

Genetic Counseling, M.S.

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<https://medschool.uci.edu/education/graduate-studies/masters-degree-programs/genetic-counseling> (<https://medschool.uci.edu/education/graduate-studies/masters-degree-programs/genetic-counseling/>)

The Graduate Program in Genetic Counseling at UCI School of Medicine's Department of Pediatrics (<https://www.pediatrics.uci.edu/>) is committed to providing education and professional training in counseling and medical genetics, leading to a Master of Science in genetic counseling. Our goal is to train genetic counseling professionals who have developed the practice-based competencies that an entry-level provider must demonstrate to successfully practice as a genetic counselor, in a culturally responsive and respectful manner across practice settings and with all clients.

The program is based in the clinical Division of Genetic and Genomic Medicine (<http://www.ucihealth.org/medical-services/genetic-testing/>) at UCI Medical Center (<http://www.ucihealth.org/medical-services/genetic-testing/>) in Orange, about 15 miles from the main university campus in Irvine. A distinguishing characteristic of the program is its integration within an active clinical genetics unit, where faculty genetic counselors and medical geneticists provide service to a wide variety of patients and families. From their first quarter of graduate study, students participate in a wide range of clinics where they learn to apply the skills and knowledge learned through academic coursework.

Our program is a two-year, full-time graduate program that operates on a quarter system. We typically admit and graduate between six and eight students each year. The class size is intentionally small to maximize the opportunity for trainees to closely interact with our faculty members in and out of the classroom and clinic.

The graduate program is fully accredited by the Accreditation Council for Genetic Counseling (ACGC (https://www.gceducation.org/wp-content/uploads/2023/09/ACGC_PracticeBasedCompetencies_2023-Final.pdf)). Graduates of the program are eligible to apply for certification by the American Board of Genetic Counseling (ABGC (<https://www.abgc.net/>)), and also may apply for a license in those states that have implemented licensure. Information for University of California students regarding licensure and certification is available on the UCOP Institutional Research and Academic Planning page (<https://www.ucop.edu/institutional-research-academic-planning/content-analysis/academic-planning/licensure-and-certification-disclosures.html>).

Recommended undergraduate preparation includes course work in the biological and behavioral sciences—particularly in genetics, biochemistry, molecular biology, cell biology, psychology, statistics, and human anatomy or embryology. Fluency in Spanish or a Southeast Asian language confers an advantage but is not required. Extracurricular or employment experiences that provide evidence of the student's maturity, interpersonal skills, and promise as a genetic counselor figure prominently in the admissions decision. References should speak to these qualities as well as to the academic qualifications of the applicant. Experience providing crisis counseling is also recommended.

Applications are accepted for the fall quarter only and must be complete by December 18. Applications undergo a holistic review process and interviews for selected applicants are conducted during February through early April. All interviews will be conducted as VIRTUAL interviews by ZOOM. We participate in the Genetic Counseling Admissions Match program which was established to place applicants into programs based on a fair process taking into account both the applicants' and programs' preferences (similar to the process of matching physicians to residency training programs). All applicants to our program must provide a Match ID number to be considered for admission. For further information about the match program, visit the GC Admissions Match website (<https://natmatch.com/gcadmissions/>). Six to eight students are usually admitted each year.

During the six to eight academic quarters of the program, students complete a sequence of core courses covering medical, quantitative, biochemical, molecular, and cancer genetics and genomics; teratology, embryology, and development; cytogenetics; counseling theory and application; research methods; ethical issues; and community resources. All courses are taught by Division faculty specifically for students in the program. Experiential professional training occurs concurrently with formal course work in a variety of clinics at the UCI Medical Center and affiliated facilities, in the prenatal diagnosis and cancer genetics programs, in cytogenetics and molecular genetics laboratories, and in various community agencies. Students participate in divisional and departmental professional and educational activities such as lectures, seminars, and journal club; rounds including in pediatrics, obstetrics, and ethics; tumor boards; and various research, counseling, and patient management conferences throughout the program.

Degree requirements include a minimum of 87 quarter units, completion of a research thesis, and demonstration of the practice-based competencies of an entry level genetic counselor. The program director serves as faculty advisor to students. Teaching and supervision of professional experiential training are shared by all Division faculty and staff, who frequently review student progress. Successful completion of the program (together with an assessment that the student has achieved the practice-based competency of an entry-level genetic counselor) fulfills the curricular and clinical training requirements for eligibility to sit for examination by the American Board of Genetic Counseling.

Faculty

Maureen E. Bocian, M.D. University of Illinois, *Senate Emerita of Pediatrics; Genetic Counseling*

Elizabeth C. Chao, M.D. University of California, Irvine, *Associate Adjunct Professor of Pediatrics; Genetic Counseling*

Pamela L. Flodman, M.S. University of California, Irvine, *Adjunct Professor of Pediatrics; Genetic Counseling*

Kathryn Steinhaus French, M.S. University of Colorado Denver, *Health Sciences Clinical Professor Emerita of Pediatrics; Genetic Counseling*

Natalie M. Gallant, M.D. University of Southern California, *Health Sciences Associate Clinical Professor of Pediatrics; Genetic Counseling*

John Jay Gargus, M.D. Ph.D. Yale University, *Professor Emeritus of Physiology and Biophysics; Genetic Counseling; Pediatrics (functional genomics; molecular pathophysiology of ion pumps, channels, and signaling)*

June-Anne Gold, M.B.B.S., D.C.H., M.R.C.P. University of London, *Health Sciences Clinical Professor of Pediatrics; Genetic Counseling*

Virginia E. Kimonis, M.D. University of Southampton, *Professor of Pediatrics; Environmental Health Sciences; Genetic Counseling; Pathology and Laboratory Medicine*

Angela Myers, M.C.H., M.D. Stanford University, *Health Sciences Assistant Clinical Professor of Pediatrics; Genetic Counseling*

Deepika Nathan, M.S. Northwestern University, *Health Sciences Associate Clinical Professor of Pediatrics; Genetic Counseling*

Leslie J. Raffel, M.D. Medical College of Pennsylvania, *Health Sciences Clinical Professor of Pediatrics; Genetic Counseling*

Kathryn E. Singh, M.P.H., M.S. University of California, Irvine, *Health Sciences Associate Clinical Professor of Pediatrics; Genetic Counseling*

Moyra Smith, M.D., Ph.D., M.F.A. University of Pretoria, *Professor Emerita of Pediatrics; Genetic Counseling*

Michael V. Zaragoza, M.D., Ph.D. Case Western Reserve University, *Associate Professor of Pediatrics; Biological Chemistry; Genetic Counseling*

Courses

PED GEN 200A. Introduction to Medical Genetics and Genomics. 4 Units.

Covers current concepts regarding mitosis, meiosis, the cell cycle, and chromosome ultrastructure and function. Clinical disorders caused by chromosomal aneuploidy, duplication, and deletion, and principles of Mendelian, chromosomal, and multifactorial and nontraditional inheritance are presented and illustrated.

Restriction: Graduate students only.

PED GEN 200B. Genetic Screening, Prenatal Development, and Human Teratology. 4 Units.

Principles and techniques of prenatal, neonatal, and carrier screening. Infertility, pregnancy, and delivery. Normal and abnormal prenatal growth and development. Reproductive and fetal effects of drugs, radiation, infections, and other environmental factors.

Prerequisite: PED GEN 200A. PED GEN 200A with a grade of B- or better

Restriction: Genetic Counseling Majors only. Medical students only.

PED GEN 200C. Human Genetic Disorders. 4 Units.

Inheritance, diagnosis, natural history, management, and counseling considerations for commonly encountered genetic diseases, birth defects, and dysmorphic syndromes.

Prerequisite: PED GEN 200B. PED GEN 200B with a grade of B- or better

Restriction: Genetic Counseling Majors only. Medical students only.

PED GEN 200D. Disorders due to Inborn Errors of Metabolism. 4 Units.

Aspects of biochemistry and metabolism are reviewed with special emphasis on genetic abnormalities which lead to inborn errors of metabolism. Diagnostic procedures, heterozygote detection, treatment, counseling issues, and prenatal diagnosis are reviewed.

Prerequisite: PED GEN 200A. PED GEN 200A with a grade of B- or better

PED GEN 200E. Molecular Genetics, Gene Mapping, and Genetic Linkage. 4 Units.

Derivation of different types of DNA probes and DNA libraries, restriction endonuclease polymorphisms, assignment of genes to chromosomes, and genetic linkage. Emphasis on the use of recombinant DNA technologies and genetic analysis for diagnosis of human genetic disease.

Prerequisite: PED GEN 200A and PED GEN 200D. PED GEN 200A with a grade of B- or better. PED GEN 200D with a grade of B- or better

PED GEN 200F. Quantitative Genetics. 2 Units.

Quantitative aspects of human genetics, including population studies, segregation analysis, linkage, mapping, and genetic risk determination.

Prerequisite or corequisite: PED GEN 200A. PED GEN 200A with a grade of B- or better

Overlaps with PED GEN 200B.

PED GEN 200G. Hereditary Cancer Counseling. 4 Units.

Issues in genetic counseling for cancer. Cancer biology; genetic mechanisms and environmental influences in carcinogenesis; tumor pathology; cancer gene mapping; epidemiology. Features natural history, diagnosis, prevention, surveillance, and management of hereditary cancers. Psychosocial, ethical, legal aspects of cancer risk assessment.

Prerequisite: PED GEN 200B. PED GEN 200B with a grade of B- or better

Restriction: Genetic Counseling Majors only. Medical students only.

PED GEN 200H. Genetic Counseling Research Design. 4 Units.

Quantitative and qualitative methods for genetic counseling research. Reference management; statistics: sample size, power, and data analysis; reliability and validity; surveys, questionnaires, interviews, focus groups; quality of life and genetic epidemiology research; designing a research protocol; IRB issues; grant writing.

PED GEN 200L. Cytogenetics Laboratory. 4 Units.

Practicum introducing methods of specimen collection, short-term lymphocyte and bone marrow culture, long-term fibroblast and amniocyte culture, harvesting and slide preparation, chromosome staining, microphotography, and darkroom techniques. Microscopic chromosome analysis, photographic karyotyping, and appropriate use of cytogenetic nomenclature are emphasized.

Restriction: Graduate students only.

PED GEN 200M. Embryology for Medical Genetics. 2 Units.

Introduction to normal and abnormal prenatal growth and development of the major systems of the body from an embryological point of view. Intended for first-year genetic counseling students in preparation for clinical rotations.

Restriction: Graduate students only.

PED GEN 201A. Introduction to Genetic Counseling. 4 Units.

Through directed readings, observing patient evaluations, role-playing, and conducting intake interviews, students are introduced to the process of diagnosis, management, and counseling for genetic disease. Psychosocial issues, interviewing techniques, pedigree construction, clinical photography, and various other skills are addressed.

Restriction: Medical students only. Genetic Counseling Majors only.

PED GEN 201B. Clinical Rotation I. 4 Units.

Provides extensive supervised experience in history taking, interviewing, and psychosocial assessment in the clinical genetics setting. Students independently perform telephone, office, and home-visit intake interviews, participate in counseling, and present cases at patient management conferences.

Restriction: Medical students only. Genetic Counseling Majors only.

PED GEN 201C. Clinical Rotation II. 4 Units.

Provides further supervised experience in genetic counseling, case management, clinic administration and organization, and the use of community resources. Emphasis is on sharpening counseling skills and on developing a professional identity and code of ethics.

Restriction: Medical students only. Genetic Counseling Majors only.

PED GEN 202A. Counseling in Human Genetics: Theory and Methods. 3 Units.

Theoretical approaches, counseling models and methods, and bio-psychosocial assessment strategies are examined in the context of genetic counseling. Contract-setting, working alliance, the use of self and evaluation methods. Beginning counseling and peer supervision skills are practiced in class.

Restriction: Medical students only. Genetic Counseling Majors only.

PED GEN 202B. Community Resources. 1-2 Units.

Lectures, guest speakers, and community visits acquaint genetic counselors with public and private health care and funding agencies, parent support and advocacy groups, and other resources to assist individuals and families confronted with genetic disorders, developmental disabilities, and birth defects.

Repeatability: May be taken for credit 2 times.

Restriction: Medical students only. Genetic Counseling Majors only.

PED GEN 202C. Ethical Issues in Human Genetics. 1-2 Units.

Explores major social, legal, and ethical issues in genetic counseling including those arising in genetic screening, prenatal diagnosis, informed consent, privacy and confidentiality, rights of the disabled, new genetic and reproductive technologies, treatment, and access to services.

Repeatability: May be taken for credit 2 times.

Restriction: Medical students only. Genetic Counseling Majors only.

PED GEN 203A. Counseling in Human Genetics: Putting Thought to Practice. 4 Units.

Builds upon the skills learned in previous courses emphasizing advanced counseling methods such as listening, empathy, and collaboration. The counselor's own self-awareness, ethical behaviors, and limits are explored. Individual, team, and group exercises are performed.

Prerequisite: PED GEN 202A. PED GEN 202A with a grade of B- or better

Restriction: Genetic Counseling Majors only. Medical students only.

PED GEN 204. Professional Skills Development. 4-8 Units.

Hones and augments existing competencies in genetic counseling through ongoing clinical experiences. Develops skills using computers for genetics applications, provision of community and professional education, and clinic administration. Further experience in genetics laboratories or specialty clinics may be elected.

Repeatability: May be taken for credit 4 times.

Restriction: Graduate students only.

PED GEN 295. Master's Thesis and Research Writing. 4-8 Units.

Under the supervision of one or more faculty members, the student designs and conducts a research project or completes a case report. A problem in the cytogenetics, biochemical, clinical, psychosocial, or behavioral areas of medical genetics may be investigated.

Grading Option: Satisfactory/unsatisfactory only.

Repeatability: May be taken for credit 3 times.

Restriction: Graduate students only.