, developed by the Computer Systems Laboratory, for research on the structure and function of biologically important molecules.

Candidates should have a graduate research degree with experience in crystallographic computing and in the use of both high-performance graphics and minicomputer systems. The salary will depend on qualifications and experience. Applications should include a résumé and should be supported by letters of reference directed for the attention of:

**Dr. C. D. Barry
Director, MMS-X National
Collaborative Research Program
Computer Systems Laboratory
724 South Euclid Avenue
St. Louis, Mo. 63110**

Conference On The Chemistry and Physics of Coal Utilization

WEST VIRGINIA UNIVERSITY
JUNE 2-4, 1980

- Physics and chemistry phenomena of coal utilization.
- Chemistry and physics of coal.
- Possibilities for new science to improve technology.

INVITED LECTURES,
PANEL DISCUSSIONS,
CONTRIBUTIONS FROM
ATTENDEES.

PROGRAM COMMITTEE

B. R. Cooper (chairperson), C. Alexander, Jr., Y. Chen, A. Davis, W. A. Ellingson, J. Gethner, C. L. Herzenberg, W. D. Jackson, I. S. Jacobs, T. J. O'Brien, R. B. Oder, L. Petrakis, H. L. Retcofsky, P. C. Scott, P. G. Shewmon, M. Poutsma, M. Siskin, S. E. Stein, P. L. Walker, Jr., D. D. Whitehurst, W. H. Wiser, D. E. Woodmansee.

FOR FURTHER INFORMATION WRITE:

B. R. Cooper,
Department of Physics
WEST VIRGINIA UNIVERSITY
MORGANTOWN, WV 26506
OR Phone: W. E. Vehse at
(304)293-3422

Physical Chemist

PhD.

Challenging senior level research position with Merck Sharp & Dohme Research Laboratories. Broad ranging responsibilities include devising and performing chemical research on the physical chemistry of organic reactions and solving process chemistry problems, e.g., conformation, bonding, mechanism, etc.

Successful candidate will have a Ph.D (or equivalent), up to 3 years related research experience and thorough working knowledge of organic chemistry. Demonstrated communication skills a plus.

Merck is located on a campus like setting 25 miles from New York City. For further information, please reply in confidence to Susan R. Jenkins,



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P.O. Box 2000, Rahway, NJ 07065

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SOCIAL AND BEHAVIORAL SCIENTISTS

The Research Division of the Boys Town Center for the Study of Youth Development (Omaha, Nebraska) is seeking social and behavioral scientists to design and conduct research programs on issues and problems related to the personal and social development of youth (roughly the years from 10 to 20) and the family. We seek scientists already experienced in youth and family research at a range of levels comparable to that from advanced assistant professor to full professor.

In choosing from among candidates of equal excellence, we will favor proposed research in the following areas: alcohol and drug abuse, delinquency, family crises, learning disabilities, and other problem behaviors; the delivery and evaluation of services to youth and their families; and the juvenile justice system. However, applications will be accepted from candidates interested in any set of issues or problems related to youth development, including studies of normal youth and their families and of the childhood antecedents or adult outcomes of youth development.

The Boys Town Center is a privately-funded research organization for studying youth development in an interdisciplinary environment that also features active dissemination and training. Although application for outside grants and contracts is encouraged, substantial core support of research is provided by the Center's budget. Supportive resources within the Center include a library services division, research computing division, and a residential conference center. Salaries are competitive and fringe benefits are comprehensive and attractive.

Persons wishing to apply should send vita, a general statement of research interests and objectives, and preprints or reprints of recent work to:

**Dr. John P. Hill, Chair
Research Recruitment Committee
The Boys Town Center
Boys Town NE 68010**

Candidates should arrange for three letters of recommendation to be sent as well. To ensure full consideration, materials should be received by January 1, 1980.

An Equal Opportunity/Affirmative Action Employer

Biochemist

research scientist

To the biochemist interested in a highly sophisticated research environment, Baxter Travenol, a leader in the medical care products field, offers challenging opportunity within our research department.

The professional we seek must have metabolic training and solid research background in a wide variety of biochemical and bioanalytical techniques and methods including GC and HPLC. Ideally this individual will possess a PhD in nutritional biochemistry or physiology plus 2-4 years post-doctoral work. Experience in animal experimentation is also very desirable.

In addition to becoming an integral member of our innovative research staff, the successful candidate can look forward to a competitive salary, comprehensive benefits and progressive professional advancement. For prompt consideration, send a resume complete with salary history in confidence to:

Bill Bartnick

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6301 Lincoln Ave.
Morton Grove, IL 60053

We are an Equal Opportunity Employer

POSITIONS OPEN

MELLON RESEARCH FELLOWSHIP IN REPRODUCTIVE BIOLOGY. Research positions available for candidates interested in pursuing investigations related to mechanisms of peptide and steroid hormone action on the ovary and testis, and neuroendocrine and anatomical basis of behavior, ovarian cyclicity, puberty, or seasonal anestrus. Preference will be given to candidates who have demonstrated exceptional research ability and have nearly completed postdoctoral training. Positions available for 1 to 3 years with salary based on qualifications. To apply, submit curriculum vitae, three letters of reference, and evidence of research potential to: **Program Coordinator, Reproductive Endocrinology Program, The University of Michigan, Ann Arbor, Mich. 48109.** *An Equal Opportunity/Affirmative Action Employer.*

VERTEBRATE PHYSIOLOGICAL ECOLOGIST

Permanent **ASSISTANT** or **ASSOCIATE PROFESSORSHIP** to be filled on or before 15 September 1980 (associate must be available by 31 March, 1980). The successful applicant will take charge of an introductory vertebrate zoology course, develop a graduate course in specialty, and participate in a physiology or ecology program. Candidates must show strong teaching and research potential. Ph.D. required. Send curriculum vitae and statement of teaching and research interests before 21 December 1979 to: **Dr. Jonathan N. Baskin, Chairman, Search Committee, Biological Sciences Department, California State Polytechnic University, Pomona, Pomona, California 91768.** *Cal Poly is an Affirmative Action/Equal Opportunity Employer.*

VETERINARY ANATOMY POSITIONS

The Department of Anatomy, Tufts University Schools of Medicine, Dental Medicine, and Veterinary Medicine, invites applications for tenure-track positions beginning July 1980. Applicants should possess the D.V.M. (or equivalent) and/or the Ph.D. in anatomy. The positions involve independent and collaborative research, as well as the teaching of such courses as veterinary gross anatomy (small or large animal), embryology, microscopic anatomy, or veterinary neuroanatomy at Tufts University School of Veterinary Medicine. Applicants for the assistant professor level should have at least 1 or 2 years of postdoctoral experience and show promise of developing an active and independent research program. Applicants for the associate professor or professor level must have an established research program and extensive teaching experience in veterinary anatomy. Current research areas in the department include: pulmonary cell biology, reproductive biology and neuroendocrinology, comparative immunology, mechanisms of hormone action, cell biology (especially secretory mechanisms), and the effects of aging and/or alcohol on the CNS. We also seek candidates involved in locomotor related research. Salary and rank are dependent upon qualifications and experience. Applicants are invited to submit curriculum vitae, names of three references, and a letter describing research and teaching interests to: **Dr. Karen Hitchcock, Chairman, Department of Anatomy, Tufts University Schools of Medicine, Dental Medicine, and Veterinary Medicine, 136 Harrison Avenue, Boston, Massachusetts 02111.** Deadline for receipt of applications is 10 February 1980.

Tufts University is an Equal Opportunity/Affirmative Action Employer.

VIROLOGIST. An expanding microbiology department is seeking applicants for a tenure-track position in the area of molecular and pathogenic virology. Applicants must have Ph.D. and appropriate postdoctoral training. Development of a strong research program will be expected. Send curriculum vitae and statement of interests, and have three letters of recommendation sent to: **Chairman, Search Committee, Department of Microbiology, University of Missouri-Columbia, School of Medicine, Columbia, Mo. 65212.** Deadline: 15 January 1980. *An Affirmative Action/Equal Opportunity Employer.*

ASSISTANTSHIPS

GRADUATE ASSISTANTSHIPS. The Division of Cell and Molecular Biology, Department of Biological Sciences, offers assistantships carrying a 12-month stipend of \$5000, plus tuition waiver. A firm grounding in chemistry, genetics, or biochemistry is desirable. Information and application forms may be obtained from: **Division of Cell and Molecular Biology, Department of Biological Sciences, State University of New York at Buffalo, Amherst, N.Y. 14260.**

TRAINING PROGRAM

POSTDOCTORAL RESEARCH TRAINING—Department of Pharmacology, The Mount Sinai School of Medicine of City University of New York, offers an NIDA-sponsored research training program in pharmacology of drug abuses. Opportunities exist for studies using biochemical, behavioral, molecular (including quantum chemical), neurophysiological, and histological techniques. Candidates must have an M.D., Ph.D., or equivalent before entering the program. Send curriculum vitae (including graduate transcript) and three letters of recommendation to: **Chairman, Training Program, Department of Pharmacology, THE MOUNT SINAI SCHOOL OF MEDICINE, One Gustave L. Levy Place, New York, N.Y. 10029.** *An Equal Opportunity Employer.*

FELLOWSHIPS

POSTDOCTORAL OR RESEARCH ASSOCIATE. Janice Gram Fellowship established for study of motor neuron disease. Position available January 1980 for M.D. or Ph.D. Neuron-neuron and neuron-glia relationships in vitro; emphasis on neuroendocrinology and receptor autoradiography. Background in neuroanatomy and/or neuroendocrinology preferred. Salary to \$15,000. Submit curriculum vitae and three references to: **Dr. L. P. Weiner, Department of Neurology, University of Southern California School of Medicine, 2025 Zonal Avenue, Los Angeles, California 90033.** *Equal Opportunity/Affirmative Action Employer.*

POSTDOCTORAL RESEARCH FELLOWSHIPS

**Simpson Memorial Research Institute
University of Michigan Medical School**

NIH training positions available July 1980, for M.D.'s or Ph.D.'s in broad field of hematology/oncology. Major research programs in: (i) immunology (macrophage/lymphocyte studies), (ii) leucocyte biochemistry, (iii) hematopoiesis, (iv) clinical and laboratory pharmacology, (v) tumor cell kinetics and biochemistry, (vi) gene expression in normal and malignant cells, (vii) corticosteroid receptor modulation in lymphoid cells, (viii) coagulation, (ix) platelet function and metabolism, (x) red cell biochemistry, (xi) hemoglobinopathies, and (xii) biochemical mechanisms of immunodeficiency states.

Applications should include curriculum vitae, two letters of recommendation, and indication of major research interests. Send application or letter of inquiry to: **Dr. Albert F. LoBuglio, Simpson Memorial Research Institute, University of Michigan, 102 Observatory Road, Ann Arbor, Mich. 48109.**

A nondiscriminatory, Affirmative Action Employer

The Department of Biochemistry at The University of Texas Health Science Center at San Antonio invites applications for **Graduate Teaching Assistantships** for fall 1980. The department has vigorous research programs that cover a wide range of biochemical areas leading to the Ph.D. degree and is well equipped for research. Stipends for a 12-month period begin at \$5400. For more information, write to: **Dr. Paul Horowitz, Department of Biochemistry, The University of Texas Health Science Center at San Antonio, San Antonio, Texas 78284.** *An Equal Opportunity/Affirmative Action Employer.*

Pre- and Postdoctoral Fellowships in Reproductive Endocrinology. One postdoctoral position is available immediately. Pre- and postdoctoral fellowships are also available for a summer 1980 starting date. Only U.S. citizens or holders of a permanent resident visa are eligible. For further information write or telephone:

**R. B. Billiar, Ph.D.
Department of Reproductive Biology
Case Western Reserve University
Cleveland, Ohio 44106
Telephone: 216-444-1693**

POSTDOCTORAL FELLOWSHIP POSITIONS IN CANCER ETIOLOGY AND TREATMENT. Available at the Medical College of Virginia, Virginia Commonwealth University. Training will include cellular pharmacokinetics, carcinogenesis, tumor immunotherapy, tumor virology, and molecular biology. Only U.S. citizens or foreign nationals with permanent residence or immigrant visas considered. Contact: **Dr. Page Morahan, Box 678-MCV Station, Richmond, Va. 23298.** *Affirmative Action/Equal Opportunity Employer.*

FELLOWSHIPS

POSTDOCTORAL FELLOWSHIPS available in a training program in molecular and cellular **IMMUNOLOGY** comprising clinical and preclinical departments of the Johns Hopkins Medical Institutions. These positions are open to individuals holding a Ph.D., M.D., or D.V.M. degree, and who are U.S. citizens or hold a permanent resident visa. Applicants should send their curriculum vitae to: **Immunology Postdoctoral Training Program, Department of Microbiology, The Johns Hopkins University School of Medicine, 725 North Wolfe Street, Baltimore, Md. 21205.**

GRADUATE FELLOWSHIPS IN PHARMACOLOGY (\$5040 per year) available to all qualified predoctoral students admitted to the Ph.D. Program in Pharmacology at the University of Alabama in Birmingham beginning September 1980. Research opportunities include: autonomic, biochemical, endocrine and cardiovascular pharmacology, carcinogenesis, and environmental toxicology. Apply by 1 March 1980 to: **Graduate Committee, Department of Pharmacology, University of Alabama in Birmingham, Birmingham, Alabama 35294.** *Women and minorities are encouraged to apply.*

POSTDOCTORAL FELLOWSHIP—Position available for research concerning receptors for chemotactic factors on leukocytes. Strong background in receptor research is essential. Stipend dependent on background. Send curriculum vitae and bibliography to: **Dr. R. Snyderman, Box 3892, Duke University Medical Center, Durham, N.C. 27710.**

POSTDOCTORAL FELLOWSHIP IN IMMUNOLOGY

Recent graduate to work on lymphocyte activation, macrophage function. Remuneration is \$12,200 per annum, renewable. The position is available immediately. For details contact: **Dr. J. Gordon, Department of Surgery, Division of Surgical Research, McGill University, Donner Building, 740 Docteur Penfield Avenue, Montreal, Quebec, Canada H3A 1A4; telephone: 514-392-4859.**

POSTDOCTORAL FELLOWSHIPS IN NEUROBIOLOGY—The Neurobiology Program, an interdepartmental grouping of faculty offering graduate and postdoctoral training in the neurosciences, has available immediately three postdoctoral training positions. These traineeships, supported by an NIH grant, are currently available for persons holding a Ph.D., M.D., or equivalent degree. Priority will be given to applicants with expressed interest in: (i) injury and regeneration of the nervous system; (ii) peptides active in the central nervous system; or (iii) metabolism and structure of synaptic junctions. Each of these research areas has attracted the efforts of a number of faculty members at this institution so that appropriate advanced-level multidisciplinary research training may be provided. Please contact: **Director, Neurobiology Program, 59 Medical Research Building-206H, University of North Carolina, Chapel Hill, N.C. 27514.**

Equal Opportunity/Affirmative Action Employer

MARKET PLACE

BIOLOGICAL INFORMATION SERVICES

Do you require the expertise of a professional biologist; the location of collections of preserved biological specimens; or information about federal- or state-regulated species and permit requirements?

For these and other services, contact: **Association of Systematics Collections, Center for Biosystematics Resources, Museum of Natural History, University of Kansas, Lawrence, Kans. 66045; telephone: 913-864-4867.**

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Fisheries and Oceans Canada
Marine Ecology Laboratory
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 **Public Service** *Fonction publique*
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RESEARCH SCIENTISTS

Salary: Up to \$36,428

The Bedford Institute of Oceanography located in Nova Scotia, Canada, one of the world's largest Oceanographic Institutes, has need for Research Scientists in the following specialties:

Microbiologist (119-291-011)

Ref. No.: 79-PSCH-DFO-SE-6073

Conducts research on micro-organisms in the marine environment with emphasis on nutrition, growth, bio-energetics, and on the role of micro-organisms in the tropic dynamics of the marine ecosystem.

Qualifications

Ph.D. in microbiology, oceanography or similar field. Research experience in ecology or marine micro-organisms; ability to conduct research at sea and to plan and conduct studies of structure and function of the marine phytoplankton community.

Physical Oceanographer (119-291-002)

Ref. No.: 79-PSCH-DFO-SE-6072

Plans and conducts research on the physical processes which determine biological productivity with emphasis on continental shelves. The research involves participation in work at sea as well as extensive use of numerical simulation and analysis techniques.

Qualifications

Ph.D. or equivalent research experience in physical oceanography, physics, applied mathematics or related field. Research experience and demonstrated capacity to make relevant original contributions.

Zooplanktologist (119-261-002)

Ref. No.: 79-PSCH-DFO-SE-6074

Conducts research on marine secondary production processes among representative groups in the pelagic community, with the objective of developing biochemical indices of resource transfer and energy utilization for use in food chain modelling and production studies.

Qualifications

Ph.D. or equivalent research experience in marine biology, oceanography or biochemistry with a sound general knowledge of ecology and invertebrate zoology especially marine zooplankton. Ability to conduct research at sea.

Language Requirements

Knowledge of English is essential for all these positions.

"Additional job information is available by writing to the address below;

Toute information relative à ce concours est disponible en français et peut être obtenue en écrivant à l'adresse suivante".

How to apply

Send your application form and /or résumé to:

Mrs. E. Cruickshank (902) 426-2169
Public Service Commission of Canada
4th Floor, 5161 George Street
Halifax, Nova Scotia B3J 1M8
Closing Date: December 28, 1979

Please quote the applicable reference number at all times.

Toxicologist

Our Soflens Division, the leader in soft contact lens technology, seeks an individual with an advanced degree in Toxicology (or allied field) or a BS in Life Sciences with equivalent work experience. This self-starter has a working knowledge of both in-vitro and in-vivo toxicity testing methods, familiarity with F.D.A. regulations, IND's GLP's, and NDA's. Industrial experience is strongly preferred, but not required, and experience in tissue culture techniques, ocular physiology and ophthalmic preservatives would be an added plus.

Specific duties will involve coordinating, directing, and preparing protocols and reports on the various phases of toxicity evaluation for the Division. This includes in-house and outside contract testing of new contact lens materials, solutions and accessories.

This position, which offers an outstanding opportunity for growth, is located in Rochester, New York . . . a city known for its exceptional quality-of-life resources. In addition to a competitive salary and a comprehensive benefit package, we will assist you in relocating to our community.

If a challenging position in a growth environment meets with your career objectives, please forward your resume, including salary history, in confidence to:

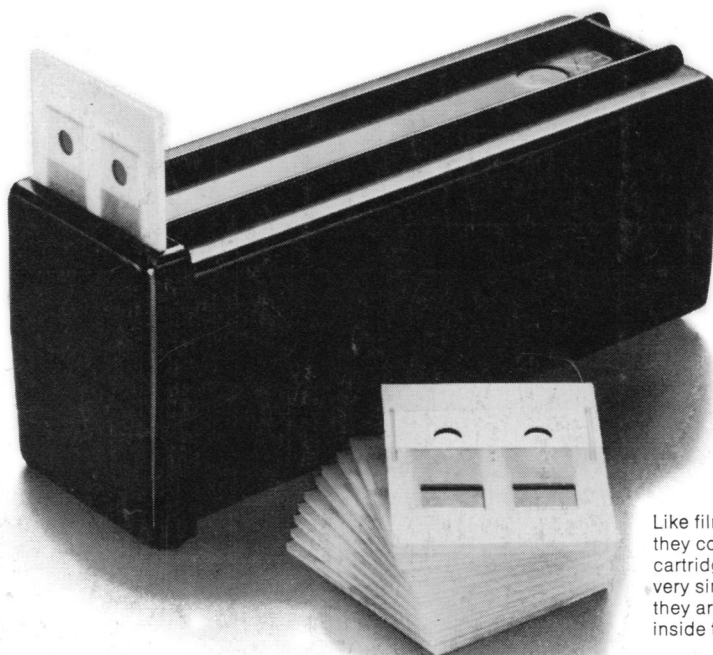
Shelly Knapp
Corporate Employment Representative

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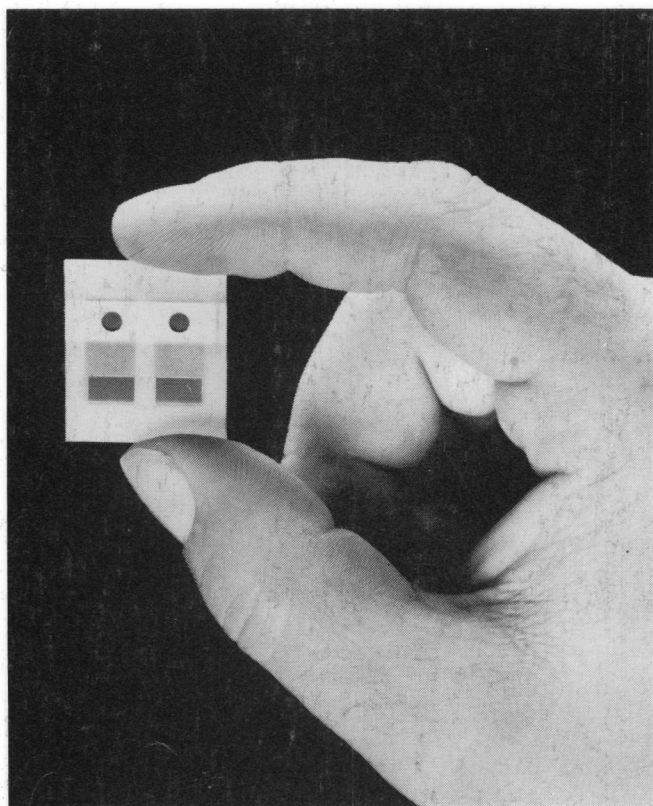
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Like film for a camera they come in this cartridge. They look very simple. In a way they are. They work inside the equipment.



Use once. Two little strips of polyester film base bearing 500 nanometres of evaporated silver. Surface of the silver oxidized to AgCl. Thin layer of cellulose acetate over that. Sandwich the strips between polystyrene covers, with a cross strip of ion-free paper embedded in the top cover. Paper acts as the "salt-bridge" mentioned in books and articles about ion-sensing instruments, which are exquisite examples of craftsmanship. These miniature equivalents stamped out by our production machinery may be a great invention, but they lack

individual character that the user must learn over the course of time.

Instrumentation to measure serum electrolytes meters simultaneously into the two round holes 10 μ l each of reference fluid and patient serum. Within 30 seconds ions are crossing the paper bridge. A pair of contacts pierce through the rectangular windows to the silver. They pick up the potential difference between the two half-cells. At three minutes it has reached a steady state. Circuitry reads out the chloride concentration.

To measure potassium we coat KCl in gelatin over the AgCl and over that a potassium-selective membrane of polyvinyl chloride containing an aromatic ester dispersion in which is dissolved a compound with a very convenient degree of affinity for K⁺. (One learns how nicely such multilayer systems work after 40 years of making lots of very successful color film.) Three minutes after the drops touch, 0.1% of the water has been imbibed, quite enough to establish steady-state potentials at the interfaces. A concentration cell is now operating with the potential at each electrode determined by the K⁺ activity in the outer solution. The potential on one side is bucked against the potential from its identical companion strip. If there is any small residual drift, it's the same for both and cancels out.

In this kind of business, accuracy and precision are better stated with numbers than with adjectives. In addition to our own acquisition of pertinent numbers by comparison with the coulometric reference method for Cl⁻ and the flame photometry reference method for K⁺, hospital laboratories small and large are participating in the evaluation process under routine conditions. The same kind of cooperation preceded the introduction of the first phase of Kodak Ektachem clinical chemistry products. That uses multilayer slides that work not potentiometrically but colorimetrically for glucose, blood urea nitrogen, and, just recently, total calcium and total bilirubin.

With reliable numbers easier to come by, will the practice of medicine become mere reaction to sets of numbers? The computer as physician? We don't think so. We certainly hope not.

1880



1980