

BIOST/PHG 302: Forensic Genetics, Spring 2021

Tuesdays 10:00-11:20 am. Zoom link 919 1865 7303

Thursdays 10:00-11:20 am. Zoom link 983 0330 7641

Slack Workspace by invitation.

Instructor

Dr Bruce Weir, Department of Biostatistics and Institute for Public Health Genetics

bsweir@uw.edu

Office Hours: Please post questions on Slack, or use email to request a Zoom call.

Teaching Assistant: Fa Kul, graduate student in Public Health Genetics

Course Description

This course uses actual cases to introduce the field of forensic genetics. Students develop the skills to interpret the evidence of matching genetic profiles; to perform calculations relevant for parentage determination; the identification of remains; and to consider the implications of familial searching of DNA databases.

Topics Covered

- Forensic STR markers: mutation process, genotyping technology, and electropherogram artifacts particularly new considerations for back, forward, double back stutter and exotics.
- Allelic independence, genetic characterization of relatedness.
- General principles of evidence evaluation using likelihood ratios (LRs), computing LR for identification using presence/absence of autosomal STR genotypes and for mitochondrial and Y-chromosome markers.
- Complications of mixture interpretation when the queried contributor is a relative of true contributor.
- Consequences of database searches.
- New molecular techniques for human identification.

Learning Objectives

After completing this course, students will be able to:

- Calculate single-locus likelihood ratios for a binary model with specified propositions under simplified settings (i.e. assuming no population structure and STR typing anomalies).
- Identify and describe the three main likelihood ratio modeling approaches, including strengths and limitations.
- Describe the hierarchy of propositions, identify the level of propositions in a case setting, and formulate propositions following the principles for setting hypotheses.
- Understand and recognize bias in a forensic setting, including cases where bias leads to potential fallacies such as the prosecution's fallacy and the association fallacy.
- Predict kinship values for pairs of individuals in simple pedigrees.

Course Format

Two classes per week include student presentations of actual cases and lectures by instructor.

Grading Structure

- Review posted material for each case.
- Submit mini-report (1 or 2 pages) on each of five cases (Pitchfork, Castro, Romanov, Simpson, Knox). (10 points each: 50 points total).
- Participate in student presentation of one case. (20 points)
- Submit a final report (5-10 pages) as described below. (30 points)

If the number of points is 95 or higher, your grade will be 4.0.

If the number of points is 61 or less, your grade will be 0.7.

For points in the range 62 to 94, your grade will be $(points/10 - 5.5)$.

Report Requirements

- **Mini-report (1-2 pages).** What was the crime? What role did DNA evidence play? What forensic genetic issues were raised by this case? This mini-report should be your own work and it should contain some item not in the slides posted on Canvas. You must cite all your sources, and use at least one source not given in the notes on Canvas. Upload reports to Canvas under the Assignments tab: use Word or pdf format and include your name in the title your file.
- **Student presentations.** Students have been assigned to one of 12 groups, as shown in the table below, and also in the Slack workspace. Prepare slides to answer: What was the crime? What was the DNA evidence? What calculations (if any) were performed? What issues (if any) were raised by the defense? Cite your sources. Work as a team, using Slack, on this presentation.
- **Final report (5-10 pages).**
 - Prepare a report on the nature of DNA typing in a forensic setting. Refer to cases covered in this course to describe (i) the history of DNA typing, (ii) the types of genetic markers used for forensic science, (iii) the way DNA evidence should and should not be presented in court, (iv) the effect of family relatedness on forensic genetics, (v) the use of non-human DNA, (vi) the hierarchy of propositions, (vii) post-conviction review, (viii) the pros and cons of universal genetic testing. Give full citation details of any source you use. Include at least one source not listed on the class Canvas site.
 - This report should be your own work. Report due at 5pm on Monday, June 14.

Required Readings

Readings for each case are posted on Canvas.

2021 Schedule

Tuesday	Thursday
March 30 Overview of Forensic Genetics Bruce Weir	April 1 Forensic Genetic Typing Bruce Weir
April 6 First case: Colin Pitchfork (England) Student presentation group 1	April 8 First US case: Tommie Lee Andrews (FL)
April 13 First US challenge: Joseph Castro (NY) Student presentation group 2	April 15 Familial Matching Bruce Weir Asgt 1 (Pitchfork case mini-report) due at 5pm
April 20 Familial Searching: Lonnie Franklin (CA) Student presentation group 3	April 22 Relatives: Kelvin Johnson (CA) Bruce Weir
April 27 Remains Identification: Romanov Family (Russia) Student presentation group 4 Asgt 2 (Castro case mini-report) due at 5pm	April 29 Post-conviction DNA testing Lara Zarowsky: Innocence Project Northwest
May 4 First Exoneration: Gary Dotson (IL) First Death Penalty Exoneration: Kirk Bloodsworth (MD) Student presentation group 5	May 6 Mixtures: O.J. Simpson (CA) Student presentation group 6 Asgt 3 (Romanov mini-report) due at 5pm
May 11 Plants: Mark Bogan (AZ) Student presentation group 7	May 13 Animals: Douglas Beamish (Canada) Student presentation group 8
May 18 Tim Zolandz, CODIS Program Manager, FBI	May 20 Prosecutor's Fallacy: Troy Brown (NV) Student presentation group 9 Asgt 4 (Simpson case mini-report) due at 5pm
May 25 Hierarchy of Propositions: Amanda Knox (Italy) Student presentation group 10	May 27 Genetic Genealogy: Joseph deAngelo (CA) Student Presentation group 11
June 1 DNA Testing in Washington State Sean Carhart: DNA Technical Leader, Washington State Patrol	June 3 Probabilistic Genotyping: Oral Hillary (NY) Student Presentation Group 12 Asgt 5 (Knox case mini-report) due at 5pm
June 7 Exam week No class	June 10 Exam week No class
June 14 Final Exam due at 5pm.	

Presentation Groups

Group	Member	Member	Member	Member
1	Elizabeth Alcanter	Abby Lindhout		
2	Sanjana Jobi	Kaylee Liu	Adam Rodriguez	
3	Fern Bettinger	Alia Johnson	Jack Rosen	Elsy Cruz
4	Emma Bryan	Addison Keely	Siming Yiu	Jennifer Santiago-Sanchez
5	Won Chang	Manvir Malhi	Laura Sheen	Erin Recasner
6	Souzanna Crew	Gillian Kirkpatrick	Will Marek	Julia Kuharenko
7	Melinda Day	Madison Miller	Shelby Smith	Roshni Sinha
8	Suzanne Downey	Ohl Lapilio	Juliana Miller	Ashkay Venkatesh
9	Astrid Fiallos	Mia Laposky	Katie Mortimore	Mikayla Studioso
10	Valentine Fry	Seunghyun Lee	Wendy Sun	Erin Kato
11	Morgan Li	Minh Phan	Rianna Thompson	Karina Vargas-Silva
12	Vivian Ha	Skylar Likes	Divya Puvvadi	Emma Thuline

Land Acknowledgment

The University of Washington acknowledges the Coast Salish people of this land, the land which touches the shared waters of all tribes and bands within the Duwamish, Suquamish, Tulalip and Muckleshoot nations.

Diversity Statement

Diverse backgrounds, embodiments and experiences are essential to the critical thinking endeavor at the heart of University education. In the UW School of Public Health students are expected:

1. To respect individual differences, which may include, but are not limited to, age, cultural background, disability, ethnicity, family status, gender, immigration status, national origin, race, religion, sex, sexual orientation, socioeconomic status and veteran status.
2. To engage respectfully in the discussion of diverse worldviews and ideologies embedded in course readings, presentations and artifacts, including those course materials that are at odds with personal beliefs and values.
3. To encourage students with concerns about classroom climate to talk to their instructor, adviser, a member of the departmental or SPH EDI Committee, the Assistant Dean for EDI, or the program's director.

Religious Accommodations

Washington state law requires that UW develop a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. The UW's policy, including more information about how to request an accommodation, is available at Religious Accommodations Policy (<https://registrar.washington.edu/staffandfaculty/religious-accommodations-policy/>). Accommodations must be requested within the first two weeks of this course using the Religious Accommodations Request form (<https://registrar.washington.edu/students/religious-accommodations-request/>).

Student conduct

The University of Washington Student Conduct Code (WAC 478-121) defines prohibited academic and behavioral conduct and describes how the University holds students accountable as they pursue their academic goals. Allegations of misconduct by students may be referred to the appropriate campus office for investigation and resolution. More information can be found online at <https://www.washington.edu/studentconduct/>

Disability resources

Your experience in this class is important to me. It is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law. If you have already established accommodations with Disability Resources for Students (DRS), please activate your accommodations via myDRS so we can discuss how they will be implemented in this course.

If you have not yet established services through DRS, but have a temporary health condition or permanent disability that requires accommodations (conditions include but not limited to; mental health, attention-related, learning, vision, hearing, physical or health impacts), contact DRS directly to set up an Access Plan. DRS facilitates the interactive process that establishes reasonable accommodations. Contact DRS at disability.uw.edu.

Campus safety

Call SafeCampus at 206-685-7233 anytime - no matter where you work or study to anonymously discuss safety and well-being concerns for yourself or others. SafeCampus's team of caring professionals will provide individualized support, while discussing short- and long-term solutions and connecting you with additional resources when requested.

Bias Concerns

The Office of the Dean has a student concern policy, a faculty concern policy and standard HR procedures for staff concerns. Our 2018 climate survey states that most people in SPH do not report bias incidents because they do not know where to go. Students are encouraged to report any incidents of bias to someone they feel comfortable with, including instructors, advisers or department staff.

They can email dcinfo@uw.edu for immediate follow up. Bias concerns can be anonymously and confidentially reported at this link <https://sph.washington.edu/about/diversity/bias-concerns>. Data is collected by the Assistant Dean for EDI and the Director of Program Operations for Student and Academic Services and tracked for resolution and areas are identified for further training.