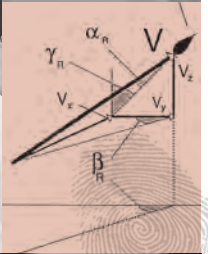
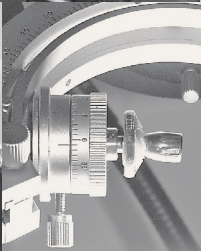
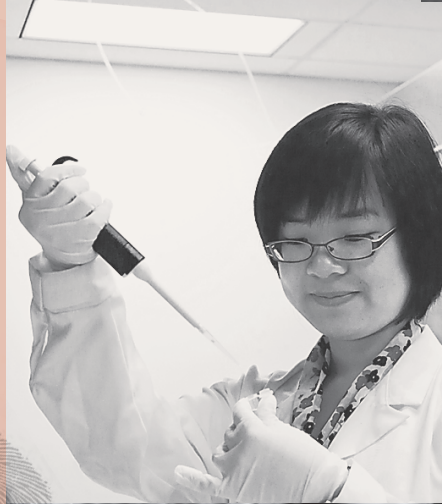
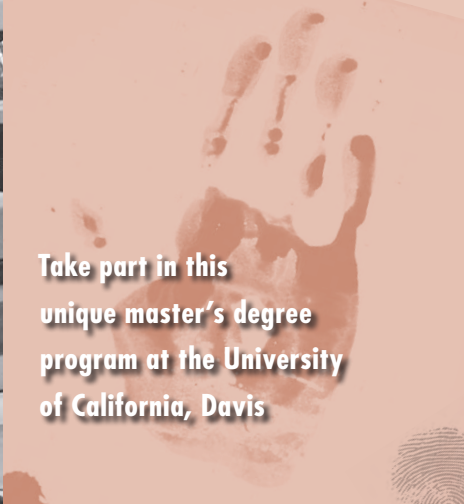


Master of Science in Forensic Science



Offered by the UC Davis
Forensic Science Graduate Group
in collaboration with
UC Davis Extension

UC DAVIS
**FORENSIC SCIENCE
GRADUATE PROGRAM**



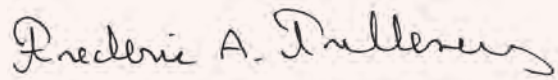
<http://forensicscience.ucdavis.edu>

WELCOME

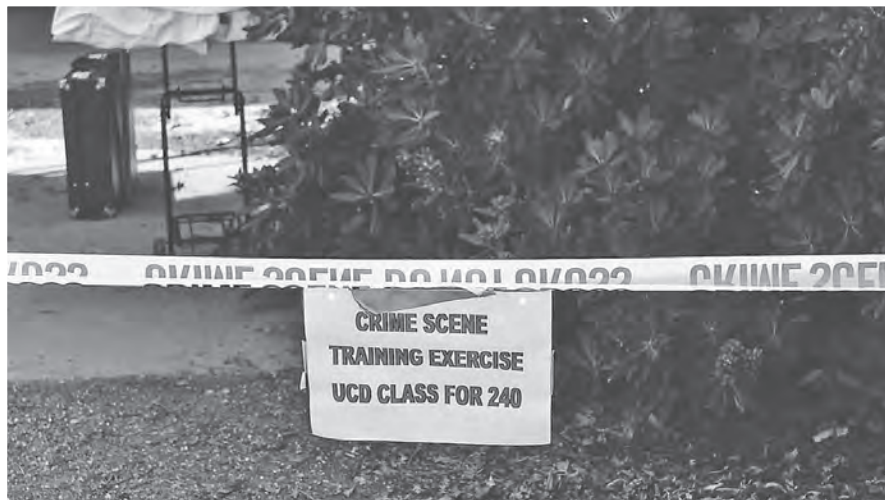
UC Davis' Master of Science in Forensic Science offers a unique opportunity to obtain a research-based, forensic science graduate degree. Students who have been trained to develop critical thinking skills and can find solutions to forensic science problems will be the leaders of tomorrow's forensic science laboratories. This program is designed to accommodate both full-time and part-time candidates for the Master of Science in Forensic Science. We have developed a faculty of top scholars who are nationally recognized in the forensic science community along with a diversified interdisciplinary graduate group that allows for research in a wide variety of forensic-related disciplines. We encourage you to apply!



Robert Rice
Forensic Science Graduate Group Chair
Forensic Science Program, UC Davis



Frederic A. Tulleners
Director and Advisor
Forensic Science Program, UC Davis



MASTER OF SCIENCE IN FORENSIC SCIENCE

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INTRODUCTION

Meeting New Challenges and Opportunities

Advances in molecular biology, microanalytical techniques and microscopy have created new challenges and opportunities in the forensic sciences and have increased the demand for well-trained professionals. The University of California, Davis, is pleased to offer a comprehensive and unique graduate program—the Master of Science in Forensic Science.

Pursue Studies in:

- Alcohol impairment
- Accident reconstruction
- Chemistry
- DNA analysis
- Failure analysis
- Fire and arson investigation
- Firearms and toolmark identification
- Forensic statistics
- Gunshot residue analysis
- Identification of materials
- Impression identification
- Microanalytical methods
- Stable isotope techniques
- Toxicology
- Trace analysis



Complete Your Degree While You Keep Your Job

The Master of Science in Forensic Science is a research-oriented advanced degree that can be taken on a full-time or part-time basis. The program is designed to accommodate the needs of professionals as well as regular graduate students. Most required courses take place in the evenings or late afternoons. It is possible to conduct research projects at campus labs, at your working lab or at an independent facility, whichever is most compatible with your research interests and your schedule. The program can be completed in two years, but most students participating on a part-time basis will complete the degree in about three years.

Career Opportunities in Forensic Science

In the past few decades, forensic science has evolved rapidly from an applied science using basic analytical tools for fingerprint, blood type and material analysis to a cutting-edge discipline employing sophisticated laboratory and computer methods to obtain information and conclusively identify ownership of evidential material. As these methodologies become more demanding and the credibility of expert testimony is subjected to greater scrutiny, the need for postgraduate training has grown. A master of science degree is now evolving as the standard training required for leadership positions in crime laboratories. According to the FBI Quality Assurance Standards for Forensic DNA Testing Laboratories, "... the technical manager or leader of a DNA section or laboratory shall have at minimum a master's degree in biology, chemistry or a forensic science-related area."

The University of California, Davis' Master of Science in Forensic Science represents the only degree in forensic science in the University of California system. It is unique in its emphasis on research and in its collaboration with the California Criminalistics Institute and the Sacramento County Laboratory of Forensic Science, allowing students to have hands-on experience in the latest analytical technologies and methods in forensic science. Graduates from this program will find opportunities in local, state, federal and private crime labs as well as in consulting, investigation and advanced research. Approximately 83 percent of the graduates from the Forensic Science program are working in a forensic science laboratory or in a closely related scientific field.

This comprehensive program incorporates a unique curriculum that balances breadth and depth of study. Through scholarly coursework and high-quality research, the program provides a strong foundation in science, together with an understanding of the logic and workings of the legal system. Coursework covers in-depth the theoretical underpinnings of the biological and physical sciences as used in the collection, analysis and interpretation of evidence.



ABOUT THE PROGRAM

Mission Statement for the Forensic Science Program

This program aims to (1) provide exemplary forensic science education in criminalistics, including DNA identification analysis, at the graduate level; and (2) select students who are in the top third of their undergraduate class and who aspire to become the future forensic scientists in the various forensic science laboratories; and develop in these select students the skills necessary for working in this profession including ethics, integrity, the ability to devise innovative methods and techniques, and the capacity to integrate new technology. This comprehensive program incorporates a unique curriculum that balances breadth and depth of study. Through scholarly coursework and high-quality research, the program provides a strong foundation in science, together with an understanding of the logic and workings of the legal system. In-depth coursework covers the theoretical underpinnings of the biological and physical sciences as used in the collection, analysis and interpretation of evidence.

Goals:

- promote critical thinking skills
- focus on innovative M.S. thesis research
- publish student thesis research in peer-reviewed forensic science journals
- present research results at forensic science society seminars
- present curriculum based on real-world examples
- maintain the ethical standard of the profession of forensic science
- prepare students for future employment in forensic science laboratory careers

Program Accreditation

The Forensic Science Graduate Program at University of California, Davis has been awarded full accreditation by the American Academy of Forensic Sciences, Forensic Science Education Program Accreditation Commission (FEPAC). See www.aafs.org for a list of FEPAC accredited programs.



Forensic Science
Education Program
Accreditation Commission

Program Requirements

In addition to a thesis or capstone project, all students must complete six required core courses, three units of seminar and the appropriate number of elective/research units, depending on selection of Plan I or Plan II, for a total of 48 units. A maximum of 6 units (or 12 units from another UC campus) of undergraduate, upper division coursework can be accepted towards completion of the degree, as long as the units have not been used for another degree.

Note: Students who do not maintain a GPA of 3.0 or higher in graduate courses will be placed on academic probation and will be subject to dismissal. A grade of "C" in any course is considered a failing grade and the units will not count toward the M.S. degree.

Program Eligibility (Qualifications for Admission)

Academic Requirements

This program is suitable for people with a variety of backgrounds. Requirements for admission include an undergraduate degree in the sciences, engineering or a closely related field from an accredited institution with a GPA of 3.0 or higher on a four-point scale. Students coming from colleges where a GPA cannot be calculated are evaluated using other aspects of their files and letters bearing on in-class performance when available.

Well-qualified applicants will have undergraduate preparation (one year each) in general and organic chemistry, general physics, math through calculus and a course in statistics. Applicants interested in following the DNA track should consider classes in general biology, biochemistry, molecular biology and genetics. Students lacking the appropriate undergraduate preparation will be advised to take recommended courses before consideration for admission to the program. In addition, those who do not have at least an intermediate course in statistics will be required to take one before submitting a thesis.

Graduate Record Examinations (GREs) are not required for acceptance, but can make a difference in borderline cases.



Crime Laboratory Background Requirements

Prospective students planning a career with county, state or federal law enforcement agencies, or with crime labs, should be aware that anyone seeking such employment will be expected to undergo an extensive background check. A history of substance use (alcohol or drugs, including marijuana), disruptive or unethical behavior, financial irresponsibility or a bad driving record may disqualify you from employment, even if you have never been arrested or convicted. Conviction of domestic abuse can also preclude one from being hired.

The University of California, Davis cannot advise you on whether the particulars of your background might exclude you. If you have any questions in this regard, you are urged to contact the agencies or labs where you hope to work and obtain information about their specific policies. Furthermore, most forensic laboratories have restrictive requirements for their positions and, in general, require a degree in one of the physical or natural sciences or a closely related field. Some California forensic science laboratories may also require a course in quantitative analysis or its equivalent.

M.S. Forensic Science Degree Plans

The Forensic Science program at UC Davis offers a Plan I Thesis and a Plan II Non-Thesis option.

The Plan I option requires the submission of a thesis whereas the Plan II option requires more course work and the submission of a much more limited capstone project followed by an oral examination on that project. Both plans allow for a DNA track or a criminalistics track. We encourage all students to follow the Plan I Thesis option. But for some students, the Plan II option may be a more viable option.

Both plans require the completion of 48 quarter units with a combination of classes and applied research, and both plans have the same tuition costs.

Location of Courses

The courses take place on the UC Davis campus, at the Da Vinci Center in Davis or at the CCI training facility near the UC Davis Medical Center in Sacramento. Graduate student research projects can be conducted at UC Davis labs, government labs where students are employed or independent labs.

Program Cost

Current tuition is \$555 per unit. Additional fees include a nonrefundable application fee (\$80 for U.S. applicants, \$100 for international applicants) due at the time of application. Since the Forensic Science program is a self-supporting program, at this time there are no additional campus fees. Books, supplies, lab material and other program costs are not included in the tuition. Tuition and fees are subject to change without notice.

Financial Assistance

Students enrolled in at least six (6) units per quarter may be eligible for federal financial aid and/or educational loans. Each category has different requirements and restrictions. For details on how to apply, please visit the Financial Aid Office website.

<http://financialaid.ucdavis.edu/graduate/apply/Apply.html>

Students enrolled in less than six (6) units per quarter are not eligible for financial aid.



UC Davis Master of Science in Forensic Science Program Statistics for 2011

Year the M.S. Forensic Science program was approved	Fall 2002
Number of program graduates with a M.S. degree	78
Number of student and staff peer review publications	35
Number of presentations by students to forensic organization	38
Number of graduate thesis publications	76
Number employed in crime labs or closely related areas	82%
Current Forensic Science externally funded research grants	4

FORENSIC SCIENCE COURSES

FOR200 Fundamental Concepts of Forensic Science

(Required)

Offered every fall quarter.

3 units.

Overview of forensic science—problem definition, strategies for problem solving, analytical tools, and professional and ethical considerations. Specific topics include the scope and history of forensic science; reconstruction of past events; the scientific method; scientific and legal concepts of evidence and proof; establishing unique connections using physical, chemical and biological foundations; reconstructing dynamic processes in terms of physical, chemical and biological aspects; recognition, collection and preservation of evidence; statistical considerations in evidence interpretation; heuristic considerations in evidence analysis; and professional standards, ethics and quality assurance.

FOR205 Microscopy and Microanalytical Methods in Forensic Science

(Required Criminalistics track)

Offered every other spring quarter.

3 units.

Introduction to optical and electron microscopy. Topics span microscopy and photography, including transmission, diffraction, reflection and absorption; polarized light and polarizing crystals; phase contrast and radiography; imagerecording and the various methods of processing and enhancement; scanning electron microscopy in the analysis of gunshot residues, paints and glass; EDS and XRF spectroscopic analysis and interpretation; and the boundaries of trace analysis including the significance of signal-to-noise ratios, and minimum detectable levels and homogeneity.

FOR210 Personal Identification Methods in Forensic Science

(Required)

Offered every winter quarter.

3 units.

This course explores methods by which individuals may be identified using physical evidence from crime scenes and related events. Students are exposed to a variety of identification methods and required to evaluate them by application of criteria of reliability, accuracy and usefulness. Students will develop an understanding of the value and reliability of methods of personal identification in forensic science.

FOR212 Scientific Evidence and Courtroom Testimony

(Required)

Offered every winter quarter.

3 units.

Explore the relationship between science and the criminal justice system. Admissibility of scientific testimony and documentary proof during the trial, concepts of relevancy, hearsay and opinion rule, examination of expert witnesses, impact of Kelley-Fry and Daubert decisions and court testimony are discussed.

FOR215 Arson Investigation

(Elective)

Offered every other spring quarter.

3 units.

This course addresses principles and techniques of scientific investigation of fires and related crimes; offers peer-reviewed protocols for processing fire and explosion scenes; discusses recognition, collection and analysis of physical evidence; and describes the scientific method for decision-making in fire/arson investigation.

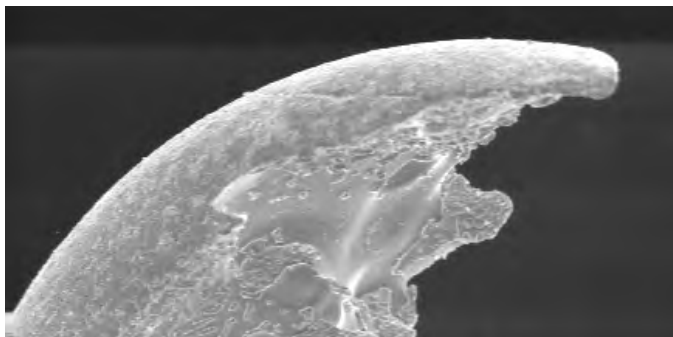
FOR218 Technical Writing in Forensic Science

(Elective)

Offered every fall quarter.

3 units.

This course will instruct students on how to write clear, credible forensic science reports and scientific articles that (a) serve the ends of the justice system, (b) meet their readers' varying needs and (c) reflect well on the author.



**FOR220 (ETX220)
Analysis of Toxicants**

(Required Criminalistics track)

Offered every fall quarter.

3 units.

This course presents an introduction to the analysis of toxic chemicals, including the theoretical and practical considerations regarding the separation, detection and quantitative determination of toxicants by chemical and instrumental techniques.

FOR221L Forensic Science Analytical Instrumentation

(Elective)

Offered every other fall quarter.

2 units.

This course covers methodology and instruments used for the analysis of substances of interest in the discipline of forensic science. Students gain practical experience with modern instrumental techniques and methodologies used in the advanced forensic science laboratory.

FOR240 Homicide Crime Scene Investigation

(Required)

Offered every fall quarter and spring quarter, as needed.

3 units.

This course explores processing and evaluating complex homicide scenes. Functions and activities of police agencies are also covered as well as recognition, documentation, identification and collection of evidence; event sequence reconstruction; and evidence collection, preservation, report writing and courtroom presentation.

FOR268 Forensic Statistics

(Elective)

Offered every other winter quarter.

3 units.

This course deals with basic statistical methods as well as the common statistical methods used in forensic science. The course covers the limitations and application of these methods as well as the foundations upon which they are based.

FOR278 (ETX278) Molecular Techniques

(Required DNA track)

Offered every other fall quarter.

3 units.

Directed toward those graduate students (and advanced undergraduates) who have some background in biochemistry, this course teaches students a variety of basic molecular biological techniques/approaches, including how these techniques are used and what information they can provide. Examples of the application of these techniques are taken from current scientific literature.

**FOR280 (ETX 280)
Forensic DNA Analysis**

(Required DNA track)

Offered every winter quarter.

3 units.

This course provides a foundation in theory and practice of forensic DNA analysis; past, present and emerging technologies; legal and quality assurance issues. DNA extraction, DNA quantitation, multiplex amplification of STR loci, capillary electrophoresis of amplified products, and analysis of STR typing data are also covered.

FOR281 (ETX 281) Principles and Practice of Forensic DNA Typing

(Elective)

Offered every spring or summer quarter.

3 units.

Prerequisite: FOR280 or permission of instructor.

Lecture—2 hours; laboratory—3 hours. This course provides an overview of the principles underlying forensic serology and DNA typing and gives students the opportunity to apply this knowledge in a laboratory setting. A strong emphasis will be placed on mastering basic molecular biology laboratory skills as well as the specific techniques that forensic analysts use to identify bodily fluids and to extract, quantify and type human DNA.

FOR283 Forensic Biology

(Elective)

Offered every winter quarter.

3 units.

This course provides an overview of the foundational concepts in forensic biology: chemistry and molecular biology of biological evidence, genetic basis of biological uniqueness, evolutionary basis of species differences, patterns and dynamics of evidence deterioration, and the legal/professional considerations associated with biological evidence.



FOR284 (ETX284) Analysis of Non-Human DNA

(Elective)

Offered fall quarter, alternate years.

3 units.

The objective of this non-human forensic science course is to provide a comprehensive understanding of plant and animal forensic biology in terms of sample collection, preservation, analytical methods and/or the invaluable lines of inquiry this forensic evidence may permit.

FOR290 Seminar Series

(Mandatory for new students in the fall quarter)

Offered fall and spring quarters.

1 unit.

The seminar series brings in renowned speakers in forensic science to present subject matter important to all students. This is also the forum in which students are required to present the results of their thesis research.

FOR293 Research Methods in Forensic Science

(Elective)

Offered every spring quarter.

2 units.

This course introduces identification, formulation and solution of meaningful scientific problems encountered in forensic science including experimental design and/or theoretical analysis of new and prevailing techniques, theories and hypotheses. Students will present their thesis research.

FOR298 Group Study in Forensic Science

(Elective)

Offered as needed.

Variable units.

Group focused study for the presentation of special topics as the opportunity arises.

FOR299 Research in Forensic Science

(Required)

Offered each quarter.

Variable units.

Students are expected to complete a total of 18 units (Plan I) or 6 units (Plan II) of research in their desired area of specialization. A principal advisor guides students in shaping their research plan.



The following are examples of some of the courses available as electives.

ANG111 Molecular Biology Laboratory Techniques

Offered every fall quarter.

4 units.

Prerequisite: *Biological Sciences 1C, 101, 102, 103.*

This course provides an introduction to the concepts and techniques used in molecular biology; the role of this technology in both basic and applied animal research, and participation in laboratories using some of the most common techniques in molecular biology

ANG212 Sequence Analysis in Molecular Genetics

Offered every other winter quarter.

2 units.

Prerequisite: *Biological Sciences 101* or the equivalent; graduate standing or consent of instructor.

The course examines the use of computer algorithms and online databases to analyze nucleic acid and protein sequences in molecular genetics research.

CHE219 Spectroscopy of Organic Compounds

Offered every fall quarter.

4 units.

Lecture—3 hours; laboratory—2.5 hours. Prerequisite: 128C or the equivalent. This course provides an identification of organic compounds and the investigation of stereochemical and reaction mechanism phenomena using spectroscopic methods—principally NMR, IR and MS.

CHE240 Advanced Analytical Chemistry

Offered every fall quarter.

3 units.

Lecture—3 hours. Prerequisite: 110A and 115 or the equivalent. Course topics include numerical treatment of experimental data; thermodynamics of electrolyte and non-electrolyte solutions; complex equilibria in aqueous and non-aqueous solutions; potentiometry and specific ion electrodes; mass transfer in liquid solutions; and fundamentals of separation science, including column, gas and liquid chromatography.

EMS182 Failure Analysis

Offered every winter quarter.

4 units.

Analysis of the way materials fail. This course examines the effects of temperature, mechanical deformation and corrosion on the properties of materials. Forensics and methodologies for investigating failures of materials including optical microscopy, x-ray analysis and scanning electron microscopy, and investigation of practical problems are also covered.

ETX102B Quantitative Analysis of Environmental Toxicants

Offered every spring quarter.

5 units.

This course examines toxic chemicals, primarily pollutants, in the environment; concepts and techniques of sampling, detecting and quantifying toxicants; collection, interpretation and use of analytical data. **This course has been approved by the California Department of Health as meeting the quantitative analysis requirement.**

FPS161 Structure and Properties of Fibers

Offered every fall quarter.

3 units.

Prerequisite: Textiles and Clothing 6 and Chemistry 8B. This course covers the structure, properties and reactions of natural- and man-made fibers; the relations between molecular structure of fibers and their physical properties; and interactions of fibers and detergents.

FPS161L Textile Chemical Analysis Laboratory

Offered every fall quarter.

1 unit.

Prerequisite: FPS161 (may be taken concurrently). This course teaches laboratory methods and procedures employed in qualitative and quantitative analysis of textile fibers and auxiliaries.

ETX220L Analysis of Toxicants Laboratory

Offered every fall quarter.

2 units

Prerequisite: ETX220 (may be taken concurrently). This course teaches laboratory methods and procedures for the microanalysis of toxicants. Students learn to use chemical and instrumental techniques for separation, detection and quantitative determination of toxicants.

GGG201A Transmission Genetics

Offered every fall quarter.

3 units.

Prerequisite: Biological Sciences 101, introductory statistics and calculus. This course covers segregation, linkage and the mapping and modifications of Mendel's original genetic model.

GGG201D Quantitative and Population Genetics

Offered every winter quarter.

3 units.

Prerequisite: GGG 201A or consent of instructor. Study the basic concepts of quantitative and population genetics including gene and genotypic frequencies, multiple factor hypothesis, phenotypic and genotypic values, heritability, selection, genetic variation, the detection of quantitative trait loci and evolution in populations. Experimental and analytical methods are also explored.

GGG211 Concepts in Human Genetics and Genomics

Offered every other winter quarter.

3 units.

Prerequisite: GGG 201A or equivalent (201B and 201C are recommended). Topics in this course include human genomic organization; genetic structure of human populations; positional cloning of genes for human disease, application of linkage, association and haplotypes for human studies; quantitative trait loci analyses; integrative genetic studies of gene expression; DNA repair mechanisms in genetic disease; mutation analyses; epigenetics in human disease; human mitochondrial DNA disease; and gene manipulation and gene therapy.

GGG294 Seminar in Human Genetics

Offered every quarter.

2 units.

Seminar—2 hours. Prerequisite: GGG 201A and consent of instructor. Topics of current interest in human genetics and genomics are discussed.

LAW229 Scientific Evidence

Taken concurrently as a FOR298 Group Study Course

Law School—semester schedule varies.

3 units.

Prerequisite: 219. This course examines evidence law governing the admission of scientific testimony and considers trial advocacy in presenting and attacking such testimony. Each student is required to make an oral class presentation and prepare a research paper dealing with a particular forensic technique. Limited enrollment.

MCB162 Human Genetics

Offered every fall quarter.

3 units.

The goals of this course are to 1) explain central concepts of current human genetics; 2) illustrate how molecular and genomic approaches have revolutionized the practice of human genetics; 3) discuss the professional practice of human genetics; and 4) develop proficiency in reading primary literature and querying databases in human genetics.

MAE217 Combustion

Offered every other winter quarter.

4 units.

Prerequisite: Engineering 103 and 105. This course reviews chemical thermodynamics and chemical kinetics. Discussions include reacting flows, their governing equations and transport phenomena; detonations; laminar flame structure and turbulent combustion.

MIC215 Recombinant DNA Technology

Offered every fall quarter.

3 units.

This course covers application of recombinant DNA technology to modern problems in biology, biochemistry and genetics, emphasizing molecular cloning strategies, choice of vectors, preparation of insert DNA and selection procedures.



NOTE THAT ELECTIVE COURSES MAY CHANGE.

Other graduate courses are available depending on students' research focus. While the required courses will be offered either evenings or late afternoon, the electives are usually taught during the day. Elective courses may also have their own particular academic prerequisites. Students should take these courses in conjunction with the recommendations of their academic advisors.

PLAN I AND PLAN II FORENSIC SCIENCE M.S. DEGREE PROGRAM

Plan I and Plan II Specifics

Effective Jan. 2008, the UC Davis Graduate Council approved a substantially revised Forensic Science M.S. program. This program now consists of two plans. Both of these plans require 48 quarter units which encompass a combination of classes, seminars and research. All students are required to take four core courses for 12 units, six units of core track courses (DNA or Criminalistics), and three seminar units.

The Plan I students have an additional nine units from any accepted elective classes and 18 units of research with the submission of a thesis. The Plan II students have an additional 21 units of classes with six units of research for the capstone project.

The standard program sequence is:

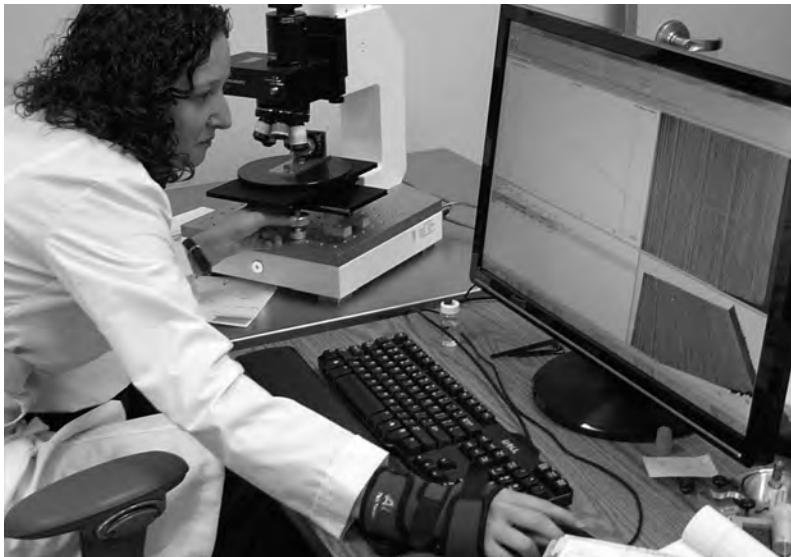
Common core courses (4).....	12 units
Specialty track core courses (2).....	6 units
Seminar classes (3).....	3 units
Electives Plan I.....	9 units
Research units Plan I.....	18 units
OR	
Electives Plan II.....	21 units
Research units Plan II.....	6 units
Total units.....	48 units

Plan	Plan I M.S. Degree	Plan II M.S. Degree
Total Units	48 units	48 units
Thesis	Required	No – Instead, a capstone project* followed by oral examination
Course Units	27 units	39 units
Seminar Units	3 units	3 units
Research Units	18 units	6 units

*Capstone project: A project that does not require original research or laboratory research work. Suitable capstone projects are extensive literature reviews in a given subject, validation studies of a particular technique or database population support. The student is expected to publish the project in a thesis or journal format and will be questioned extensively about the project by his/her research committee members who also oversee the project.

	Plan I Specifics	Plan II Specifics
Core Required Courses	12 Units FOR200 Fundamental Concepts of Forensic Science (3) FOR210 Personal Identification and Analytical Methods (3) FOR212 Scientific Evidence (3) FOR240 Homicide Crime Scene Investigation (3)	12 Units FOR200 Fundamental Concepts of Forensic Science (3) FOR210 Personal Identification and Analytical Methods (3) FOR212 Scientific Evidence (3) FOR240 Homicide Crime Scene Investigation (3)
Track Required Courses	6 Units DNA Track (6) FOR278 Molecular Techniques (3) FOR280 Forensic DNA Analysis (3) OR Criminalistics Track (6) FOR205 Microscopy and Microanalytical Methods (3) FOR220 Analysis of Toxicants (3)	6 Units DNA Track (6) FOR278 Molecular Techniques (3) FOR280 Forensic DNA Analysis (3) OR Criminalistics Track (6) FOR205 Microscopy and Microanalytical Methods (3) FOR220 Analysis of Toxicants (3)
Elective Courses	Suggested Electives Courses 9 units (from any of the following): FOR215 Forensic Arson and Fire Investigation (3) FOR218 Technical Writing in Forensic Science (3) FOR221L Instrumental Laboratory (2) FOR268 Forensic Statistics (3) FOR281 Principles and Practices of Forensic DNA Typing (3) FOR283 Forensic Biology (3) FOR284 (ETX284) Analysis of Non-Human DNA (2) FOR293 Research Methods in Forensic Science (2) Campus Elective Options CHE115 Instrumental Analysis (4) CHE205 Symmetry, Spectroscopy and Structure (3) CHEM217 X-Ray Structure Determination (3) CHE219 Organic Spectra (4) CHE240 Adv. Analytical Chemistry (3) CHE241C Mass Spectrometry (3) EME298 Impact Biomechanics and Design of Crash Protection Systems (4) EMS182 Failure Analysis (4) EMS230 Electron Microscopy (3) ETX102B Quantitative Analysis of Environmental Toxicants (5) ENT158 Forensic Entomology (3) FPS161 Structure and Properties of Fibers (3) FPS161L Textile Chemical Analysis Lab (1)	Suggested Electives Courses 21 units (from any of the following): FOR215 Forensic Arson and Fire Investigation (3) FOR218 Technical Writing in Forensic Science (3) FOR221L Instrumental Laboratory (2) FOR268 Forensic Statistics (3) FOR281 Principles and Practices of Forensic DNA Typing (3) FOR283 Forensic Biology (3) FOR284 (ETX284) Analysis of Non-Human DNA (2) FOR293 Research Methods in Forensic Science (2) Campus Elective Options CHE115 Instrumental Analysis (4) CHE205 Symmetry, Spectroscopy and Structure (3) CHEM217 X-Ray Structure Determination (3) CHE219 Organic Spectra (4) CHE240 Adv. Analytical Chemistry (3) CHE241C Mass Spectrometry (3) EME298 Impact Biomechanics and Design of Crash Protection Systems (4) EMS182 Failure Analysis (4) EMS230 Electron Microscopy (3) ETX102B Quantitative Analysis of Environmental Toxicants (5) ENT158 Forensic Entomology (3) FPS161 Structure and Properties of Fibers (3) FPS161L Textile Chemical Analysis Lab (1)

<p>Elective Courses (continued)</p>	<p>GGG201A Transmission Genetics (3) GGG201D Quantitative and Population Genetics (3) GGG211 Concepts in Human Genetics and Genomics (3) GGG294 Seminar in Human Genetics (2) MCB120L Biochemistry Lab (6) MCB162 Human Genetics (3) MAE161 Combustion and the Environment (4) MAE217 Combustion (4) MCB221C Molecular Biology (4) Other courses as approved by the graduate advisor</p>	<p>GGG201A Transmission Genetics (3) GGG201D Quantitative and Population Genetics (3) GGG211 Concepts in Human Genetics and Genomics (3) GGG294 Seminar in Human Genetics (2) MCB120L Biochemistry Lab (6) MCB162 Human Genetics (3) MAE161 Combustion and the Environment (4) MAE217 Combustion (4) MCB221C Molecular Biology (4) Other courses as approved by the graduate advisor</p>
<p>Seminars</p>	<p>3 Units 2–FOR290 Seminars 1–XXX290 Seminar session (a seminar session in another group)</p>	<p>3 Units 2–FOR290 Seminars 1–XXX290 Seminar session (a seminar session in another group)</p>
<p>Research</p>	<p>18 Units FOR299 Research in Forensic Science</p>	<p>6 Units FOR299 Research in Forensic Science</p>



FORENSIC SCIENCE GRADUATE GROUP FACULTY

This Master of Science program brings together several key faculty members from the University of California who have made substantial contributions to the field of forensic science and forensic medicine through their own disciplines in the sciences, medicine, engineering, law and psychology. Additional faculty is drawn from the California Criminalistics Institute, forensic consulting firms and public crime labs.

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Ralph C. Aldredge, III, Ph.D., P.E., is a professor in the Department of Mechanical and Aeronautical Engineering at UC Davis and a licensed professional engineer. He performs research investigations and consulting in areas relating to energy conversion, biotransport, failure analysis and accident reconstruction. He received Master of Science and Ph.D. degrees in mechanical and aerospace engineering from Princeton University in 1988 and 1990, respectively.

Matthew P. Augustine, Ph.D., is a professor and a physical chemist and has been in the UC Davis Department of Chemistry since 1998. He earned his Ph.D. from Yale University and did postdoctoral work at UC Berkeley. Professor Augustine received the National Science Foundation Career Award in 2000, developed and filmed *Chemistry of Everyday Life* for the Discovery Channel in 2003, developed Wine Scanner, Inc. to screen full wine bottles for contaminants in 2004, received the ASUCD Excellence in Education Award in 2004, was a visiting research scientist at the Universite de la Mediterranee Aix-Marseille from 2005-2008, and is active in the UC Davis-Peking University 10+10 program. Augustine's principal research interests include wine analysis, ion binding, luminescence, ultrasound, non-linear dynamics and solid state nuclear magnetic resonance (NMR).

Ruth E. Ballard, Ph.D., is a professor in the Department of Biological Sciences at California State University, Sacramento, adjunct professor in the Department of Environmental Toxicology at UC Davis and DNA/Biology advisor in the Forensic Science Graduate program. She teaches courses in genetics, human genetics and forensic biology at California State University, Sacramento, and teaches FOR281 (*Principles and Practice of Forensic DNA Typing*) at UC Davis. Ballard developed and coordinates the concentration in Forensic Biology at CSU Sacramento and is the director of CSI-TRU (Crime Scene Investigation Training and Research for

Undergraduates). She has developed several human STR allele frequency databases for world populations, including the populations of Tanzania, Laos and U.S. Assyrians, and is currently involved in a similar study in Kenya.

Christyann Darwent, Ph.D. is an associate professor of anthropology at UC Davis. She received her Ph.D. from the University of Missouri in 2001. She has had an interest in forensic anthropology since she was an undergraduate at the University of Calgary, Canada, where she focused on human skeletal remains. Her current work is in the High Arctic of Greenland and Alaska and she currently has two NSF-sponsored projects in these locations. Her own research focuses on animal bones and taphonomic analysis of those remains (i.e., what happens during the death, burial and recovery sequence). She uses this taphonomic information as a means of assessing climatic changes, prehistoric and historic human hunting and butchering of animals. She also oversees any human remains recovered in their archaeological excavations.

R. Michael Davis, Ph.D., is a professor in the Department of Plant Pathology at UC Davis. He received his Ph.D. from the University of California, Riverside, in plant pathology. His major effort is in the area of fungal, bacterial and viral diseases of field and vegetable crops, especially tomatoes, potatoes, carrots, onions, garlic, cucurbits, cotton and corn as well as mushroom production and diseases. He received the University of California Cooperative Extension Distinguished Service Award for Outstanding Research in 2006.

Katayoon (Katie) Dehesh, Ph.D., is a full professor in the Department of Plant Biology, College of Biological Sciences at UC Davis. She received her Ph.D. from Sussex University in Sussex, England. She pursued her postdoctoral research at the University of Freiburg, Germany; University of Kiel in Germany; University of Wisconsin, Madison; and University of California, Berkeley. Her postdoctoral research focused on plant photomorphogenesis with emphasis on dissection of the transcriptional machinery of light-regulated genes. Her current research is focused on unraveling the plant stress-signaling network. Specifically she is studying oxylipin mediated stress signaling pathway to examine the role of lipid derived metabolites in plant responses to biotic and abiotic challenges. In addition she is examining the parallels between the oxylipin metabolic pathways in plant and animals.

Holly Ernest, D.V.M., Ph.D., is associate professor-in-residence of Wildlife Population Health and Genetics. She directs the Wildlife and Ecological Genetics Unit at the UC Davis Veterinary Genetics Laboratory (VGL) which conducts research on genetics of threatened and endangered species. Genetic work applicable to forensic science in Ernest's laboratory includes development of DNA marker panels (microsatellites, sex and species ID markers, etc.), databases, population genetics and statistical analysis techniques in collaboration with state and federal wildlife agencies. Ernest is a faculty member of the UC Davis School of Veterinary Medicine, Department of Population Health and Reproduction, as well as graduate groups in animal biology, avian science, ecology, epidemiology and genetics.

Walter E. Finkbeiner, M.D., Ph.D., received his M.D. from the University of Illinois (1978), and Ph.D. from UC San Francisco (1989). He completed training in anatomic pathology at UC San Francisco (1982) and forensic pathology at UC Davis (2001). He is currently professor and vice chair of the Department of Pathology, UC San Francisco, and chief of pathology at San Francisco General Hospital. His areas of research include airway cell biology, autopsy pathology and forensic pathology. Finkbeiner is co-author of *Autopsy Pathology: A Manual and Atlas*, Churchill Livingstone: Philadelphia, 2004.

Paul Gepts, Ph.D., is a professor in the Department of Plant Sciences at UC Davis, specializing in evolutionary factors that have shaped crop biodiversity during and after crop domestication. His research program attracts graduate students primarily from the U.S. and Latin America, but also from Africa and Asia through the Ecology, Genetics, Horticulture and Agronomy and International Agricultural Development Graduate Groups. The experimental work in his lab that is most applicable to forensics involves the development and use of molecular markers to distinguish among closely related genotypes within plant species. Gepts is an elected fellow of the American Association for the Advancement of Science, the American Society of Agronomy and the Crop Science Society of America. He reads, speaks and writes fluently in four languages (French, Dutch, Spanish and English).

Gail S. Goodman, Ph.D., is a distinguished professor in the Department of Psychology at UC Davis. Her research specialties include memory development and children's abilities and experiences as victims/witnesses (to provide testimony about events they have experienced or witnessed). She is also currently studying the effects of child abuse on emotional adjustment/psychopathology and relations between child maltreatment, re-victimization and juvenile delinquency. Her studies have been cited in U.S. Supreme Court decisions. Goodman has served as president of two divisions (Child, Youth and Family Services; and Psychology and Law) and one section (Child Maltreatment) of the American Psychological Association. She has received numerous grants and awards for her research. Goodman is also director of the Center for Public Policy Research at UC Davis.

William M. Green, M.D., is currently a clinical professor of Emergency Medicine at UC Davis Health System. He is one of the founders of the Sexual Assault Forensic Evaluation (SAFE) team at the UC Davis Medical Center. His publications include *Rape: The Evidential Examination and Management of the Adult Female Victim*. In 1990, he was appointed by the California Commission on the Status of Women to the State Advisory Committee that oversees services to sexual assault victims. Green is currently medical director of California Clinical Forensic Medical Training Center at UC Davis and has recently been named to the Governor's Task Force on Campus Sexual Assault.

David Howitt, Ph.D., is a professor emeritus in the Department of Chemical Engineering and Materials Science at UC Davis. He received his Ph.D. degree at UC Berkeley. His areas of research emphasis include forensics and failure analysis, electron microscopy and the determination of structure property relationships in materials.

You-Lo Hsieh, Ph.D., is chair and a professor in the Division of Textiles and Clothing at UC Davis, specializing in fiber and polymer science. Her research focuses on fiber and polymer chemistry, with active projects related to fiber chemistry and structure (natural and synthesized), functional fibers and membranes (nanofibers, nanoporous), polymer synthesis and chemistry (bio-based, stimuli-responsive, functional), encapsulation of biomolecules (proteins, enzymes, sugars, chemicals, etc.), and conversion and utilization of bio-based materials and renewable natural products.

Edward J. Imwinkelried is the Edward L. Barrett Jr. Professor of Law at UC Davis. He is the co-author of *Scientific Evidence* (4th ed. 2007) and the author of *The Methods of Attacking Scientific Evidence* (4th ed. 2004). He is the expert testimony columnist for *National Law Journal* and a contributing editor on forensic science for *Criminal Law Bulletin*. Imwinkelried was a member of the Legal Issues Working Group of the National Commission on the Future of DNA Evidence and served as the legal consultant to the Surgeon General's Commission on urinalysis testing in the Armed Forces. He is currently a member of the National Institute of Standards and Technology's expert group on human factors in latent fingerprint analysis.

Sree Kanthaswamy, Ph.D., is a population geneticist at the UC Davis California National Primate Research Center (CNPRC) and the Department of Anthropology. His NIH-funded projects include the genetic management of the CNPRC's non-human primate colony. He also heads a NIH-funded grant on the development of a species determination assay for law enforcement forensic labs in the U.S.

Robert B. Kimsey, Ph.D., is an associate adjunct professor of entomology investigating epidemiology of tick-borne zoonoses in Northern California. He received his Ph.D. in entomology at UC Davis in 1984 and then conducted postdoctoral research in that department. In 1987 he joined the Harvard School of Public Health, Department of Tropical Public Health as a research associate. Kimsey was a visiting lecturer in parasitology in the School of Veterinary Medicine at Tufts University during this period. He teaches a graduate-level seminar in forensic entomology at UC Davis and continues to consult for law enforcement as well as law firms.

Donald P. Land, Ph.D., has been a professor in the Department of Chemistry at UC Davis since 1991. He served as an Alexander von Humboldt Postdoctoral Fellow (1990-1991). His specialty is analytical and physical chemistry studies of solids and surfaces with applications in biology, medicine, catalysis and the environment. Land uses microscopy, spectroscopy, lasers and mass spectrometry to analyze solids and surfaces to study trace evidence and to elucidate the relationship between structure and function in surface chemistry, often using custom-designed instrumentation. His forensic applications include the study of soot composition, elemental analysis of glass fragments and GC/MS studies of clandestine lab materials.

Leslie A. Lyons, Ph.D., is a geneticist and professor in the Department of Population Health and Reproduction in the School of Veterinary Medicine at UC Davis. She received her M.S. and Ph.D. degrees from the University of Pittsburgh, Graduate School of Public Health, Department of Human Genetics. The laboratory has the capacity for high-throughput DNA amplification, DNA sequencing, DNA polymorphism and single nucleotide polymorphism (SNP) detection. Current forensic projects include the development of markers and databases for mtDNA, microsatellites and phenotypic-associated SNPs for identification of feline crime scene evidence.

Alyson Mitchell, Ph.D., is an associate professor and food chemist in the Department of Food Science and Technology at UC Davis where she received her Ph.D. degree. Her interests are application of HPLC and LC/MS/MS in the identification and occurrence of phytochemicals and their metabolites in foods and biological matrices.

Terence M. Murphy, Ph.D., is a professor in the UC Davis Department of Plant Biology. Murphy received his Ph.D. in cell biology at UC San Diego. He studies effects of abiotic stresses on the biochemistry and physiology of plant cells. His areas of interest have included membrane transport, formation and removal of reactive oxidizing agents, and DNA repair. He has applied his experience to the identification and comparison of plant samples through DNA sequence analysis.

Edward A. Panacek, M.D., M.P.H., is a professor of Emergency Medicine at the UC Davis Medical Center and the associate editor of the *Journal of Emergency Medicine*. He received his M.D. degree from the University of South Alabama. He holds board certification in Emergency Medicine, Internal Medicine and Critical Care Medicine. His research interests, relevant to the forensic sciences, include medical aspects of violence and injury—specifically, sexual assault and injury prevention. He is the chair of a multidisciplinary research group at UC Davis Medical Center, called SARG (Sexual Assault Research Group). He is also a founding member of a nascent California-based, multi-institutional SARG, that is just beginning.

Birgit Puschner, Ph.D., is a professor of clinical veterinary toxicology at UC Davis. She received her Ph.D. from Ludwig-Maximilians Universität München, Germany. She is a diplomat of the American Board of Veterinary Toxicology. Her interests are in the investigation, review and interpretation of all toxicology case submissions in light of clinical, clinicopathological and pathological findings. This includes the continuous improvement and development of diagnostic capabilities such as method development. Specific areas of expertise are: investigation of intoxication of animals, development of new diagnostic tools to confirm intoxications and assessment of potential food safety concerns, including bio/agro terrorism.

Bahram Ravani, Ph.D., is a professor of mechanical and aero engineering and chair of the Department of Electrical and Computer Engineering at UC Davis. He received his M.S. from Columbia University in New York and his Ph.D. from Stanford University, both in mechanical engineering. His research areas include forensic biomechanics, forensic evaluation and analysis of injury accidents and accident reconstruction. He also specializes in kinematics and dynamics, mechanical design and robotics. Ravani uses the science bases of kinematics, dynamics and biomechanical engineering in forensic evaluation of accidents and injuries which includes multidisciplinary investigation of traffic, industrial and other injury accidents. He has been involved in research, investigation and analysis of many accidents evaluating causation and accident reconstruction.

Robert H. Rice, Ph.D., serves as chair of the Forensic Science Graduate Group at UC Davis and a professor and faculty adviser for the Department of Environmental Toxicology. His areas of emphasis include mechanisms of action of toxic and physiological agents affecting keratinocyte growth and differentiation, biochemistry and expression of specific keratinocyte markers, metabolic activation of toxic agents in epidermal cells, and proteomics of epidermis and appendages. He is also a member of the UC Davis Graduate Groups in Biochemistry and Molecular Biology, Cell and Developmental Biology, and Pharmacology and Toxicology.

William Ristenpart, Ph.D., is an assistant professor in the Department of Chemical Engineering and Materials Science and Department of Food Science and Technology at UC Davis. His research area of interest is the behavior of electrofluids, biofluidics and microfluids. He received his undergraduate degree in chemical engineering from UC Davis, and his Ph.D. from Princeton University. He did his post doctoral research at Harvard University. Recently, he received a National Institute of Justice (NIJ) grant in the area of bloodstain pattern interpretation. This NIJ grant will focus on using ultra high speed video and the mathematical analysis of blood drop dispersion in order to elucidate the effect of velocity and distance.

Moshe Rosenberg, D.Sc., is a professor and specialist in the Department of Food Science and Technology at UC Davis. He received his M.Sc. and D.Sc. degrees in food engineering and biotechnology from Technion, Israel Institute of Technology, Haifa, Israel. His research focuses on developing a new understanding about physio-chemical and microencapsulating properties of proteins, lipids and carbohydrates, and on developing advanced, highly functional delivery systems for nutrients and bioactive compounds. His research is also aimed at gaining a better understanding about physio-chemical principles that govern milk processibility, functionality of milk constituents and the development of quality attributes of cheese and other dairy products.

Ben Sacks, Ph.D., is a geneticist, assistant professor in the Department of Population Health and Reproduction, and director of the Canid Diversity and Conservation Laboratory in the Center for Veterinary Genetics at UC Davis. He conducts genetic research on domestic dogs and wildlife populations, including threatened and endangered carnivores. The laboratory has facilities for DNA extraction, PCR, sequencing and genotyping. His projects include development of autosomal and Y-chromosome STR and SNP markers and population-specific databases for genetic assignments.

Brandi Schmitt, M.S., is the director of Anatomical Services for the University of California Office of the President. Her role at UCOP includes management of the university system's five whole-body donation programs, setting ethical guidelines for the acquisition, use and disposition of anatomical materials used for education and research, as well as ensuring compliance with university policies. Schmitt's academic interests include institutional whole-body donation programs, multidisciplinary human identifications and mass fatality management and response, as well as the facilitation of clinical, surgical and forensic research and education.

George Sensabaugh, D.Crim., is a professor of forensic science and biomedical sciences in the School of Public Health at UC Berkeley. He received his doctorate degree from the School of Criminology at UC Berkeley and has taught and conducted research in forensic science for more than 30 years. His main forensic research interests are in the area of forensic biology, ranging from analysis and interpretation of biological evidence to novel applications of DNA technology. He has a longstanding interest in developing the foundations of forensic science as a professional endeavor. Other research interests include biochemical genetics, molecular epidemiology and the molecular evolution of microbes.

Takayuki Shibamoto, Ph.D., is a professor in environmental toxicology at UC Davis. He received his Ph.D. in agricultural chemistry from UC Davis. His research areas include the study of antioxidative properties of components in natural plants including antioxidative activities of aroma chemicals; and the Maillard reaction or nonenzymatic browning reaction associated with formation of antioxidants, carcinogens and anticarcinogens in food. He has studied the analysis of volatile chemicals using expertise of capillary gas chromatography, including natural plant essences and wine chemistry. Shibamoto has also conducted research on analytical methods for certain pesticides, degradation of pesticides in food and environment, and seasonal variation of pesticide residues in surface water.

David Glenn Smith, Ph.D., is a professor of anthropology and a core scientist at the California National Primate Research Center. He received his M.A. and Ph.D. degrees from the University of Colorado, Boulder, and pursued postdoctoral research in human genetic epidemiology at the Department of Human Genetics at the University of Michigan Medical School and at the Institute for Cancer Research of the Fox Chase Cancer Center in Philadelphia. Current interests include the evolution and phylogeography of the primate genus *Macaca*, the structure of the genomes of rhesus and longtail macaques with particular reference to studies of linkage and disease association, genetic evidence for circumstances pertaining to the human settlement of the New World, and the use of both modern and ancient DNA of Native Americans to assess ancestor descendant relationships and evidence of population replacement, migration and gene flow.

Faye Springer worked as a criminalist with the California Department of Justice in the Riverside and the Sacramento laboratories. In 1996, she accepted a position with the Sacramento County Forensic Laboratory where she is the technical leader of the trace evidence laboratory. Springer has worked more than 1,000 homicide cases including some of the most notable serial murderers in California. She was the subcommittee chairperson of the National Scientific Working Group on Materials (SWGMAT) developing national standards for analysis and training. She is best known for her work in the area of trace evidence and crime scene investigation.

Scott D. Stanley, Ph.D., is an associate professor of equine chemistry and director of the K.L. Maddy Equine Analytical Chemistry Laboratory, UC Davis. Under his leadership, the laboratory has established itself as one of the largest and most respected LC-MS equine drug-testing labs in the world. Stanley is a recognized leader in the field of mass spectrometry (MS) and LC-MS. His primary research interest includes trace analytical determinations of drugs, metabolites and natural products in the biological samples. He has published more than 50 peer-reviewed articles in scientific journals. Stanley received his Ph.D. in toxicology from the University of Kentucky.

Ronald S. Tjeerdema, Ph.D., D.A.B.T., is professor and chair of the Department of Environmental Toxicology. He received a Ph.D. in pharmacology and toxicology from UC Davis in 1987, and then served on the faculty of the Department of Chemistry & Biochemistry at UC Santa Cruz before returning to UC Davis in 1999. His research is focused on characterizing toxic actions via in vivo NMR and NMR-based metabolomics and the fate of pesticides and petroleum hydrocarbons in the environment.

John Thornton, D.Crim., is an emeritus professor of forensic science at UC Berkeley. After working in the Air Force as a medic, he worked for nine years in the Contra Costa Sheriff's Department crime lab as a criminalist, several years as the supervising criminalist and a one year as the laboratory director. Thornton then served as a professor at UC Berkeley for 24 years. In addition, he has served as president of the California Association of Criminalists and as chairman of the Criminalistics section of the American Academy of Forensic Sciences. He is the author of 194 published articles and has taught physical evidence methods in Spain, China, Colombia, Israel, Mexico and India. He has processed crime scenes throughout the U.S. including about 800 homicide cases over a period of 47 years. He is currently semi-retired, working as a crime scene investigator for the Napa County Sheriff's Department.

Fred Tulleners, M.A., received his graduate degree in chemistry from UC Irvine. He is the director of forensic science at UC Davis Extension and is responsible for the administration of the UC Davis Master of Science in Forensic Science program. He is a former California Department of Justice laboratory director of the California Criminalistics Institute and the ASCLD accredited Sacramento-Santa Rosa Criminalistics laboratories. His areas of interest are the statistical aspects of firearms identification, the performance of national ballistic imaging databases and forensic alcohol issues.

Cecilia von Beroldingen, Ph.D., received her Ph.D. in biology from the University of Oregon in 1978. She did postdoctoral research in the Department of Biochemistry and Biophysics at Oregon State University and in the Division of Cellular Biology at the Scripps Research Institute. She was a research associate in the Forensic Science Program at UC Berkeley, investigating the application of PCR to the analysis of biological evidence. Von Beroldingen has also served as the technical leader of the DNA section of the Oregon State Police Forensic Laboratory. She joined the California Department of Justice DNA Laboratory in 2001 and is now the director of the California Criminalistics Institute.

Timothy D. Weaver, Ph.D., is an assistant professor of anthropology. He received his Ph.D. from Stanford University and pursued postdoctoral research at the University of Wisconsin, Madison, and the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany. His research focuses on making inferences from human skeletal remains. Current interests include cranial and postcranial evolution of Neanderthals and modern humans, understanding present-day human cranial diversity and sub-adult age estimation from the postcranial skeleton. He uses a variety of approaches, including 3-D geometric morphometrics, interactive computer visualization, biomechanics, and theoretical models from quantitative and population genetics.

Matthew Wood, Ph.D., is an assistant professor in the Department of Environmental Toxicology at UC Davis. He received his degree from UC San Diego. His research program centers on investigating how oxidants and oxidative stress are perceived by organisms and regulate biological processes through oxidation and reduction of proteins. An American Heart Association Beginning Researcher Grant funds his research efforts. At the graduate level he teaches the popular ETX220, *Analysis of Toxicants* course every fall.

SPOTLIGHT ON STUDENT AND FACULTY ACHIEVEMENTS

Training for the real CSI—Forensic science grad students put crime-fighting under the microscope

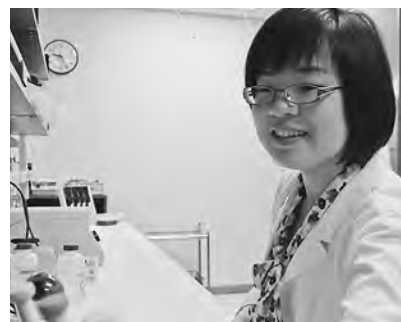
By Kristin Mick

Many a *CSI* crime series fan would love to be in the lab coats of UC Davis graduate students Khang Vuong, Katerina Doneva and Denise Oh right now.

The three, all in the UC Davis Master of Science in Forensic Science program, have been nationally recognized by the National Institute of Justice and the Forensic Sciences Foundation for their potential to lead the way in fighting crime in the lab. The two forensic agencies recently teamed up to fund student research grants to “shape the next generation of forensic scientists.” The three UC Davis students were among only nine students in the nation who received the grants this year.

Investigating today’s crimes deals with much more than police work, a fact dramatized by adventures on *Bones* and *CSI: Crime Scene Investigation*. In real life, new technologies, such as those being taught at UC Davis, have cracked open the field of crime investigation, hatching career opportunities for students with an interest in applied science.

Discriminating hair analysis



Hair is Vuong’s quest. The second-year graduate student received \$4,850 to help fund her research project on the nuclear DNA analysis of human hair.

“Hairs, especially shed hairs, are one of the most commonly encountered evidences at crime scenes,” she says. Her research aims to improve the discriminating power of hair evidence in criminal investigations.

Vuong takes the image of a “busy college student” to a new level. In addition to full-time graduate study, she works as a teaching assistant for an upper-division microbiology course on campus and has an internship at the California Criminalistics Institute in Sacramento.

“I’m also a Vietnamese interpreter for VN CARES, a UC Davis free student-run clinic” she says. Vuong plans to travel to Honduras and Vietnam in the summer to provide free medical care to people in rural areas who have little or no medical access.

DNA database in Kenya



Denise (Yong-Ning) Oh will use her \$3,500 grant to bring an improved scientific method to East Africa.

“My research is to build a DNA database in Kenya, similar to the one the FBI uses here,” Oh says. This database would improve DNA identification needed to solve crimes, establish paternity, aid immigration efforts and other purposes.

“The grant money will pay for the cards I will use to collect DNA (saliva) samples from volunteers. These cards are ideal because they’re easy to use (donor spits on the card) and will keep the DNA intact for analyzing,” Oh explains.

After graduation, Oh, an international student from Malaysia, plans to pursue a career as a crime lab DNA analyst. She says her favorite part of the master’s degree program has been interacting with “real world” forensic scientists.

Seasoned professionals as teachers



Katerina Doneva also appreciates being taught by forensic science professionals who have many years of experience in their respective disciplines. “The training and advice provided by them is invaluable and irreplaceable,” she says.

Doneva also received a \$3,500 grant. Her research involves genotyping blood, hair and saliva samples from 100 donors and comparing these profiles to detect abnormalities.

Crime solving using DNA relies on the assumption that each bodily tissue (like blood, hair and saliva) of an individual will have the same DNA profile. But this assumption is not always correct—resulting in inaccurate interpretation of DNA evidence, Doneva explains.

Mismatched DNA issues

“My research examines somatic mosaicism, [a genetic condition] which causes mismatched DNA profiles between the bodily tissues of an individual,” Doneva says. Her profiling of donated DNA samples will allow her to examine how often mismatching may occur in human DNA.

Doneva, who hopes to work as a DNA criminalist after graduation, admits that pursuing an education in forensic science is tough and competitive.

“During your undergraduate years, focus on developing your creative problem-solving skills, especially in your lab courses,” she advises prospective grad students. “Even better, get involved in a research project.”

Kristin Mick is a senior editor at UC Davis Extension.

\$3.2 million in grants from National Institute of Justice!

The students, staff and members of the UC Davis Forensic Science Graduate Group have garnered six major National Institute of Justice grants since 2009, totaling more than \$3.2 million. Research projects include:

- Statistical Evaluation of Torn Duct Tape
- Determination Unique Fracture Patterns in Glass and Glassy Polymers
- A Proposal to Develop a Computer Program to Improve the National Integrated Ballistics Information Network
- Consecutive and Random Manufactured Semi-Automatic Pistol Breech Face & Fired Cartridge Case Evaluations
- Quantitative Analysis of High Velocity Bloodstain Patterns: A Double Blind Investigation of Impact Velocity Assessment
- Forensic Science Crime Laboratory Management and Leadership



Alumna launches East Africa's first private DNA testing lab and leads effort to create a crime-fighting database in Kenya

By Andy Fell (Excerpted article from UC Davis Magazine, Spring 2011)

DNA evidence has become a staple of U.S. courtrooms both real and fictional. But in Africa, where the gene pool is the most diverse on the planet, genetic evidence is rarely used to solve crimes.

That's partly because forensic scientists do not have the reference databases to show that the match between a piece of crime-scene evidence and a suspect is correct and not due to chance.

Now, a collaboration between the UC Davis Forensic Science program and East Africa's first private DNA typing laboratory aims to address that need by building a DNA database for Kenya. The effort should also help train local police and crime scene investigators on how to collect and handle DNA evidence.

"It's extremely important because at the moment we are relying on old data to perform our analysis," said Sophie Mukwana, M.S. '06, a graduate of the UC Davis program and founder of Biotech Forensics in Nairobi, Kenya.

"When you do DNA typing, you want to get accurate numbers on how often a particular profile is found," said Ruth Ballard, an adjunct assistant professor of environmental toxicology at UC Davis and who teaches DNA analysis in the UC Davis forensics program. "You need to know the frequencies in the population."

Biotech Forensics is the first and only private lab in East Africa for analyzing DNA, the genetic material within cells, Mukwana said. The Kenyan government currently has one forensics lab in Nairobi, and neighboring Uganda and Tanzania each have a single government lab. There are no labs for forensic DNA analysis in Rwanda and Burundi.

Mukwana started the company in 2008 with backing from family and friends. The company's first major case was in 2009, when a fire in a Nairobi supermarket left 30 dead. The supermarket chain brought in Biotech Forensics to identify the victims, earning wide publicity in the country.

Much of the company's income currently comes from paternity testing. Social and legal changes in Kenya mean that more women are going to court to claim child support from men—and those cases depend on reliable paternity tests.

"This has happened because the laws have changed and become more favorable to women and children," Mukwana said. With men being required to support their children, inside and outside marriage, there is more demand for determining paternity, she said.

With the success of DNA testing, the company is also now developing facilities in toxicology and fire investigation. Mukwana also hopes that the overstretched government lab can send work to her company. In the meantime, Biotech Forensics will become the testing hub for the project to compile a DNA database of the Kenyan population. The DNA database will be used both for crime-fighting and civil cases.

Several nongovernmental organizations, as well as the U.S. Department of Justice's International Criminal Investigative Training Assistance Program, are working in the country on training police officers, attorneys and forensic nurses to investigate crime scenes properly, use DNA evidence to gain convictions and collect DNA evidence from rape victims.

Perhaps more important is the commitment of the Kenyan government to address sex crimes and gender violence, Ballard said. The country's 2006 Sex Offences Act increased penalties for sexual assaults, introducing minimum sentences of 10 years in prison for rape.

"Kenya is probably the country in that part of the world that is poised to put this in place," Ballard said. The result will be more crimes solved, perpetrators jailed and a long-term reduction of violence against women, she said.

Andy Fell writes about science and engineering for UC Davis News Service.

COMMENTS FROM PAST STUDENTS IN THE FORENSIC SCIENCE PROGRAM:

"I GAINED A LOT OF VALUABLE SKILLS in completing my graduate degree, especially the ability to independently problem-solve. This has set me apart from many of my peers who did not have independent research experience. Also, I gained a broader perspective of forensic science than most individuals competing for forensics jobs that did not complete any forensic training or participate in a crime lab internship."

"I NOTICE AT MY LAB that I am much more aware of forensic applications and implications than my coworkers who just consider themselves analytical chemists."

"THIS PROGRAM GAVE me many opportunities to learn from and be mentored by very talented forensic science professionals. I believe that I have benefited from the experience and the knowledge of those who came before me, and I now have context in which to interpret and respond to the issues currently facing the field."

"I HAVE GAINED INVALUABLE KNOWLEDGE, experience and mentorship in forensic science through the UC Davis forensics program."

"MY GOAL IS TO BE THE DIRECTOR of a crime lab, and the M.S. degree is essential for achieving that goal."

"MY STARTING BASE SALARY IS \$3,000 MORE per year than a person without a master's degree, and I have potential to get bigger raises and incentives. Thus, I think that the cost of the degree is worth the benefits I am currently receiving."

"I HAD EXPOSURE TO A VARIETY OF DISCIPLINES in forensic science so I am better prepared to address issues that may involve more than one discipline."

"I GRADUATED FEELING WELL-ROUNDED and knew that the DNA lab experience I gained during my thesis would help me get a job."

"THE RESEARCH PROJECT I COMPLETED for my M.S. at UC Davis was beneficial in many ways. I was able to present my project at a national Human Identification meeting, giving me the chance to learn about the most up-to-date forensic science research and technology as well as to meet/interact with my peers in the field. Having completed a research project has also helped me find work quickly and improved my position in the lab."

"THE DEGREE WAS PARAMOUNT to getting my foot in the laboratory and having the necessary knowledge base to be employable."

"I AM BETTER PREPARED to meet the future challenges facing the forensic community than compatriots who did not pursue graduate education because of the importance of networking and encouraging communication with other scientists. It provided a level of understanding about the basics of forensic science that I think can only come with graduate education or with many years of experience."

"I SEE A TIME IN THE NEAR FUTURE where post-graduate degrees will become the standard, much as a doctoral degree is largely required in the United Kingdom. This will ensure that the forensic scientists of the future are better able to think critically about the limitations and applications of the techniques, rather than simply following a cookbook."

"HAVING AN M.S. DEGREE will provide me with more opportunities to pursue an upper-level management position."

"I AM CERTAINLY IN A BETTER POSITION to lead a laboratory into the future by virtue of my graduate education. I would not have the requisite educational background to be a manager at my current laboratory if I had not completed my degree."

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"I RECEIVED GOOD FOUNDATIONAL INSTRUCTION in the underpinnings of forensic science—what makes an object unique, how events are reconstructed, etc. I anticipate that this foundational knowledge will be useful in the future as I advance my career in forensic science and broaden the scope of my expertise."

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"THE CLASSES I TOOK AT UC DAVIS have been applied towards mandatory courses for casework, allowing me to get through training faster. My education from UC Davis better prepared me for work in a crime lab, and having an M.S. degree will only help my future mobility in the industry."

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"HAVING SPOKEN TO UNIVERSITY OF FLORIDA ONLINE and Cal State Fresno M.S. students, I feel strongly that the UC Davis program is far superior both in coursework content and in research project opportunities. My graduate education allowed me to learn about the changes that the forensic community has faced throughout the past decade and learn how laboratories have evolved. Also, the research aspect gave me experience with facing challenges, troubleshooting and adapting to new issues."

.....

"I FEEL THAT I AM MORE PREPARED to deal with the current challenges solely due to the research aspect of the UC Davis M.S. degree. The research required self-reliance, self-motivation and self-drive. All of these attributes have continued since the completion of my master's degree and have allowed me to stay on top of current issues both in my field of expertise and other fields."

.....

"MY M.S. DEGREE WILL UNDOUBTEDLY HELP further my career as I move toward my goal of becoming DNA Technical Lead at a crime lab."

.....

"I DEFINITELY FEEL MORE PREPARED to meet future challenges than the technicians I have worked with at [my lab]. In-house training has a far narrower focus than the courses I took at UCD and often lacks significant scientific background/historical information. While the techs at [my lab] are highly capable at the tasks they have been doing for years, they are undeniably fearful of learning new techniques and I have been called upon several times in my tenure here to validate and use new equipment/reagents first then share this information with the rest of the lab. Having completed my own research project using techniques not previously performed at [my lab] put me forward as a developer of new methods in the lab as well as a teacher/trainer to others."

.....

"THE COURSES IN CRIME SCENE INVESTIGATION, Forensic DNA Analysis and Molecular Techniques, were simply outstanding, providing me with far more information than my peers from other forensic science programs. I am also extremely grateful for the opportunity to work on my M.S. thesis program in an actual crime lab—an experience which helped me tremendously in finding a crime lab position and in preparing me for what I would encounter once I actually started working in the field."

.....

"I APPRECIATED THE OPPORTUNITY TO LEARN from respected professionals in the field."

.....

"I RECEIVED CAREER ADVICE, job interview practice and encouragement from the Forensic Science Program staff. Everyone was genuinely interested in my future career opportunities."

.....



ABOUT UC DAVIS

The University of California, Davis campus is the largest in area of the 10 campuses in the UC system and the third largest in student population. The 32,000 students who attend UC Davis pursue a full range of undergraduate and graduate studies as well as professional programs in law, business management, medicine and engineering. Twenty-four of the undergraduate programs at UC Davis recently ranked among the top 10 in the nation, and the campus stands among the top 20 U.S. universities in research funding. Davis undergraduates persist and graduate at the highest rates among UC campuses. The UC Davis Shields Library is ranked among the top research libraries in North America and contains more than 2.2 million volumes.

ABOUT THE CALIFORNIA CRIMINALISTICS INSTITUTE

The California Criminalistics Institute (CCI), a unit of the California Department of Justice, Bureau of Forensic Services, provides specialized forensic science training to personnel who are practitioners in the field of forensic science.

Established in 1986, one of the primary missions of CCI is to provide state and local forensic scientists with a vehicle for keeping abreast of the ever-changing trends and discoveries in the field of forensic science. The program was designed to incorporate new and developing forensic technologies into California's criminalistics laboratories.

As part of its mission, CCI:

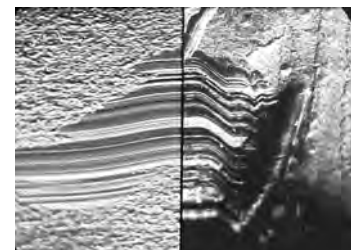
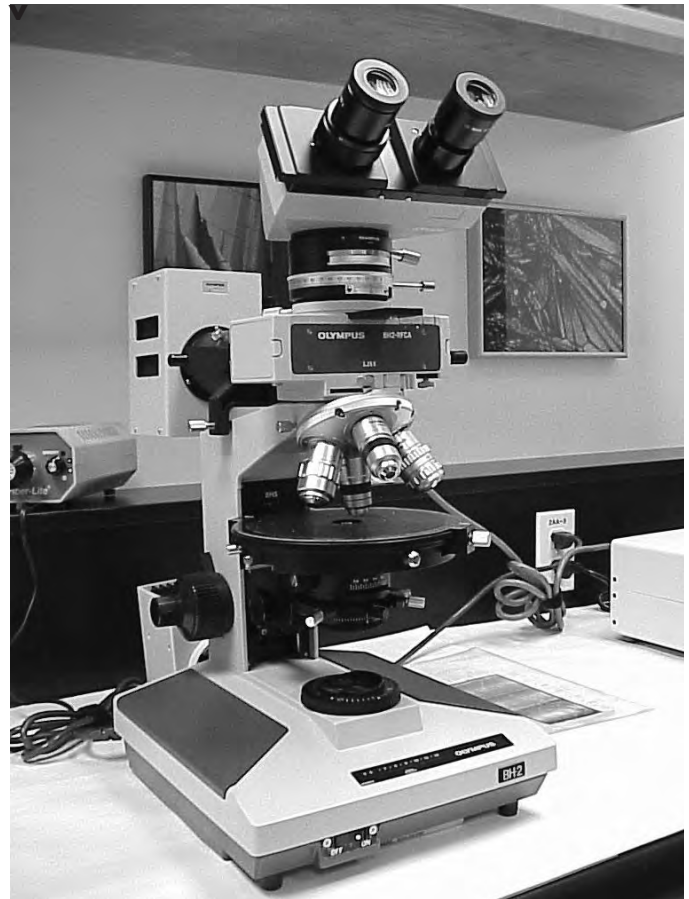
- Conducts forensic training for state and local law enforcement
- Provides literature and analytical reference information to California's criminalistics laboratories
- Develops and delivers quality assurance support to the Bureau of Forensic Services criminalistics laboratories
- Develops and evaluates new methodologies and equipment that will be used to provide more definitive answers to forensic evaluations

The students taking CCI courses include criminalists, evidence technicians, detectives and crime scene investigators from city, county, state and federal organizations.

For further information about CCI, see www.ag.ca.gov/cci.

ABOUT THE SACRAMENTO COUNTY LABORATORY OF FORENSIC SERVICES

This laboratory functions under auspices of the Sacramento County District Attorney's office (www.sacda.org). This laboratory is one of the best equipped forensic labs in California and its trace evidence section is utilized by forensic scientists throughout California. In the past two years, 12 UC Davis students have had the opportunity to work either as interns or researchers in pursuit of their varied thesis objectives using the state-of-the-art equipment in this laboratory facility.



HOW TO APPLY

Admissions are accepted for fall quarter each year.

Application deadlines:

Feb. 1 for priority review. Any application received after Feb. 1 will be considered on a space-available basis. No application received after March 1 will be considered.

Application

Complete a UC Davis Graduate Studies online application form (available at <http://forensicscience.ucdavis.edu>).

Application information must include:

- **Application fee**—a nonrefundable deposit of \$80 (domestic applicants) or \$100 (international applicants) is required and must be paid when the application is submitted. The fee may be paid by credit card or e-check. The fee must be paid before the application will be considered.
- **Statement of Purpose**—one of the most important requirements of your application. It should reflect your experience and interests as related to this program, be well organized and concise, and identify your research interests. For the applicant who is already working in the area, the statement will contain specific reference to your recent experience and accomplishments.
- **Three letters of recommendation**—from former professors or persons familiar with your technical capability and expertise and able to evaluate your readiness for graduate study in forensic science. Letters must be submitted electronically through the online application. You will be asked to include the name and email address for each of your recommenders. The recommender will automatically be notified by Graduate Studies with the instructions on how to submit his/her letter. Do not have your recommenders send letters in hard copy. **Letters must be received by the application deadline date.**
- **Personal Statement**—In an essay, you should discuss how your personal background informs your decision to pursue a graduate degree. Please include any educational, familial, cultural, economic or social experiences, challenges or opportunities relevant to your academic journey; how your life experiences contribute to the social, intellectual or cultural diversity within your chosen field; and/or how you might serve educationally-underrepresented segments of society with your degree.
- **Research Areas**—The four research areas that you are asked to fill out will help us determine the appropriate research area that may be suitable for you:
 - **DNA:** Persons choosing this area will want to focus on DNA case work and analysis. Along with this would include all biological aspects normally associated with such related case work such as identifying various biological stain and presumptive testing of such stains.
 - **Toxicology:** Persons choosing this area will want to do case work on the toxic substances found in body tissues from subjects that may have been arrested for various offenses or from coroners' cases.
 - **Chemistry:** Persons choosing this area will generally want to do research that involves the identity of unknown substances such as drugs, narcotics, trace evidence, etc.
 - **Materials science:** Persons choosing this area may want to do research in impression evidence, firearm identification, arson analysis, accident reconstruction and related areas.
- **GRE Scores**—The GRE is not required for admission to this program, but a high GRE score could improve a candidate's chances in borderline cases. The GRE institution code for UC Davis is 4834. The department code is 2202. Scores must be submitted electronically directly to UC Davis.
- **Transcripts**—one official set of academic transcripts showing graded coursework, dates of attendance and the degree earned from all colleges attended (community, state and private universities). Send your transcripts directly to the Graduate Group in Forensic Science, 1333 Research Park Dr., Davis, CA 95618. **Transcripts must be received by the application deadline date.**

If you have any questions about the application process, please contact Debbie Roberts, program administrator, by email at droberts@ucde.ucdavis.edu or by phone at (530) 754-4013.



STUDENT SERVICES

Housing

Student housing is available to any registered student and does not have a minimum unit requirement. If you are interested in student housing, contact the Student Housing office at (530) 752-2033 and look at the UCD Davis website at www.housing.ucdavis.edu.

Apartments or houses in the Davis area typically require you to sign a one-year lease beginning September 1. The website www.housing.ucdavis.edu can provide you with more information.

Transportation and parking

Parking permits may be purchased through Transportation and Parking Services (TAPS). A C-permit is available for \$127 per quarter and may be used to park in any "C" lot. The TAPS office is next to the West Entry Parking Structure.

Transportation information is available at the UC Davis website: www.taps.ucdavis.edu. This will provide you with information about various transportation facilities available in the Davis area.

Recreation

Activities and Recreation Center (ARC) passes may be purchased at the ARC office during all open hours. You may purchase an annual pass or a monthly pass. Passes are good for all Rec Hall services.

Computers and email

Email accounts may be set up using your student login ID and password. Computer labs on campus are available to all students using a student ID and password.

Student ID

Your student ID card also serves as a library card. UC Davis has an extensive network of campus libraries and many of the journals are in electronic format and available online to UC Davis students.

Employment

Some student employment positions are not available to Forensic Science graduate students as the program is self-supporting and not eligible for services supported by state funds, (the case with most positions through the Student Employment Department). However, you are eligible to apply for and accept any campus position that is open to the public. This includes both permanent/long-term positions through the Campus Employment Office, positions paid from grants and positions within the Temporary Employment Pool. This would include positions such as graduate research assistant, teaching assistant, reader or research assistant.

Medical Insurance

All students are required to have or purchase medical insurance while they are enrolled in UC Davis. You will be required to provide proof of coverage, choosing either the UC Davis plan through SHIP or private coverage.

Financial Aid

Financial aid has limited availability for Forensic Science students. Because this is a self-supporting program, state-funded aid sources are not available; however, there are a variety of federally funded and private and/or alternative loans available. Find details about financial aid options and how to apply on the Financial Aid Office website.

International Students

The UC Davis Graduate Division website <http://gradstudies.ucdavis.edu/prospective/international.html> and the Services for International Students and Scholars (SISS) at <http://siss.ucdavis.edu> provide detailed information for the entry requirements of international students. They also describe the minimum amount of financial resources that you are required to document. Because of our self-supporting nature, our current tuition costs are less than what a non-resident UC Davis student pays. The Forensic Science program does not provide any student scholarship assistance.

WEBSITES REFERRED TO IN THIS BOOKLET

American Academy of Forensic Science: www.aafs.org

Application requests: <http://forensicscience.ucdavis.edu>

California Criminalistics Institute (CCI): www.ag.ca.gov/cci

Financial aid and student loans: <http://financialaid.ucdavis.edu/graduate/apply/Apply.html> and www.studentloan.com

International Students: <http://gradstudies.ucdavis.edu/prospective/international.html> and www.extension.ucdavis.edu/international

Sacramento County District Attorney: www.sacda.org

Student housing: www.housing.ucdavis.edu

TOEFL: www.ets.org/toefl

English Language Requirements for Foreign Applicants

Applicants may fulfill the English language requirement in one of the following ways:

Submit an official score report of the Test of English as a Foreign Language (TOEFL) with a score of at least 550 on the written exam or 80 on the internet-based TOEFL. The computer-based exam is no longer accepted. Also required is the Speech Sample. The Educational Testing Service will provide information on how to complete the speaking sample section.

International students may want to enroll in the 10-week Intensive English Program at UC Davis Extension prior to beginning coursework. For more information about this program, go to www.extension.ucdavis.edu/international.

Individuals who have completed one year as a full-time student at an English-speaking university may be eligible for an English language requirement exemption. To request this waiver, write to the Forensic Science Graduate Program and explain your special qualification.

All applicants from a country whose official language is not English must fulfill the English language requirements. This includes applicants from India, Pakistan and Bangladesh. Information about the TOEFL test date and registration procedures is available at most universities and American consulates, or by writing directly to TOEFL, Educational Testing Service, CN 6154, Princeton, New Jersey 08541-6155 U.S.A. The TOEFL website is www.ets.org/toefl.

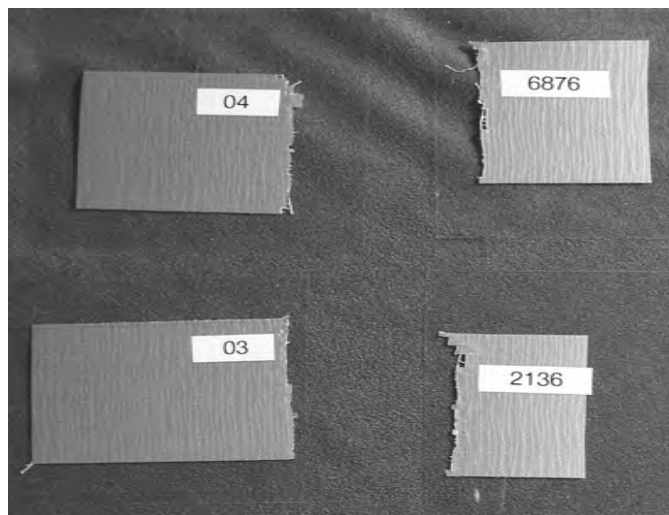
TOEFL scores more than two years old at the time of application cannot be considered. Applicants must retake the test to submit a more recent score. Applicants should register for the TOEFL at the earliest possible time to ensure that the scores are received by the Feb. 1 registration deadline. The institution code is 4834. The department code is 42.

In addition, applicants from a country whose official language is not English will be required to take the English proficiency examinations, held at the beginning of fall quarter. If your score is too low, you will not be allowed to enroll in most forensic science or other science-based courses during the first two quarters. Instead, we will direct you to an appropriate series of English classes and workshops to assist you in improving your English skills including writing, reading and comprehension, thus ensuring that you will do well in academic courses and maintain the minimum 3.0 GPA required to stay in the program. Remember that receiving a grade of B- or below will result in being placed on academic probation and two consecutive quarters of academic probation may result in dismissal from the program. Also, if a student receives a grade of C+ or lower, the class has to be repeated.

During the quarter(s) that you are taking English classes, you will be allowed to sit in or audit the forensic science courses and participate in various examinations at no cost. We hope these practice classes and the English classes will prepare you to be successful when you become eligible to enroll in these classes.

Visas

The University of California, Davis is authorized under federal law to enroll nonimmigrant students.



GENERAL INFORMATION

For more information

If you have questions about the Forensic Science Graduate Program call at (530) 754-4013, email forensic@ucde.ucdavis.edu or visit our website. <http://forensicscience.ucdavis.edu>

Tax deductibility of educational expenses

Educational expenses—including registration fees, travel, meals and lodging—may be deductible if they maintain or improve professional skills or meet the express requirement of an individual's employer.

The University of California, in accordance with applicable federal and state law and University policy, does not discriminate on the basis of race, color, national origin, religion, sex, gender identity, pregnancy*, disability, age, medical condition (cancer-related),

ancestry, marital status, citizenship, sexual orientation or status as a Vietnam-era veteran or special disabled veteran. The University also prohibits sexual harassment. The UC Davis sexual harassment policy may be viewed at <http://manuals.ucdavis.edu/PPM/380/380-12.htm>. This nondiscrimination policy covers admission, access, and treatment in University programs and activities. Inquiries regarding the University's student-related nondiscrimination policies may be directed to Jeanne Wilson, Student Judicial Affairs, (530) 752-1128; or Wendi Delmendo, Title IX Officer, (530) 752-9466.

Not produced at state expense. UC Davis Extension is a self-supporting, nonprofit organization funded by course fees, grants and contracts.

*Pregnancy includes pregnancy, childbirth and medical conditions related to pregnancy or childbirth.

FREQUENTLY ASKED QUESTIONS

Is this a UC Davis master's degree or an Extension master's degree?

The program is a UC Davis master's degree program, under the operational control of the UC Davis Graduate Division. The program is financially administered through UC Davis Extension which acts as the administrative arm for the Forensic Science Graduate Group.

Do I need to take the GRE or another graduate entrance examination before applying to this program?

No, a graduate entrance examination is not required for acceptance to the Graduate Program in Forensic Science but if you have good scores, they may make a difference in borderline admission cases.

Is the Forensic Science Graduate Program accredited by FEPAC?

FEPAC is the acronym for Forensic Science Education Programs Accreditation Commission. This commission is sponsored by the American Academy of Forensic Sciences (AAFS). The UC Davis Forensic Science Graduate Program received its accreditation in February 2010, based on an on-site inspection held in October 2009. The UC Davis program is listed on the AAFS website, www.aafs.org. Click on the FEPAC logo at the bottom of the main page. The FEPAC page lists the various colleges and universities that have met FEPAC standards. This accreditation requires a forensic science program to meet rigorous standards in various areas of forensic science.

Why is the program so restrictive on the undergraduate degree categories acceptable for admission?

As an American Academy of Forensic Sciences FEPAC-accredited program, we are limited to accepting students who meet FEPAC standards which state: "A bachelor's degree in a forensic or natural science (or its equivalent coursework in a relevant field) shall be required for entrance into a graduate forensic science program." In addition, we do not have the facilities or resources to pursue graduate level work in other forensic science areas that are not subject to FEPAC accreditation standards.

Are there any prerequisites to the program?

A bachelor's degree in a science field is required for admission. We require one year of general chemistry, one year of organic chemistry, one year of calculus and one year of physics in addition to a reasonable number of courses in your technical area. You will need a minimum GPA of 3.0 average in all your technical courses. Along with these courses, it is recommended that you hold a degree in one of the physical or natural sciences such as biochemistry, chemistry, molecular biology, biology, genetics, engineering or other closely-related field. Applicants lacking this preparation may be asked to make up deficiencies before consideration for admission, depending on the area of emphasis they wish to pursue.

Does my GPA have to be a 3.0 to apply?

The primary requirement for admission to any graduate program is evidence of intellectual achievement and promise. Your application will be evaluated primarily on the basis of your transcript to assure that your qualifications meet minimum standards as set universitywide and by UC Davis graduate councils. Generally, you must have a minimum grade point average of B (3.0) in undergraduate coursework from an institution of acceptable standing to be considered for admission. We also evaluate all of your technical courses and we generally expect these to have a GPA of 3.0 or better.

Do I have to select an area of specialization right away, or can I take a few courses before choosing a specialization?

While it is not mandatory to choose an area of specialization immediately, many students will find it helpful in drafting their statement of purpose and in choosing the right elective courses. We expect that by the end of your first year, you will be working on a research project.

Will I have to take a final examination or oral defense upon completion of the degree?

Plan I does not have a comprehensive exam or oral defense but does require that a thesis be completed and approved to earn the degree. The student will be required to present his/her research in one of the seminars.

Plan II requires the submission of a capstone project followed by an oral examination on that subject.

When are the courses offered?

The required courses and the forensic science elective courses are generally offered one to two times a week, in the evening, typically from 6-9 p.m. The general electives are usually offered on the UC Davis campus during regular campus hours.

When are the application and supporting materials due?

Applications are accepted and reviewed for the fall quarter each year. Complete applications received by **Feb. 1** will be given priority review. Applications received after Feb. 1 will be considered on a space-available basis. **No application received after March 1 will be considered.**

What does the application entail?

Completing a Graduate Studies online application requires information about your undergraduate studies, statement of purpose, letters of recommendation, GRE/TOEFL scores (if applicable) and the application fee of \$80 for domestic applicants or \$100 for international applicants.

Official transcripts from all colleges/universities attended are sent to the Forensic Science program separately.

Where can I obtain an application?

You must apply online via the program website. <http://forensicscience.ucdavis.edu/apply.asp>

How much does the program cost?

The current tuition fee is \$555 per unit. This fee is subject to change without notice. The tuition fee does not cover the costs of books, lab fees or minor supply fees. At the current rate, your overall tuition for 48 units would cost \$26,640. At the present time, the self-supporting M.S. Forensic Science program is exempt from campus fees. There are no additional fees for non-resident students.

Is financial assistance available for this program?

Students enrolled in at least six (6) units per quarter may be eligible for federal financial aid and/or educational loans. Each category has different requirements and restrictions. For details on how to apply, please visit the Financial Aid Office website.
<http://financialaid.ucdavis.edu/graduate/apply/Apply.html>

Students enrolled in less than six (6) units per quarter are not eligible for financial aid.

How competitive is this program?

Our acceptance rate ranges from 40-50% and 28% of the students who apply are enrolled in the program.

What qualifications do most forensic science crime laboratories require?

If you want a position in a crime lab, the forensic science laboratories generally mandate a degree in one of the physical or natural sciences with anywhere from eight to 30 units of chemistry. For DNA analysis, labs prefer to employ people who have also completed a course in biochemistry, genetics and molecular biology. In California, most labs require a course in quantitative analysis (lower division) or equivalent.

I want to be a crime scene investigator—is this the right education path for me to meet that goal?

The focus of our program is to develop graduates who will be working as forensic scientists or criminalists in a crime laboratory. Most laboratories respond only to major crime scenes such as homicides and officer-involved shootings. Some crime labs will not go to crime scenes. If you want to perform crime scene work, consider Evidence Technician or Crime Scene Technician positions in a law enforcement agency. These generally do not require a college degree, although a degree may be helpful.

I am a student in junior college, and I was wondering what you would recommend as a major for a college undergraduate program?

We would suggest a B.S. degree in one of the physical or natural sciences such as biochemistry, chemistry, molecular biology, biology, genetics, etc. This will provide good qualifications in order to be well qualified to work in the forensic sciences. To become a DNA analyst in a crime lab, besides having a science degree, national standards also require coursework in molecular biology, genetics and biochemistry.

On average, how long does it take to earn the Master of Science Degree in Forensic Science?

For the student who does not have a full-time professional position, we would like you to complete the program in two years. For those who are working as a professional in a crime lab, we expect the degree to be completed within five years. Our average time to degree is 2.9 years.

What are the issues facing foreign students?

Although the Immigration and Naturalization Service has strict requirements, we can accept foreign students and have had several enrolled in the program. Foreign students are required to take 12 units a quarter, but since our program is self-supporting, we can make some accommodations so overall fees for foreign students will be the same as other UC Davis Forensic Science Program students. Foreign students will be expected to complete the program in two years or less.

Visit the UC Davis Services for International Students website (<http://siss.ucdavis.edu>) for relevant information on visa issues. You may also have to meet the English language requirement for the graduate division, which sets the minimum TOEFL scores.

Do you have any fellowships or grants?

This program is a self-supporting program that currently does not have any fellowships, but occasionally the program does have paid graduate student research (GSR) positions depending on the research grant status of the program and/or the members of the graduate group. Some of our students have paid positions based on their prior work at the university or grants that have been submitted with individual faculty. Teaching assistant positions may also be available, but you would have to contact the various departments that may have openings. Ours is an inter-disciplinary forensic science group with members representing many different departments.

How long does it take to do the research?

Plan I students can expect to spend approximately 1000 hours on the research effort. This includes writing a thesis. A principal advisor will guide students in what needs to be done for the thesis. Students will be expected to complete a thesis, an article ready for submission to a peer-reviewed journal and the presentation of the results at a forensic science seminar.

What type of research will I be doing?

The program's focus on research is based on the assumption that students who have done scientific research have learned the skills needed to identify problems, propose solutions and test these solutions in a laboratory environment. Students are responsible for choosing their research topic. The graduate group has a variety of research topics in many diverse areas that are related to forensic science. You are required to have a research advisor from the graduate group. If you are working in a laboratory and have an area of interest you would like to pursue, you may select one outside advisor.

Will I be paid for my research?

In general, unless the UC Davis faculty has identified funds for the research, you will not be paid for your research effort. However, most UC Davis sponsors will provide the facilities and the basic supplies.

Can I earn the Master of Science in Forensic Science by doing only coursework?

While we prefer that students enroll in the Plan I research option, we have recently added a Plan II option for those students who are unable to complete a thesis option. The Plan II option requires more coursework than the Plan I and requires a capstone project, followed by an oral exam of that project. A capstone project requires considerably less time than a typical thesis project. We do encourage students to choose Plan I because it will provide practice skills to identify problems, propose solutions, validate solutions and publish results.

What are the job opportunities for graduates of your program?

Job opportunities in forensic science are available in many geographical areas. The American Academy of Forensic Science (www.aafs.org) has a listing of available jobs. You should also check the human resource department websites of the cities and counties that have forensic science laboratories.

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