

**San José State University  
Department of Justice Studies**

**Special Topics in Forensic Science - DNA and Crime (Seminar)**

**FS 160: Course Number 45138, Section 01, Fall, 2015**

**Course and Contact Information**

<b>Instructor:</b>	Dr. Steven Lee
<b>Office Location:</b>	On line. MH 509 for in person appointments set by email
<b>Telephone:</b>	510-882-9036 in emergencies: 408-924-2048. Best way to contact me is by email.
<b>Email:</b>	sblee999@gmail.com
<b>Office Hours:</b>	Wednesdays 1630-1730 on line- Set by appointment via email
<b>Class Days/Time:</b>	Wednesdays at 1730-2015 by WEBEX: Note, lectures will be recorded for those with conflicts. Webex capable computer is required. NOTE- No class first week First class will be held Weds 26 August
<b>Classroom:</b>	<a href="http://oucampus.sjsu.edu/people/steven.lee/courses/c2/index.html">http://oucampus.sjsu.edu/people/steven.lee/courses/c2/index.html</a>

**Course Format**

The course will be delivered on line but will have an in class midterm and final. Powerpoint presentations will be delivered by WebEx. All powerpoints and assignments will be posted to the website. A webex capable computer is required.

**Faculty Web Page and Email checking**

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on my faculty web page at <http://www.sjsu.edu/people/steven.lee/courses/c2/index.html> course website. You are responsible for regularly checking with your email (using the address loaded to the sjsu.edu web site) to learn of any updates.

## **Justice Studies Department Reading and Writing Philosophy**

The Department of Justice Studies is committed to scholarly excellence. Therefore, the Department promotes academic, critical, and creative engagement with language (i.e., reading and writing) throughout its curriculum. A sustained and intensive exploration of language prepares students to think critically and to act meaningfully in interrelated areas of their lives—personal, professional, economic, social, political, ethical, and cultural. Graduates of the Department of Justice Studies leave San José State University prepared to enter a range of careers and for advanced study in a variety of fields; they are prepared to more effectively identify and ameliorate injustice in their personal, professional and civic lives. Indeed, the impact of literacy is evident not only within the span of a specific course, semester, or academic program but also over the span of a lifetime.

### **Course Description**

Range of topics in Forensic Science which will vary by semester. Topics may include Blood Spatter Analysis, Microscopy and Trace Evidence, Forensic Art, Facial Reconstruction, and others. Repeatable for up to 9 units credit when content changes. Prerequisite: JS 10, FS 11, ANTH 157 Recommended or Instructor Permission. Justice Studies or Forensic Science major; Justice Studies minor.

This course is designed to introduce students to the basics of DNA and the application of DNA to solving crime. Students will be introduced to DNA testing utilized in criminal casework and convicted offender DNA databases. Students will become familiar with the scientific concepts, methods, practices and analytical instrumentation utilized for DNA analysis. Legal issues including national standards for quality assurance, validation, legal admissibility and training will also be covered.

Note: Must achieve a grade of "C" or better to fulfill Justice Studies major requirements.

### **Learning Outcomes (Required) and Course Goals (Optional)**

#### **Course Learning Outcomes (CLO)**

Upon successful completion of this course, students will be able to:

1. CLO1. Describe the highlights of the history and development of DNA laboratory techniques
2. CLO2. Explain the screening and confirmatory tests for the presence of biological evidence
3. CLO3. Select the different types of analyses to utilize for different amounts of biological evidence types
4. CLO4. Describe the scientific principles behind DNA techniques including PCR and design best practices for detecting and reducing contamination
5. CLO5. Provide descriptions of the current forensic DNA controls, quality assurance, standards, educational requirements and testimony utilized by accredited forensic DNA laboratories

## **Textbook**

Fundamentals of Forensic DNA Typing. John Butler 2010. ISBN 9780123749994. Academic Press

Books available at : <http://faculty.kfsc.edu.sa/jn/hakamya/documents/dna>

For copies of the figures see: <http://www.elsevierdirect.com/companions/9780123749994>

## **Other Readings**

Forensic DNA Analysis. Rudin, N. and K. Inman. 2nd Edition. 2001. ISBN: 0849302331 Publisher: CRC Press; 2nd edition (December 21, 2001) 312 pp.

Advanced Topics in Forensic DNA Typing Methodology. John Butler 2012. ISBN 978012374513-2. Academic Press ([http://220.163.113.53/G2S/eWebEditor/uploadfile/20130416175005\\_315599781486.pdf](http://220.163.113.53/G2S/eWebEditor/uploadfile/20130416175005_315599781486.pdf))

Forensic DNA Typing: Biology and Technology Behind STR Markers John Butler PhD. 2005. ISBN: 0-12-147952-8, 688pp. Academic Press

## **Required reading and Internet materials:**

Journal articles and other readings will be accessible at the SJSU library, on reserve or will be accessible on line. Citations and URLs for on line materials will be provided in assignments.

These will include:

DNA training courses <http://www.nij.gov/training/courses/welcome.htm>

STRENGTHENING FORENSIC SCIENCE IN THE UNITED STATES A PATH FORWARD 2009. NRC - [http://books.nap.edu/openbook.php?record\\_id=12589&page=R1](http://books.nap.edu/openbook.php?record_id=12589&page=R1)

NIST STRBase: <http://www.cstl.nist.gov/div831/strbase/index.htm>

NCJRS publications - <http://www.ncjrs.org/forensic/publications.html>-

[http://www.ojp.usdoj.gov/nij/sciencetech/dna\\_pub.htm](http://www.ojp.usdoj.gov/nij/sciencetech/dna_pub.htm) :

Human Genome Project Links- [http://www.ornl.gov/sci/techresources/Human\\_Genome/elsi/forensics.shtml](http://www.ornl.gov/sci/techresources/Human_Genome/elsi/forensics.shtml):  
and others

[http://www.forensic.to/links/pages/Forensic\\_Sciences/Field\\_of\\_expertise/DNA/](http://www.forensic.to/links/pages/Forensic_Sciences/Field_of_expertise/DNA/) :

<http://www.mass.gov/cpcs/links/>,

Genetic Witness: Forensic Uses of DNA Testing, Office of Technology Assessment;  
<http://www.wws.princeton.edu/~ota/disk2/1990/9021/9021.PDF>

Supplementary Texts (Optional)- Course material may include citations from the following:

Genetic Testimony. A guide to forensic DNA profiling. Spencer, C. 2004. ISBN 0-13-142338-X. Pearson Education Inc. Upper Saddle River, NJ 07458. 37 pp.

Criminalistics: An Introduction to Forensic Science (College Version), 9/E, Copyright 2007, ISBN-0132216558, RE. Saferstein, Ph.D, Prentice Hall, 672pp.  
<http://vig.prenhall.com/catalog/academic/product/0,1144,0132216558,00.html>

Techniques of Crime Scene Investigation, Seventh Edition. 2004 Barry Fisher. ISBN084931691X, 544 pages. CRC Press

The Evaluation of Forensic DNA Evidence Committee on DNA Forensic Science: An Update, National Research Council 272 pages, 6 x 9, 1996, ISBN 0-309-05395-1 National Academies Press- Available on-line for free- <http://books.nap.edu/catalog/5141.html>

### **Library Liaison**

Silke Higgins, [silke.higgins@sjsu.edu](mailto:silke.higgins@sjsu.edu), (408) 808-2118  
<http://libguides.sjsu.edu/justicestudies>

### **Course Requirements and Assignments**

SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found in [University Policy S12-3](#) at <http://www.sjsu.edu/senate/docs/S12-3.pdf>.

#### **Midterm and Final**

The midterm will be provided to you in person on Friday 16 October (time and place TBD- Please block out the day as I will be setting up the exam to accommodate as many schedules as possible).

The final will be provided to you in person on Friday 11 December 1715-1930 (Place TBD). You should plan on being available in person for both of these dates and times.

No make up exams are permitted. In extreme emergencies (with a doctor's note on letterhead, signed and sealed), a 20 page single spaced paper on a research topic (Topic TBD) with 50 citations may be substituted on a case by case basis with pre approval from the instructor.

#### **Exam format:**

- a. 70-80% Short Answer = Multiple choice, fill in, matching, true/false with explanations: Factual
- b. 10-15% Short Essay= 1-2 paragraph or diagrammatic critical thinking questions with application of your knowledge
- c. 10-15% Essay= ½ page answers with critical thinking questions

#### **Additional Assignments and Quizzes**

Additional assignments will be required as well as short answer quizzes.

Assignments will also be required for completion on line, on time.

The quizzes will also be provided to you on line via email and you will have

15 minutes to complete them. Policy for both assignments and quizzes: 10% will be deducted from your quiz grade for each minute late in returning via email to Lee

**Grading:**

Quizzes/Activities	100 points;
Midterm Exam	200 points;
Final exam	200 points;
Total required	500 points.

**Extra Credit:**

A total of 10 points may be granted for additional extra credit small group assignments and other assignments during the semester. Each assignment will be worth 1-2 points each. These extra credit points may be used to augment your final point total.

**Grading Policy**

Make-up exams will not generally be permitted. However, under extraordinary circumstances, with proper documentation and approval by the instructor, a 20 page single-spaced term paper of an instructor assigned topic, may substitute for 1 exam (with 50 recent journal citations).

**On line late grading policies**

Each minute that you are late in emailing any assignment including, quizzes, assignments and exams (midterm and final) back, 10% will be deducted from your grade, so for example, if you are late by 1 minute, the highest grade you can achieve would be 90%. If you are 2 minutes late, the highest grade you can achieve would be 80% etc.

<b><i>From -To</i></b>	<b><i>Grade</i></b>
483.5-500	A plus
467-483.4	A
450-466.9	A minus
433.5-449.9	B plus
417-433.4	B
400-416.9	B minus
383.5-399.9	C plus
367-383.4	C
< 367	F

Note that “All students have the right, within a reasonable time, to know their academic scores, to review their grade-dependent work, and to be provided with explanations for the determination of their course grades.” See [University Policy F13-1](http://www.sjsu.edu/senate/docs/F13-1.pdf) at <http://www.sjsu.edu/senate/docs/F13-1.pdf> for more details.

## Classroom Protocol

All students are expected to participate professionally in on line attendance and in group activities, be on time for all assignments and to use best practices for on – line attendance (such as keeping your phone muted to reduce background noise and be attentive to respond promptly when requested).

## University Policies

### General Expectations, Rights and Responsibilities of the Student

As members of the academic community, students accept both the rights and responsibilities incumbent upon all members of the institution. Students are encouraged to familiarize themselves with SJSU’s policies and practices pertaining to the procedures to follow if and when questions or concerns about a class arises. See [University Policy S90–5](http://www.sjsu.edu/senate/docs/S90-5.pdf) at <http://www.sjsu.edu/senate/docs/S90-5.pdf>. More detailed information on a variety of related topics is available in the [SJSU catalog](http://info.sjsu.edu/web-dbggen/narr/catalog/rec-12234.12506.html), at <http://info.sjsu.edu/web-dbggen/narr/catalog/rec-12234.12506.html>. In general, it is recommended that students begin by seeking clarification or discussing concerns with their instructor. If such conversation is not possible, or if it does not serve to address the issue, it is recommended that the student contact the Department Chair as a next step.

### Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester’s [Catalog Policies](http://info.sjsu.edu/static/catalog/policies.html) section at <http://info.sjsu.edu/static/catalog/policies.html>. Add/drop deadlines can be found on the current academic year calendars document on the [Academic Calendars webpage](http://www.sjsu.edu/provost/services/academic_calendars/) at [http://www.sjsu.edu/provost/services/academic\\_calendars/](http://www.sjsu.edu/provost/services/academic_calendars/). The [Late Drop Policy](http://www.sjsu.edu/aars/policies/latedrops/policy/) is available at <http://www.sjsu.edu/aars/policies/latedrops/policy/>. Students should be aware of the current deadlines and penalties for dropping classes.

Information about the latest changes and news is available at the [Advising Hub](http://www.sjsu.edu/advising/) at <http://www.sjsu.edu/advising/>.

### Consent for Recording of Class and Public Sharing of Instructor Material

[University Policy S12-7](http://www.sjsu.edu/senate/docs/S12-7.pdf), <http://www.sjsu.edu/senate/docs/S12-7.pdf>, requires students to obtain instructor’s permission to record the course and the following items to be included in the syllabus:

- “Common courtesy and professional behavior dictate that you notify someone when you are recording him/her. You must obtain the instructor’s permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material.”
  - Contact the instructor for the process for granting permission, in writing on a class by class basis.
- “Course material developed by the instructor is the intellectual property of the instructor and cannot be shared publicly without his/her approval. You may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor consent.”

### Academic integrity

Your commitment, as a student, to learning is evidenced by your enrollment at San Jose State University. The [University Academic Integrity Policy S07-2](http://www.sjsu.edu/senate/docs/S07-2.pdf) at <http://www.sjsu.edu/senate/docs/S07-2.pdf> requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The [Student Conduct and Ethical Development website](http://www.sjsu.edu/studentconduct/) is available at <http://www.sjsu.edu/studentconduct/>.

## **Campus Policy in Compliance with the American Disabilities Act**

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. [Presidential Directive 97-03](http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf) at [http://www.sjsu.edu/president/docs/directives/PD\\_1997-03.pdf](http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf) requires that students with disabilities requesting accommodations must register with the [Accessible Education Center](#) (AEC) at <http://www.sjsu.edu/aec> to establish a record of their disability.

## **Accommodation to Students' Religious Holidays (Optional)**

San José State University shall provide accommodation on any graded class work or activities for students wishing to observe religious holidays when such observances require students to be absent from class. It is the responsibility of the student to inform the instructor, in writing, about such holidays before the add deadline at the start of each semester. If such holidays occur before the add deadline, the student must notify the instructor, in writing, at least three days before the date that he/she will be absent. It is the responsibility of the instructor to make every reasonable effort to honor the student request without penalty, and of the student to make up the work missed. See [University Policy S14-7](#) at <http://www.sjsu.edu/senate/docs/S14-7.pdf>.

## **Student Technology Resources (Optional)**

Computer labs for student use are available in the [Academic Success Center](#) at <http://www.sjsu.edu/at/asc/> located on the 1st floor of Clark Hall and in the Associated Students Lab on the 2nd floor of the Student Union. Additional computer labs may be available in your department/college. Computers are also available in the Martin Luther King Library. A wide variety of audio-visual equipment is available for student checkout from Media Services located in IRC 112. These items include DV and HD digital camcorders; digital still cameras; video, slide and overhead projectors; DVD, CD, and audiotape players; sound systems, wireless microphones, projection screens and monitors.

## **SJSU Peer Connections (Optional)**

Peer Connections, a campus-wide resource for mentoring and tutoring, strives to inspire students to develop their potential as independent learners while they learn to successfully navigate through their university experience. You are encouraged to take advantage of their services which include course-content based tutoring, enhanced study and time management skills, more effective critical thinking strategies, decision making and problem-solving abilities, and campus resource referrals.

In addition to offering small group, individual, and drop-in tutoring for a number of undergraduate courses, consultation with mentors is available on a drop-in or by appointment basis. Workshops are offered on a wide variety of topics including preparing for the Writing Skills Test (WST), improving your learning and memory, alleviating procrastination, surviving your first semester at SJSU, and other related topics. A computer lab and study space are also available for student use in Room 600 of Student Services Center (SSC).

Peer Connections is located in three locations: SSC, Room 600 (10th Street Garage on the corner of 10<sup>th</sup> and San Fernando Street), at the 1st floor entrance of Clark Hall, and in the Living Learning Center (LLC) in Campus Village Housing Building B. Visit [Peer Connections website](http://peerconnections.sjsu.edu) at <http://peerconnections.sjsu.edu> for more information.

## **SJSU Writing Center (Optional)**

The SJSU Writing Center is located in Clark Hall, Suite 126. All Writing Specialists have gone through a rigorous hiring process, and they are well trained to assist all students at all levels within all disciplines to

become better writers. In addition to one-on-one tutoring services, the Writing Center also offers workshops every semester on a variety of writing topics. To make an appointment or to refer to the numerous online resources offered through the Writing Center, visit the [Writing Center website](http://www.sjsu.edu/writingcenter) at <http://www.sjsu.edu/writingcenter>. For additional resources and updated information, follow the Writing Center on Twitter and become a fan of the SJSU Writing Center on Facebook. (Note: You need to have a QR Reader to



scan this code.)

### **SJSU Counseling Services (Optional)**

The SJSU Counseling Services is located on the corner of 7<sup>th</sup> Street and San Fernando Street, in Room 201, Administration Building. Professional psychologists, social workers, and counselors are available to provide consultations on issues of student mental health, campus climate or psychological and academic issues on an individual, couple, or group basis. To schedule an appointment or learn more information, visit [Counseling Services website](http://www.sjsu.edu/counseling) at <http://www.sjsu.edu/counseling>.

# FS 160 DNA and Crime, Fall 2015 Course Schedule

Tentative course calendar including assignment due dates, exam dates, date of final exam; subject to change with fair notice

NOTE that [University policy F69-24](http://www.sjsu.edu/senate/docs/F69-24) at <http://www.sjsu.edu/senate/docs/F69-24>.pdf states that “Students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because active participation is frequently essential to insure maximum benefit for all members of the class. Attendance per se shall not be used as a criterion for grading.”

## Course Schedule

Week	Date	Topics, Readings, Assignments, Deadlines – all assignments due at 1200 noon, the next weds of the following week by email to <a href="mailto:sblee999@gmail.com">sblee999@gmail.com</a>
1	08/26/15	Course Overview and History of DNA- Reading Butler CH 1, CH 3 <a href="http://www.nij.gov/training/Pages/training-detail.aspx?itemid=65">http://www.nij.gov/training/Pages/training-detail.aspx?itemid=65</a> and <a href="http://www.sjsu.edu/people/steven.lee/courses/c2/s1/DNA_Sample_Handling%2001.pdf">http://www.sjsu.edu/people/steven.lee/courses/c2/s1/DNA_Sample_Handling%2001.pdf</a> <b>CLO 1</b>
2	09/02/15	Basics of Physical and Biological Evidence- Reading Butler CH 4 <b>Additional Reading</b> <a href="http://www.profiling.org/journal/vol1_no1/jbp_ed_january2000_1-1.html">http://www.profiling.org/journal/vol1_no1/jbp_ed_january2000_1-1.html</a> and <a href="http://www.sjsu.edu/people/steven.lee/courses/c2/s2/Laboratory%20Orientation%20and%20Testing%20of%20Body%20Fluids%20and%20Tissues%20for%20Forensic%20Analysts.pdf">http://www.sjsu.edu/people/steven.lee/courses/c2/s2/Laboratory%20Orientation%20and%20Testing%20of%20Body%20Fluids%20and%20Tissues%20for%20Forensic%20Analysts.pdf</a> and <a href="http://www.sjsu.edu/people/steven.lee/courses/c2/s1/S01-Crime%20Scene%20and%20DNA%20Basics%20for%20Forensic%20Analysts-20121205%202.pdf">http://www.sjsu.edu/people/steven.lee/courses/c2/s1/S01-Crime%20Scene%20and%20DNA%20Basics%20for%20Forensic%20Analysts-20121205%202.pdf</a> <b>CLO 1 and 2</b>
3	09/09/15	Basics of Biological Evidence Screening and DNA Analysis- Butler CH 2 and 3 <a href="http://www.sjsu.edu/people/steven.lee/courses/c2/s2/DNA%20Extraction%20and%20Quantitation%20for%20Forensic%20Analysts.pdf">http://www.sjsu.edu/people/steven.lee/courses/c2/s2/DNA%20Extraction%20and%20Quantitation%20for%20Forensic%20Analysts.pdf</a> <b>CLO 1 and 2</b>
4	09/16/15	Introduction to DNA and Methods : DNA Extraction Reading CH 5 and <a href="http://www.sjsu.edu/people/steven.lee/courses/c2/s2/DNA%20Extraction%20and%20Quantitation%20for%20Forensic%20Analysts.pdf">http://www.sjsu.edu/people/steven.lee/courses/c2/s2/DNA%20Extraction%20and%20Quantitation%20for%20Forensic%20Analysts.pdf</a> <b>CLO 3</b>
5	09/23/15	Introduction to DNA and Methods : DNA quantification – Reading CH 6 and <a href="http://www.sjsu.edu/people/steven.lee/courses/c2/s2/DNA%20Amplification%20for%20Forensic%20Analysts.pdf">http://www.sjsu.edu/people/steven.lee/courses/c2/s2/DNA%20Amplification%20for%20Forensic%20Analysts.pdf</a> <b>CLO 3 and CLO 4 (On line presentation -Lee in China Zhejiang Police College)</b>
6	09/30/15	Introduction to RFLP and PCR – Reading CH 7 and <a href="http://www.sjsu.edu/people/steven.lee/courses/c2/s2/DNA%20Amplification%20for%20Forensic%20Analysts.pdf">http://www.sjsu.edu/people/steven.lee/courses/c2/s2/DNA%20Amplification%20for%20Forensic%20Analysts.pdf</a> <b>CLO 3</b>
7	10/07/15	Introduction to PCR continued and STRs- Reading CH 8 and <b>Study for Midterm</b> <b>CLO 3 and CLO 4</b>

Week	Date	Topics, Readings, Assignments, Deadlines – all assignments due at 1200 noon, the next weds of the following week by email to <a href="mailto:sblee999@gmail.com">sblee999@gmail.com</a>
8	Fri 10/16/15	<b>Midterm (Friday 16 October- Time and Place TBD)</b> Chapters 1-8 and all readings listed above. <i>CLO 1-4</i>
9	10/21/15	STR separation and detection Reading CH 9 and <a href="http://www.sjsu.edu/people/steven.lee/courses/c2/s2/separation%20course.pdf">http://www.sjsu.edu/people/steven.lee/courses/c2/s2/separation%20course.pdf</a> <i>CLO 4</i>
10	10/28/15	STR genotyping and data analysis CH 10 and <a href="http://www.sjsu.edu/people/steven.lee/courses/c2/s2/STR%20Data%20Analysis%20and%20Interpretation%20for%20Forensic%20Analysts.pdf">http://www.sjsu.edu/people/steven.lee/courses/c2/s2/STR%20Data%20Analysis%20and%20Interpretation%20for%20Forensic%20Analysts.pdf</a> <i>CLO 4</i>
11	11/04/15	STR interpretation and forensic issues CH 14 and <a href="http://www.cstl.nist.gov/strbase/pub_pres/2_STR_Artifacts.pdf">http://www.cstl.nist.gov/strbase/pub_pres/2_STR_Artifacts.pdf</a> <i>CLO 4</i>
12	11/11/15	Veterans Day- No Class Reading on QA CH 13 <i>CLO 5</i>
13	11/18/15	Statistical Interpretation: Evaluating the Strength of Forensic DNA Evidence Reading CH 11 <i>CLO 4</i>
14	11/25/15	Thanksgiving – No Class Reading on DNA Databases CH 12
15	12/02/15	DNA Databases, cold hits, CODIS and SWGDAM CH 12 and CH 15 <i>CLO 4</i>
16	12/09/15	Last Class- Additional DNA loci and the Future of DNA analysis- Forensic DNA in Human Rights Investigations- Next Generation Sequencing – Study for Final CH 1-15 and all weblinks above <i>CLO 4</i>
Final Exam	Friday 12/11/15	<b><u>Final - Friday 11 December 1715-1930 (Place TBD).</u></b>

NOTE: Additional assignments may also be provided during the semester.

**Instructor:**

Professor Lee holds an a BS from SUNY Binghamton in Biology, MS from NYU and PhD from University of California, Berkeley in Molecular Biology. Lee holds several concurrent positions including consulting positions for several biotech companies, Visiting Scholar at UC Berkeley, and an adjunct professor appointment in Chemistry at Florida International University and in Biological Sciences at San Francisco State University. He was formerly the Director of R&D at CA Dept of Justice DNA Laboratory from 1994-2000 where he served as an expert witness in DNA, directed the development, validation and implementation of new technologies and, conducted DNA training courses. He is a full member of the American Association for the Advancement of Science, the California Association of Criminalists, a Fellow of the Criminalistics Division of the American Academy of Forensic Sciences, , and is an American Society of Crime Laboratory Directors Laboratory Accreditation Board certified inspector. He also served on the FBI Technical Working Group on DNA Analysis Methods group from 1994-2000. He has taught courses in molecular biology at SFSU (1996-1998), Forensic genetics at UC Davis (1997), and most recently forensic DNA Typing of STRs at FIU (2003).