Genetic Counseling

The Division of Human Genetics in the School of Medicine’s Department of Pediatrics offers a Master of Science degree program in Genetic Counseling. Many graduates of the program join academic or hospital-based genetics teams providing clinical services, teaching, and research. Others work for local, state, or federal genetics programs, for commercial genetics laboratories, in research studies, or in education. The graduate program is fully accredited by the American Board of Genetic Counseling.

Division faculty and staff are engaged in teaching, research, and patient service. Clinical activities center on diagnostic evaluation, management, and genetic counseling for genetic disorders, including birth defects, developmentally disabling conditions, and hereditary cancers. Faculty research interests include clinical genomics; gene mapping and identification using molecular and quantitative methods; characterization and management of malformation and chromosomal syndromes; counseling for late-onset genetic conditions including familial cancers and neurogenetic disorders; factors causing chromosome abnormalities, genomic disorders, and congenital malformations; cancer genetics and cytogenetics; psychosocial and cultural issues associated with genetic conditions, prenatal diagnosis, genetic screening testing, and genetic services delivery; treatment of genetic disease; and ethical and public policy issues in genetics.

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 UC Irvine Medical Center and satellite facilities, in the prenatal diagnosis program, in the cytogenetics and molecular genetics laboratories, and in various community agencies. Students participate in these and other divisional and departmental professional and educational activities such as lectures, seminars, and journal club; Pediatrics, Obstetrics, and Oncology Grand Rounds; and various research, counseling, and patient management conferences throughout the program. While not required, some students choose to arrange optional clinical rotations at other academic, private, or commercial genetics units.

Degree requirements include a minimum of 75 quarter units, completion of a research thesis that should be publishable, and demonstration of appropriate professional skills in genetic counseling. 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. In the second year, development of professional skills can be individualized according to the trainee’s needs and interests. Successful completion of the program fulfills the curricular and clinical training requirements for eligibility to sit for examination by the American Board of Genetic Counseling.

Recommended undergraduate preparation includes course work in the biological and behavioral sciences—particularly in genetics, biochemistry, molecular biology, psychology, and human anatomy or embryology. Course work in statistics is desirable. Fluency in Spanish or a Southeast Asian language confers a considerable advantage.

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. The GRE General Test is required. Subject Test scores in any area will also be considered if they are available. Since there is no GRE code for the Department of Pediatrics, applicants should use the UCI institution code: R4859.

Applications are accepted for the fall quarter only and must be complete by February 1. Because of keen competition for places in the program, a two-stage admissions process is employed. Following initial review of applications by the faculty admissions committee, approximately one-third of applicants are invited for interviews, which are usually conducted during March and April. If invited, it is greatly to the candidate’s advantage to have an on-site interview, although in difficult circumstances it may be possible to arrange an out-of-town interview. Any candidate planning to be in the Southern California area in March or April is encouraged to inquire in advance regarding the likelihood of an interview. Final selection from the interviewed candidates occurs in late April or early May. Five or six students are usually admitted each year.

Faculty

Maureen Bocian: Heterogeneity and variability in genetic diseases; characterization of new syndromes; neurofibromatosis; skeletal dysplasias
José A. Camacho: Genetic metabolic diseases; urea cycle disorders; Hyperornithinemia-Hyperammonemia-Homocitrullinuria (HHH) syndrome
Elizabeth Chao: Clinical genomics, whole exome sequencing, variant classification, cancer genetics
Pamela Flodman: Genetic counseling, risk analysis, and risk perception; genetic epidemiology; human genome informatics
Kathryn Steinhaus French: Prenatal genetic diagnosis; standardization of family pedigree nomenclature
John Jay Gargus: Genetic metabolic diseases; molecular pathophysiology of inborn errors in signal transduction via growth factor receptors and channels; autism
Virginia Kimonis: Genetics of neuromuscular diseases; inherited muscle disorders that occur in combination with diseases of bone; disorders due to mutations in VCP; natural history of Prader Willi syndrome and early onset morbid obesity syndromes; genotype-phenotype correlation in craniosynostosis
Kathryn Singh: Genetic counseling; cystic fibrosis; hereditary cancer counseling
Moyra Smith: Gene linkage and mapping in neurogenetic disorders including autism; mutation analysis and genotype-phenotype correlation in tuberous sclerosis
M. Anne Spence: Genetic epidemiology, quantitative genetics; linkage and mapping
Michael V. Zaragoza: Genetics and genomic analysis of cardiomyopathies in humans and mice
Courses

PED GEN 200A. Introduction to Medical Genetics and Cytogenetics. 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.

Prerequisite: PED GEN 200A.

Restriction: Genetic Counseling 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.

Restriction: Genetic Counseling 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 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 200F. Quantitative Genetics. 2 Units.
Quantitative aspects of human genetics, including population studies, segregation analysis, linkage, mapping, and genetic risk determination.

Prerequisite: Prerequisite or corequisite: PED GEN 200A.

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

Prerequisite: PED GEN 200B.

Restriction: Genetic Counseling 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 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: Genetic Counseling students only.

PED GEN 201B. Clinical Rotation I. 4 Units.
Provides extensive supervised experience in history taking, interviewing, 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: Genetic Counseling students 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: Genetic Counseling students only.

PED GEN 201D. Prenatal Diagnosis Counseling. 4 Units.
A practicum with extensive supervised experience in prenatal diagnosis counseling which provides the student with the opportunity to conduct genetic counseling sessions semi-independently and to further develop clinical skills.

Prerequisite: PED GEN 200A and PED GEN 200B and PED GEN 200C.

Restriction: Genetic Counseling students only.
PED GEN 202A. Counseling in Human Genetics: Theory and Methods. 3 Units.
Theoretical approaches, counseling models and methods, and biopsychosocial 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: Genetic Counseling students only.

PED GEN 202B. Community Resources. 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.
Restriction: Genetic Counseling students only.

PED GEN 202C. Ethical Issues in Human Genetics. 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.

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.
Restriction: Genetic Counseling students only.

PED GEN 204A. Professional Skills Development. 4 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.
Prerequisite: PED GEN 204B.
Repeatability: May be taken for credit 3 times.
Restriction: Graduate students only.

PED GEN 204B. Professional Skills Development. 4 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.
Prerequisite: PED GEN 204A.
Repeatability: May be taken for credit 3 times.
Restriction: Graduate students only.

PED GEN 204C. Professional Skills Development. 4 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.
Prerequisite: PED GEN 204B.
Repeatability: May be taken for credit 3 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.