Gang-yu Liu, Ph.D., Professor
Laura Marcu, Ph.D., Professor
Marjorie L. Longo, Ph.D., Professor
Tonya L. Kuhl, Ph.D., Professor
Denise Krol, Ph.D., Professor

Current techniques in Biophysics. Topics include protein folding, microscopy, electron microscopy, fluorescence, spectrometry, stochastic process, scanning probe microscopy, fluorescence, membrane structure and dynamics, Raman spectroscopy, fluorescence resonance energy transfer, time resolved fluorometry, 2D- and 3D-laser scanning, imaging, esr, high resolution nmr, and in vivo nmr. (S/U grading only.)—III. (III.) 200A. Biophysics Laboratory (3) Laboratory—18 hours. Prerequisite: course 200 (may be taken concurrently). One five-week laboratory assignment in the research laboratory of a Biophysics Graduate Group faculty member. Individual research problems with emphasis on methodological/procedural experience and experimental design. May be repeated for credit two times.—I, II, III. (I, II, III.)

200B. Biophysics Laboratory (6) Laboratory—two 18-hour rotations. Prerequisite: course 200 (may be taken concurrently). Two five-week laboratory assignments in the research laboratories of Biophysics Graduate Group faculty members. Individual research problems with emphasis on methodological/procedural experience and experimental design. May be repeated for credit two times.—I, II, III. (I, II, III.)

225. Biophotonics in Medicine and the Life Sciences (3) Lecture/disputation—3 hours. Prerequisite: Physics 108 and Biology 101-105; course 202 highly recommended; graduate standing. Introduction to the science and technology of biomedical optics and photonics, with an overview of applications to medicine and the life sciences. Emphasis on research supported by the NSF Center for Biophotonics at UC Davis Medical Center. (Same course as Applied Science 255 and Biomedical Engineering 255.)—II. (II.)

231. Biological Nuclear Magnetic Resonance (3) Lecture—3 hours. Prerequisite: Molecular and Cellular Biology 221A or the equivalent or consent of instructor. Principles and applications of magnetic resonance in biomedicine. Fundamental concepts and the biophysical basis for magnetic resonance applications in areas of tissue characterization/imaging, metabolic regulation, and cellular bioenergetics. (Same course as Biological Chemistry 231.) Offered in alternate years.—III. (III.)

241. Membrane Biology (3) Lecture—3 hours. Prerequisite: Biological Sciences 102, 103, or consent of instructor. Advanced topics on membrane biochemistry and biophysics. Relationship of the unique properties of biomembranes to their roles in cell biology and physiology. (Same course as Molecular and Cellular Biology 241.)—III. (III.)

271. Optical Methods in Biophysics (4) Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: Biological Sciences 102 or the equivalent, Applied Science Engineering 108B or the equivalent, and Chemistry 110A or the equivalent. Principal optical techniques used to study biological structures and their related functions. Specific optical techniques useful in the study of proteins/nuclear acid, protein membrane and protein-protien interactions. Biomedical applications of optical techniques. (Same course as Applied Science Engineering 271.)—III. (III.)

290. Biophysics Seminar (1) Seminar—1 hour. Prerequisite: graduate standing or consent of instructor. Presentation of current research by experts in biophysics. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

290C. Research Conference in Biophysics (1) Discussion—1 hour. Prerequisite: graduate standing in Biophysics and/or consent of instructor; course 299 concurrently. Presentation and discussion of faculty and graduate student research in biophysics. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

299. Introduction to Research Topics (1) Seminar—1 hour. Presentation of current research activities of the Biophysics Graduate Group faculty. Facilitation of students in development of research interest, and promoting collegial interactions. May be repeated one time for credit. (S/U grading only.)—I. (I.)

298. Group Study (1-5) (S/U grading only.)

299. Research (1-12) (S/U grading only.)

Biostatistics (A Graduate Group)

Bruce Rannala, Ph.D. (Evolution and Ecology)

Group Office: 4118 Mathematical Sciences Building 530-692-5194; http://biostat.ucdavis.edu/

Faculty

Sharil Aly, Ph.D., Assistant Professor (Population Health & Reproduction)
Rahman Azari, Ph.D., Lecturer (Statistics)
Heejung Bang, Ph.D., Associate Professor (Population Health & Reproduction)
Laurel Beckett, Ph.D., Professor (Neurology)
Hao Chen, Ph.D., Assistant Professor (Statistics)
Andrew J. Clifford, Ph.D., Professor (Nutrition)
Christiana Drake, Ph.D., Professor (Statistics)
Thomas R. Fanuha, Ph.D., Professor (Animal Science)
Thomas B. Farver, Ph.D., Professor (Population Health & Reproduction)
Emilio Ferrer, Ph.D., Associate Professor (Psychology)
Valdimir Finkov, Ph.D., Associate Professor (Computer Science)
Danielle Harvey, Ph.D., Associate Professor (Public Health Sciences)
Fusiih Hisehi, Ph.D., Professor (Statistics)
Ana-Maria Iosif, Ph.D., Assistant Professor (Public Health Sciences)
Jiming Jiang, Ph.D., Professor (Statistics)
Philip H. Kass, Ph.D., Professor (Population Health & Reproduction)
Kyongmi Kim, Ph.D., Associate Professor (Public Health Sciences)
Ian Karf, Ph.D., Assistant Professor (Evolution and Ecology)
Thomas Lee, Ph.D., Professor (Statistics)
Chin-Shang Li, Ph.D., Assistant Professor (Public Health Sciences)
Diana Mean, Ph.D., Professor (Public Health Sciences)
Brian Moore, Ph.D. Assistant Professor (Evolution and Ecology)
Hans-Georg Muller, M.D., Ph.D., Professor (Statistics)
Debashis Paul, Ph.D., Associate Professor (Statistics)
Jie Peng, Ph.D., Associate Professor (Statistics)
Richard Plant, Ph.D., Professor Emeritus (Plant Sciences)
Lihong Qi, Ph.D., Associate Professor (Public Health Sciences)
Bruce Rannala, Ph.D., Professor (Evolution and Ecology)
David M. Rocke, Ph.D., Professor (Public Health Sciences)
Francisco J. Samaniego, Ph.D., Professor Emeritus (Statistics)
Chih-Ling Tsai, Ph.D., Professor (Graduate School of Management)
Jiaren Wang, Ph.D., Professor (Statistics)
Keith Widaman, Ph.D., Professor (Psychology)
Graduate Study. Biostatistics is a field of science that uses quantitative methods to study life sciences problems that arise in a broad array of fields. The program provides students with, first, solid training in the biostatistical core disciplines and theory; second, with state-of-the-art knowledge and skills for biostatistical data analysis; third, substantial exposure to the biological and epidemiological sciences; and fourth, with a strong background in theoretical modeling, statistical techniques and quantitative as well as computational methods. Programs of study and research are offered leading to the M.S. and Ph.D. degrees. The program prepares students for interdisciplinary careers ranging from bioinformatics, environmental toxicology and stochastic modeling in biology and medicine to clinical trials, drug development, epidemiological and medical statistics. The program draws on the strengths of the Biostatistics faculty at UC Davis.

Preparation. Students should have one year of calculus, a course in linear algebra or one year of biological course work; facility with a programming language; and upper-division work in at least one of Mathematics, Statistics and Biology.

Graduate Adviser. Jie Peng (Statistics)

Courses in Biostatistics (BST)

Graduate

222. Biostatistics: Survival Analysis (4)
Lecture—3 hours; discussion/laboratory—1 hour.
Prerequisite: Statistics 131C. Incomplete data; life tables; non-parametric methods; parametric methods; accelerated failure time models; proportional hazards models; partial likelihood; advanced topics. (Same course as Statistics 222.)—II.

223. Biostatistics: Generalized Linear Models (4)
Lecture—3 hours; discussion/laboratory—1 hour.
Prerequisite: Statistics 131C. Likelihood and linear regression; generalized linear model; Binomial regression; case-cohort studies; dose-response and bioassy; Poisson regression; Gamma regression; quasi-likelihood models; estimating equations; multivariate GLMs. (Same course as Statistics 223.)—II.

224. Analysis of Longitudinal Data (4)
Lecture—3 hours; discussion/laboratory—1 hour.
Prerequisite: course/Statistics 222, 223, Statistics 232B or consent of instructor. Standard and advanced methodology, theory, algorithms, and applications relevant to analysis of repeated measurements and longitudinal data in biostatistical and statistical settings. (Same course as Statistics 224.)—III.

225. Clinical Trials (4)
Lecture—3 hours; discussion/laboratory—1 hour.
Prerequisite: course/Statistics 223 or consent of instructor. Basic statistical principles of clinical designs, including bias, randomization, blocking, and masking. Practical applications of widely-used designs, including dose-finding, comparative and cluster randomization designs. Advanced statistical procedures for analysis of data collected in clinical trials. (Same course as Statistics 225.) Offered in alternate years. —III.

226. Statistical Methods for Bioinformatics (4)
Lecture—3 hours; discussion/laboratory—1 hour.
Prerequisite: course 121C or consent of instructor; data analysis experience recommended. Standard and advanced statistical methodology, theory, algorithms, and applications relevant to the analysis of omic data. (Same course as Statistics 226.) Offered in alternate years. —III.

252. Advanced Topics in Biostatistics (4)
Lecture—3 hours; discussion/laboratory—1 hour.
Prerequisite: course 222, 223. Biostatistical methods and techniques used to analyze data; subject at least one of the following: genetics, bioinformatics and genomics; longitudinal or functional data; clinical trials and experimental design; analysis of environmental data; dose-response, nutrition and toxicity; survival analysis; observational studies and epidemiology; computer-intensive or Bayesian methods in biostatistics. May be repeated for credit with consent of advisor when topic differs. (Same course as Statistics 252.) Offered in alternate years.—III.

290. Seminar in Biostatistics (1)
Seminar—1 hour. Seminar on advanced topics in the field of biostatistics. Presented by members of the Biostatistics Graduate Group and other guest speakers. May be repeated for up to 12 units of credit. ([/SUB]Grading only.)—I, II, III.

298. Directed Group Study (1-5)
Prerequisite: consent of instructor. ([/SUB]Grading only.)

299. Special Study for Biostatistics Graduate Students (1-12)
Prerequisite: consent of instructor. ([/SUB]Grading only.)

299D. Dissertation Research (1-12)
Prerequisite: advancement to Candidacy for Ph.D. and consent of instructor. Research in biostatistics under the supervision of major professor. ([/SUB]Grading only.)

299. Special Study for Biostatistics Graduate Students (1-12)
Prerequisite: consent of instructor. ([/SUB]Grading only.)

299D. Dissertation Research (1-12)
Prerequisite: advancement to Candidacy for Ph.D. and consent of instructor. Research in biostatistics under the supervision of major professor. ([/SUB]Grading only.)

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Prerequisite: consent of instructor. ([/SUB]Grading only.)

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299. Special Study for Biostatistics Graduate Students (1-12)
Prerequisite: consent of instructor. ([/SUB]Grading only.)

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Prerequisite: advancement to Candidacy for Ph.D. and consent of instructor. Research in biostatistics under the supervision of major professor. ([/SUB]Grading only.)