Saturday

8:00-9:00  Breakfast

9:00-10:00  Featured Talk
  Dick Hudson Ecology & Evolutionary Biology, UCI
  Fun with coalescents

10:15-12:15  First Session
  Jonathan B. Geller  Hopkins Marine Station, Stanford
  Within and between species variation in mitochondrial rDNA in Mussels
  Robert Gibson  Biology, UCLA
  What lks have told us about sexual selection
  Kristina Jones  Botany, UC Davis
  Fertility selection in plants: a model with non-random mating
  Michael Fugate  Dept. Biology, UCR
  Genetic relationship between populations of 4 species of fairy shrimp
  William Klitz  Integrative Biology, UCB
  Unraveling of complex genetic traits
  Gerrit Platenkamp  Botany & Plant Sciences, UCR
  Quantitative genetics of seed characters in baby blue eyes

12:30-1:30  Lunch

2:00-3:20  Second Session
  Trevor Price  Biology, UCSD
  Evolution of a color pattern
  Lily Lion  Dept. Biology, UCSD
  Evolution of song in Phylloscopus warblers
  Adam Richman  Dept. Biology, U. Oregon
  Evolution of ecological segregation in the Old World leaf warblers
  Austin Burt Biology, UCSC
  The selective advantage of mate choice

3:20- 4:00  Coffee break

4:00-6:00  Third Session
  Sean Rice  Integrative Biology, UCB
  Evolutionary dynamics with two levels of selection
  Enrique F. Lessa  MVZ, UCB
  Surveying DNA sequence variation using gradient gel electrophoresis
  Manyuan Long  Center for Population Biology, UCD
  Molecular evolution of ADH pseudogene in D. yakuba and teissieri
  Bradley Shaffer  Zoology, UCD
  The genetic basis of convergent evolution in amphibian metamorphosis
  Joanna Mountain Genetics, Stanford
  Nuclear DNA polymorphisms and human evolution
  John Wakeley  Integrative Biology, UCB
  Substitution rate variation in non-recombining DNA sequences

6:30  Dinner

8:00-8:40  Forth Session
  Scott Edwards  Biochemistry & MVZ, UCB
  mtDNA of babblers: coalescence across Pleistocene water barriers
  Gordon Fox  Ecology & Evolution, Arizona
  Inferences in multilocus genetics: Wright meets the Hamiltonian
Sunday

8:00-9:00  Breakfast

9:00-10:00  Featured Talk
  Brian Charlesworth  Ecology and Evolution, Chicago
  Fun with Sex

10:15-12:15  Fifth Session
  Jaume Bertranpiedt  Genetics, Stanford
  PCA of gene frequencies and the history of human populations
  Kevin Laland  Integrative Biology, UCB
  Sexual selection with a culturally transmitted mating preference
  Robert Podolsky  Botany & Plant Sciences, UCR
  Patterns of variation in two populations of Clarkia dudleyana
  Laura Galloway  Botany, UCD
  Environment-dependent heritability of reproductive isolation in Mimulus
  Valeria Souza  Ecology & Evolutionary Biology, UCI
  Paradoxical fitness effects due to recombination in bacteria
  Luis Eguiarte  Botany & Plant Sciences, UCR
  Population genetics of tropical plants

12:30-1:30  Lunch

2:00-3:40  Sixth Session
  Michael Travisano  Zoology, Michigan State
  Adaptation and divergence during long-term evolution
  Fred Janzen  Ecology & Evolution, Chicago
  Natural selection on body size in hatchling snapping turtles
  Maria Orive  Integrative Biology, UCB
  Effective population size in clonal organisms
  Edmund D. Brodie III  MVZ, UCB
  Correlational selection in garter snakes and its genetic implications
  Philippe Jarne
  Population structure & mating systems in freshwater hermaphroditic snails

People who could talk, but who claimed they didn't care one way or the other:
  Alan Rogers  Anthropology, Univ. of Utah
  Population growth makes waves in distribution of pairwise differences
  Gord Hines  Math & Stat, Univ. of Guelph
  Sex as an investment strategy
  H. Allen Orr  Center for Population Biology, UCD
  A genetic model of speciation: hybrid sterility in Drosophila
Participants

Robin Bush  Dept. Ecology, UC Irvine
Briette de Saint Phalle  Biology, UC Santa Cruz
Steven Frank  Ecology & Evolutionary Biology, UC Irvine
Jonathan B. Geller  Hopkins Marine Station, Stanford
Robert Gibson  Biology, UCLA
Monty Slatkin  Integrative Biology, UC Berkeley
Lianne Voelm  Genetics, UC Berkeley
Mark Grote  Integrative Biology, UC Berkeley
Trevor Price  Biology, UC San Diego
Karen Marchetti  Zoology, UC Davis
Hugh Salamon  Integrative Biology
Kristina Jones  Botany, UC Davis
Peter Hecht  Molecular and Cell Biology, UC Berkeley
Michael Fugate  Dept. Biology, UC Riverside
Lilly Lion  Dept. Biology, UCSD
Mark Tinkle  Dept. of Biology, UC San Diego
Magnus Nordborg  Dept. Biological Sciences, Stanford
William Kitz  Integrative Biology, UC Berkeley
Glenys Thomson  Integrative Biology
Gerard Platekamp  Botany & Plant Sciences, UC Riverside
Bill Rice  Biology, UC Santa Cruz
Adam Richman  Dept. Biology, U. Oregon
Ana Maria Valdes  Integrative Biology, UC Berkeley
Austin Burt  Biology, UCSC
Vassiliki Koufopanou  Biology, UCSC
Damian Gessler  Biology, UCSD
Sean Rice  Integrative Biology, UCB
Enrique P. Lessa  MZ, UCB
Chaoqiang Lai  Center for Population Biology, UCD
H. Allen Orr  Center for Population Biology, UCD
Charles H. Langley  Center for Population Biology
Manyuan Long  Center for Population Biology, UCD
Gord Hines  Math & Stat, Univ. of Guelph
David Pollock  Biological Sciences, Stanford
Peter Godfrey-Smith  Philosoph, Stanford
Jaume Bertranpetit  Genetics, Stanford
Jonathan Eisen  Biological Sciences, Stanford
Yoko Satta  Population Genetics, National Institute of Japan
Robert Podolsky  Botany & Plant Sciences, UC Riverside
Eric Nagy  Botany, UCD
Laura Galloway  Botany, UCD
Valeria Souza  Ecology & Evolutionary Biology, UCI
Luis Eguiarte  Botany & Plant Sciences, UCR
Fred Janzen  Ecology & Evolution, Chicago
Maria Orive  Integrative Biology, UCB
Edmund D. Brodie III  MZ, UCB
Philip Spleth  Plant Pathology, UCB
Scott Edwards  Biochemistry & MZ, UCB
Alan Rogers  Anthropology, Univ. of Utah
Gordon Fox  Ecology & Evolution, Arizona
Joseph Lorenz  Anthropology, UCD
Jamie King  Zoology, UCD
Jennifer MacDonald  Center for Population Biology, UCD
Tim Frout  Genetics, UCD
Bradley Shaffer  Zoology, UCD
Joanna Mountain  Genetics, Stanford
Pam Wiener  Biological Sciences, Stanford
Sally Otto  Biology, Stanford
David Goldstein  Biology, Stanford
Aviv Bergman  Biology, Stanford
John Wakeley  Integrative Biology, UCB
Michael Travisano  Zoology, Michigan State
Dick Hudson Ecology & Evolutionary Biology, UCI
John Braverman  Center for Population Biology, UCD
David Neale Institute of Forest Genetics, USFS
Kim Marshall  Institute of Forest Genetics, USFS
Brian Charlesworth  Ecology and Evolution, Chicago
Deborah Charlesworth  Ecology and Evolution, Chicago
Jane Charlesworth  Center for Lizard Biology, Chicago
John Gillespie  Center for Population Biology, UCD
David Mirman  Genetics, UCD
Paul E. Turner  Zoology, Michigan State
Anne Gerber  
Kevin Laland  Integrative Biology, UCB
Eric Rowe  Integrative Biology, UCB
Robin Gordon  Sacramento Country Day School
Deborah Rogers  Forestry & Resource Management, UCB
Philippe Jarne  Ecology & Evolution, Chicago
Dick Hudson: Coalescence

Gene Genealogy

Wright-Fisher Neutral Model

- Choose $F_2$ randomly
- Add mutation

when did these two have common ancestor

- $p(\text{same parent}) = \frac{1}{2N}$
- $p(\text{different}) = 1 - \frac{1}{2N}$
- $p(\text{recent ancestor at } t)$

mutation: constant per generation

- Difference between these two sequences should be
  
  $E(2U) = \frac{1}{2} \mu N$ (from above)

- $\frac{1}{2} \mu N$

- $p(\text{same}) = \frac{\frac{1}{2} \mu N}{\frac{1}{2} \mu N + 2U}$

- $p(\text{different}) = \left(\frac{2U}{\frac{1}{2} \mu N + 2U}\right)^j \left(\frac{1}{2} \mu N \right)^j \left(\frac{2U}{\frac{1}{2} \mu N + 2U}\right)^{-j}$
Geographic Structure

\( p(A \text{ came from other pop}) = 2m \)

\( E(T \text{ common ancestor}) = 4N \) (mean)

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<tr>
<th>fixed</th>
<th>synonymous</th>
<th>non-synonymous</th>
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<td>polym.</td>
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all mutations of
1. will get fixed

all here
poly...
B. Charlesworth: Evolution of Sex Chromosomes

Hermaphrodites \( \rightarrow \) separate sexes

\[ \phi + \phi \rightarrow \phi + \phi \]

\[ \phi + \sigma \rightarrow \phi + \sigma \]

\[ \phi \rightarrow \sigma \quad \text{ANDRODIOECY} \]

many examples of GYNO Dioecy but not ANDRO Dioecy

- must also include cytoplasmic factors because those factors are inherited through \( \phi \) and \( \sigma \) fertility is less "important"

- inbreeding avoidance may help explain advantages of GYNO Dioecy

\[ \text{in plants that are self-compatible} \]

\[ M, F \]

\[ M^{A-} + M^{A+} \rightarrow F^{a+} + M^{A-} \rightarrow M^{a+} F^{a+} \]

\[ F^{a+} \rightarrow F^{a-} \]

\[ M^{a-} \rightarrow M^{a+} \]

\[ M^{a+} F^{a+} \rightarrow M^{a+} F^{a-} \]

male sterility due to recessive mutation

- male \( \sigma \) sterile due to recessive mutation

female \( \phi \) sterile due to "male sterility locus"

\[ M^{-} M^{-} \]

\[ \phi \text{ sterility locus} \]

\[ \begin{array}{c|c|c}
\phi & \phi & F \\
F & F & M \\
\end{array} \]

Gene for \( \phi \) or \( \sigma \) sterility must be linked for \( \phi \) invasion will occur
How does Y evolve to become degenerate?

Muller's ratchet

Y accumulates damage so may "want" to increase dosage of X relative to Y

Bill Rice's ratchet

Hitchhiking of deleterious mutations on Y chromosomes may lead to dosage compensation

Transposons on Y chromosomes

[Drawings of genetic elements and processes]

[Diagrams of genetic processes and relationships]
Lily Liu: Evolution of song in Phylloscopus warblers

Song can only be related to history in very closely related organisms.

Song may be constrained by environment.

* Trevor Price?

- Origin of new features in evolution
- Problem: selection obscures origin
- No theory of development

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<th>Species</th>
<th>Patches</th>
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Lack of melanin is due to premature melanocyte death.

Development Model:
- "Activator" of pattern autocatalyzes itself
- Also starts "repressor"
1. Jonathan Geller: Mitochondrial RNA variation in muskrat
   Mytilus edulis complex
galloprovincialis
transulcis

How does
ballast work?

2. Kristina Jones: selection and plant population evolution
   Evolution of flowers.

   adults
   pollination
   --- > fertilization
   offspring
   pollen receipt
   --- > seed maturation

must incorporate
1) non-random mating

Assort. mating acts
like disruptive selection

3. Michael Pugate: UCR
   Genetic relatedness of 4 species of fairy shrimp
   population:
   Est. rest for 2 3 4 5 6 7 8 9
   
   Est

4. William Klitz: unraveling of complex genetic traits
   Genetic IDDM
   Transmission ratio analysis
Mitochondrial variance within a population as indication of population size.

\[ \text{freq.} \]

\[ i = \text{pairwise distance} \]

\[ \text{predicted from population of constant size} \]

\[ \Theta_0 = 2 \mu N_0 \]
\[ \Theta = 2 \mu N_1 \]
\[ \Theta = 2 \mu t \]

No = original population size
\[ u = \text{sum of mutations per generation} \]

Can use to predict \( t \)
Scan Rice

1. Colony of cells w/ asexual reproduction
2. Individual selection
3. Groups make baby groups at different time scale

How do groups make baby groups?

Scott Edwards mtDNA in bubbles
Mangum Long
A04: Pseudo-pseudogenes in Drosophila

Evolution of metamorphosis in salamanders
Joanna Mountain

1. Directed evolution with two alleles
2. Add two lac genes to E.coli
do Caussin's test
analyze types of mutation
3. Introduce adjacent mutations to see how they change
S. Otto  Evol. implications of Ploidy Level

- see Valero et al in TREE
  - haploids have less DNA to copy; can do it faster
  - diploids can have heterozygote advantage
  - diploids have copy to aid in repair
- if two copies of every gene deleterious recessive mutations can be masked

WHAT ABOUT GENE DUPLICATIONS IN HAPLOIDS?

working hypothesis:

3 2

market due to duplications in haploids
Jaume Bertranpetit: Origin of the Bearded

Kevin Laland: Cultural Influences on Sexual Selection

Robert Flaherty

Laura Salkowsky

Reproductive allocation

Q: What does that mean in terms of chloroplasts?

Q

Test allocation

Q

If source-sink models hold for allocation then chloroplasts may be very important

Michael Travisano: Adaptation & Divergence during Long-term Evolution

What is the Arabidopsis mutation?

Valerie Seara