

Evolutionary Genetics: 15 Fundamental Figures

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333 Science II

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Course Content: This course will focus on reading about and discussing ~15 fundamental figures in evolutionary genetics. The idea is to introduce the seminal contributions of these geneticists, their historical role in shaping the field of evolutionary genetics, how they came to their discoveries/contributions, and who they were as people. Each week we will read at •1 key paper from the primary literature by the focal geneticist along with •1 very short papers discussing historical circumstances surrounding that individual. The latter goal will be aided considerably by a recent book edited by James Crow and William Dove (2000) entitled "Perspectives on Genetics" (<\$25 from University of Wisconsin Press). This course is an excellent opportunity to learn about and critically read classic papers by and historical accounts of seminal scientists in this field.

Classes: Attendance, preparation, and weekly participation is mandatory; these will determine your grade. Every student enrolled will be expected to participate in the discussion EACH WEEK and will be asked to lead the discussion once during the semester. Leading a discussion will consist of sharing a perspective on the key paper(s), raising questions about the work (and its current relevance/role in evolutionary genetics, if possible), and offering thoughts about the social and scientific circumstances surrounding the individual's contribution(s). Expertise in evolutionary genetics IS NOT required. However, I expect EVERYONE, not just the discussion leader, to read the papers critically and thoroughly so that we can have good discussions. During these discussions, I expect a free exchange of thoughts and I encourage everyone to ask questions even if they seem unbearably simple. It won't do you any good if you don't understand what we're discussing! I may provide mini-lectures as a supplement where additional background is required or requested by the participants.

Tentative Schedule and Topics

<u>WEEK</u>	<u>TOPIC [readings from Crow and Dove (2000)]</u>
1	Organizational meeting
2	Gregor Mendel [pp. 284-292] 1866. Versuche über Pflanzen-hybriden. Verhandlungen des Naturforschenden Vereins in Brünn. Translated by R. A. Fisher as "Experiments in plant hybridisation", pp. 7-51.
3	Labor Day
4	Francis Galton [pp. 357-360, 465-468] 1888. Co-relations and their measurement, chiefly from anthropometric data. Proc. R. Soc. London 45:135-145.
5	Godfrey Harold Hardy and Wilhelm Weinberg [pp. 54-57] Hardy, G. H. 1908. Mendelian proportions in a mixed population. Science 28:49-50. Stern, C. 1943. The Hardy-Weinberg law. Science 97:137-138.
6	Thomas Hunt Morgan [pp. 349-352, 672-675] 1913. Factors and unit characters in Mendelian heredity. Am. Nat. 47:5-16.
7	Ronald Aylmer Fisher [pp. 142-146, 667-671] 1918. The correlations between relatives on the supposition of Mendelian inheritance. Trans. R. Soc. Edinburgh 52:399-433.
8	Sewall Wright [pp. 3-4, 531-538] 1922. Coefficients of inbreeding and relationship. Am. Nat. 56:330-338.
9	Alfred Henry Sturtevant [pp. 37-39, 233-237, 493-496] 1920. Genetic studies with <i>Drosophila simulans</i> . I. Introduction. Hybrids with <i>Drosophila melanogaster</i> . Genetics 5:488-500.
10	John Burdon Sanderson Haldane [pp. 253-258, 617-631] 1922. Sex-ratio and unisexual sterility in hybrid animals. J. Genet. 12:101-109.
11	Herman Joseph Muller [pp. 51-53, 238-241, 632-637] 1927. Artificial transmutation of the gene. Science 66:84-87.
12	Theodosius Dobzhansky [pp. 31-34, 555-559, 612-616] 1937. Genetic nature of species differences. Am. Nat. 71:404-420.
13	Barbara McClintock [pp. 469-474, 516-519, 688-692]

1951. Chromosome organization and genic expression. Cold Spring Harbor Symp. Quant. Biol. 16:13-47.
- 14 Thanksgiving Week
- 15 **Gustave Malécot** [pp. 103-118]
1955. The decrease of relationship with distance. Cold Spring Harbor Symp. Quant. Biol. 20:52-53.
- 16 **Richard C. Lewontin** [pp. 227-232, 378-383]
1966. A molecular approach to the study of genetic heterozygosity in natural populations. II. Amount of variation and degree of heterozygosity in natural populations of *Drosophila pseudoobscura*. Genetics 54:595-609.
- 17 **Motôo Kimura** [pp. 17-18, 93-96]
1968. Evolutionary rate at the molecular level. Nature 217:624-626.

You may find that this list omits one of your “favorite” fundamental evolutionary geneticists or focuses on a paper by one of them that you consider less seminal than another. Well, speak up then! It’s your class too. Of course, we can’t discuss ALL the important contributors to the field of evolutionary genetics because of our time constraint, so we must make difficult choices. Certainly others such as Jim Crow, William Castle, Russell Lande, Masatoshi Nei, Wen-Hsiung Li, Lynn Margulis, Joe Felsenstein, Francisco Ayala, John Avise, John Maynard Smith, William Hamilton, etc., etc. have made crucial contributions as well.