

# Human Biology Newsletter

The Program in Human Biology | Stanford University

Spring 2008

## The Case of the Missing Warbler *Student Searches for Environmental Clues*



Photo: Curt Given

For nearly three months **Bill Anderegg (HB '08)** searched in vain for yellow warblers, the canary-colored songbirds that migrate to Northern California each spring. Using a standard technique for measuring bird density called “spot-mapping,” he would walk a ten-acre quadrant of the Jasper Ridge Biological Preserve, documenting breeding pairs of birds. This bird census was part of his Honors research project, which he will publish later this year.

What Anderegg discovered was troubling. By comparing his data to a similar census taken in 1972 by **Dave DeSante**, a former Stanford student who now runs the Institute for Bird Populations, he found that bird diversity dropped significantly in the region, especially among neotropical migratory birds. In 1972, yellow warblers were the fourth most common species in the territory, with 15 territorial males observed. During his 2007 census, Anderegg only saw one warbler.

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### DIRECTOR'S MESSAGE

As our society faces an ever-growing list of global problems – from climate change, to resource shortages, to emerging diseases – our faculty must ask the question: What are the most important things to teach the next generation of Human Biology students? What makes this a particularly daunting task is that at the same time the body of scientific knowledge is rapidly expanding.



Carol Boggs

With the passing of one of the esteemed founders of Stanford's Human Biology Program, **Joshua Lederberg, Ph.D.**, we are reminded of how far genetics has come since his 1958 discovery of bacterial gene transfer. To further prepare our students to take advantage of the next wave of scientific breakthroughs, we have reevaluated our Core curriculum. This is all part of our goal to provide students with a better “toolkit” for tackling the challenges that lay ahead. So, as science, society, and the earth evolve, so does our curriculum. §

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UNDERGRADUATE RESEARCH

## Warblers, cont'd

Working with [Terry L. Root, Ph.D.](#), Senior Fellow at the Woods Institute for the Environment, and [Carol Boggs, Ph.D.](#) Director of the Program in Human Biology and Professor (Teaching) of Biology, Anderegg is researching the factors that may have contributed to this decline in the bird fauna. Root's work uses small-scale studies of plant and animal populations to reveal larger ecological trends important to humans. Based on this research, she has found that climate and vegetation changes are important factors in shaping the ranges and abundances of birds.

Though Anderegg is currently in the middle of data analysis, he has a few preliminary theories as to why the yellow warbler populations are declining at [Jasper Ridge](#).

"While non-migratory bird populations here are also going down, the disproportionately large decline in neotropical migrants leads us to believe that changes elsewhere may be reducing these populations," said Anderegg. "Neotropical migrants typically spend the winter anywhere between Mexico and Brazil, and their absence here could be caused by disruptions in their wintering grounds or migratory pathways, due to deforestation and human development. Perhaps the birds are having trouble finding places to roost safely during their long migratory journeys."

After Anderegg finishes his honors thesis, he hopes to publish his findings in a journal like "Conservation Biology." In addition to his research, Anderegg participates in the "[Students for Sustainable Stanford \(SSS\)](#)" program, which spearheads projects that range from reducing disposable cup waste at Stanford's dining halls, to the "Green My Apple" campaign, which seeks to convince



Photo: Sabrina Boyce

Bill Anderegg (HB '08)

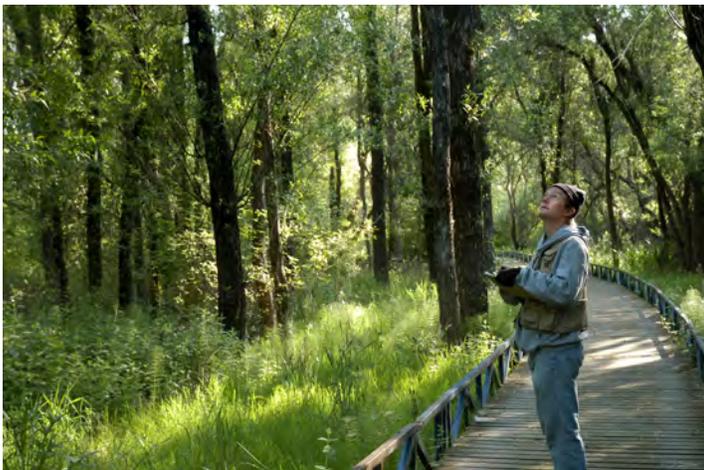
Apple, Inc., to phase out the toxic substances in their hardware and to improve their recycling program. Next year Anderegg plans to attend a graduate program in environmental science and biology, and to continue his new-found hobby of bird watching. §



STUDENTS FOR A SUSTAINABLE STANFORD

## Jasper Ridge Preserve: Stanford's Living Laboratory

[Jasper Ridge](#) was formally designated as a biological preserve in 1973. This 1,189 acre parcel serves as a natural laboratory for researchers from Stanford and all over the world. For example, Human Biology Program co-founder [Paul Ehrlich, Ph.D.](#), Bing Professor of Population Studies, and his colleagues, frequented Jasper Ridge while studying Bay checkerspot butterfly populations. Their work formed the basis for several modern concepts in population biology. After the butterfly's extinction at Jasper Ridge in 1998, analyses by Ehrlich, current Human Biology Director [Carol Boggs](#), and other colleagues established that altered climate was a factor in the butterfly's decline. Ehrlich's pioneering work demonstrated the unique value of long-term research in ecology. §



Anderegg "spot mapping" at Jasper Ridge.

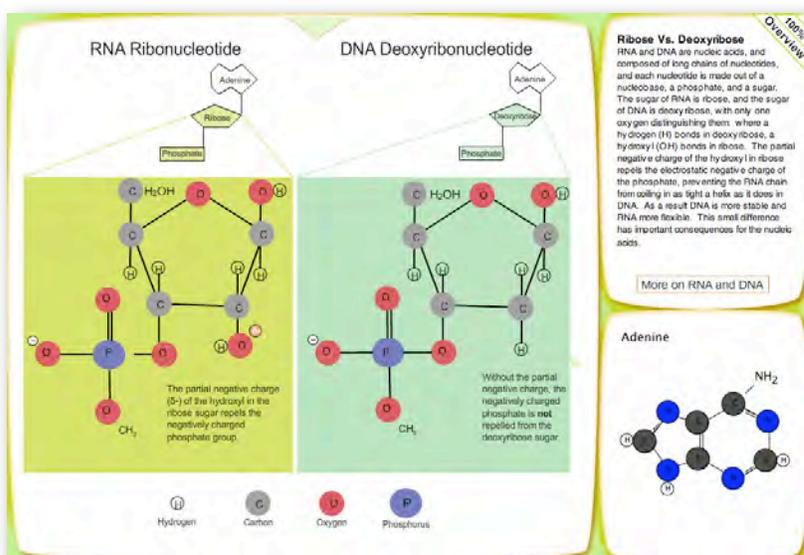
## Chemistry in a Box

### New HumBio Chem Module Launched

One of the challenges in the Human Biology Core is teaching students who have diverse chemistry backgrounds. Some basic organic chemistry is taken for granted when lecturing about metabolic processes. Also, some conceptual understanding of how DNA is transcribed into RNA, and RNA is translated into proteins, is necessary to follow an explanation of many viral and congenital diseases. For students who need a quick refresher course, HumBio's

Because it's in an electronic format, unlike a textbook, the Chem Module can be revised on the fly. Tutors can use the module like flash cards when helping out their students, and later email a reference to any part of the module by linking to a static URL.

Professor [Uta Francke, M.D.](#), used the module as a visual aid during her lectures in the fall, saying, "Its easy access to the structures of the molecules of life was a real asset in teaching, and the openness of the system allowed me to add outside videos to enliven lectures with movement and sound." §



## More on the Core

### Fall Quarter: From Genetics to Societies

This is the third in a series of articles about the Human Biology "Core," a 30-unit course sequence taken by Human Biology sophomores. Its goal: To provide students with a broad understanding of humans from biological, behavioral, and social perspectives.

During fall quarter, the Core consists of two integrated courses, HB-2A and HB-2B. The A-side covers evolutionary processes, genetics, and ecology. The B-side examines social theory, some ethnography, the evolution of hominids, and the emergence of social and cultural complexity. Three modules integrate the two sides by illustrating the ways in which biology and culture interact.

In the fall of 2007, [Uta Francke, M.D.](#), a Genetics and Pediatrics professor and a Howard Hughes Medical Institute Investigator, joined the A-side of the Core to teach molecular genetics. (Francke is one of the leading researchers in the world studying the genetic basis of disease.) Next academic year the B-side will be re-organized and better integrated to trace human biological and

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Chem Module web page: <http://humbio.stanford.edu/chem>

academic technologists, [Carlos Seligo, Ph.D.](#) and [Larry Spackman](#), developed an innovative online chemistry teaching aid, "[The Chem Module](#)."

The Chem Module covers important biochemical information needed in HumBio lectures. Using graphics-rich web pages, basic chemistry concepts are grouped functionally, populated with hot spots that allow students to "drill down" for more details. Many of the chemical processes are animated, providing students with a deeper understanding of the dynamics of organic chemistry.

Students are able to navigate through the information in the manner that best suits their individual learning styles—either by clicking on functionally grouped graphics or by navigating through an alphabetized index. The Chem Module also links to outside videos and resources, such as Harvard's stunning animation, "[The Inner Life of the Cell](#)" and Rutgers's Protein Data Bank.

FALL	WINTER	SPRING
<b>HB 2A</b> Genetics, Evolution, Ecology	<b>HB 3A</b> Cell & Developmental Biology	<b>HB 4A</b> The Human Organism
<b>HB 2B</b> Culture, Evolution, & Society	<b>HB 3B</b> Behavior, Health, & Development	<b>HB 4B</b> Environmental & Health Policy Analysis

## FACULTY NEWS

## In Memoriam: Nobel Laureate Joshua Lederberg

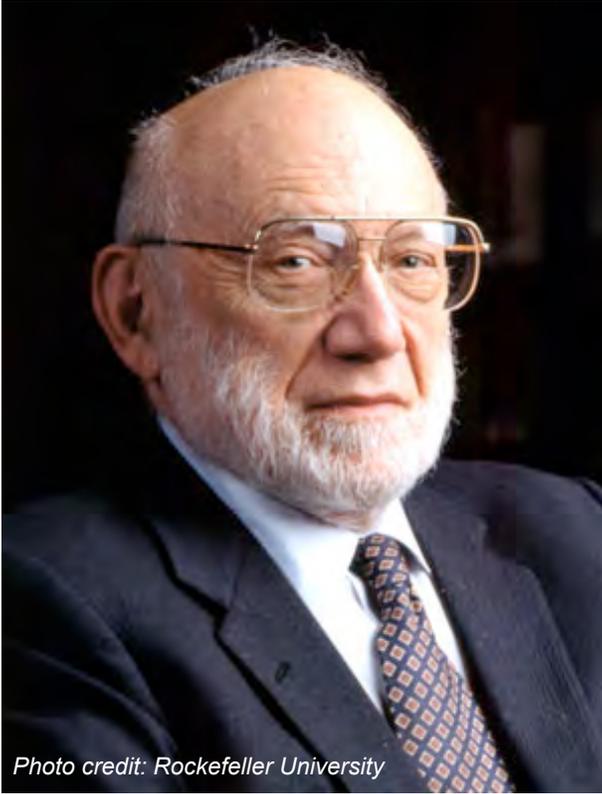


Photo credit: Rockefeller University

**Joshua Lederberg, PhD**, winner of the 1958 Nobel Prize in Science/Medicine and co-founder of Stanford's Program in Human Biology, died on Feb. 2 of pneumonia. He was 82. Lederberg was honored for his discovery that bacteria transfer genetic information, overturning the prevailing theory that bacteria weren't able to swap DNA. Lederberg found that bacteria exchange loops of DNA called plasmids, and that these allow bacteria to pick up new genes so that they can better adapt to new environments.

In 1959 Lederberg arrived at Stanford's School of Medicine to become the chair of Genetics. Recognizing the need for an interdisciplinary curriculum that integrated human biology and the social sciences, he co-founded Stanford's Program in Human Biology in 1970, along with Professors **Sanford Dornbusch, Paul Ehrlich, David Hamburg, Albert Hastorf, Donald Kennedy, Norman Kretzmer**, and **Colin Pittendrigh**.

As a professor in Human Biology, Lederberg opened students' eyes to the implications of emerging biological knowledge, addressing such topics as the evolution of bacteria to adapt to antibiotics, the uses and abuses of

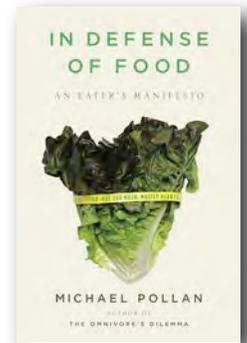
genetic technologies, and ethical issues in organ transplantation. The Joshua Lederberg Award for Academic Excellence in Human Biology is awarded annually to honor his contributions to the program and to encourage other students to follow in his footsteps. §

## CONTINUING EDUCATION

### Brain Food "To Go"

You can now watch or listen to **Michael Pollan's** recent HumBio talk on food by downloading it to your iPod or computer. Pollan's book, "The Omnivore's Dilemma: A Natural History of Four Meals," was named one of the ten best books of 2006 by the New York Times. In this humorous and enlightening talk, based on his 2008 book "In Defense of Food," Pollan, a Knight Professor of Science and Environmental Journalism at UC Berkeley, expanded on his manifesto, "Eat Food, Not Too Much, Mostly Plants."

Download site: <http://med.stanford.edu/medcast>. §



### Free Global Water Conference

**Gabriel Novais** (HB '09), co-president of Stanford Association for International Development (SAID), has been awarded funds from the William Bingham Foundation to co-sponsor the conference, "Water and the Developing World."

Panelists at this two-day conference will present global water issues through an interdisciplinary lens, discussing the future of water for both production and consumption. Keynote speakers will include HumBio co-founder **Donald Kennedy**, the former President of Stanford and Editor-in-Chief of Science magazine; **Vanessa Tobin**, chief of water at UNICEF, and **Paul Polak**, CEO of International Development Technologies.

This free conference is open to the public. To register and for more information, visit this website: <http://waterconference.stanford.edu/home> §

## EVENTS

## Celebrating Darwin's Birthday

In February the Stanford community celebrated Charles Darwin's 199th birthday with an afternoon of student and faculty presentations on the life and science of the man who developed the theory of natural selection. The event was organized by Human Biology professors, **William Durham, Ph.D.**, Bing Professor of Human Biology, and **Robert Siegel, M.D., Ph.D.** Associate Professor (Teaching) of Microbiology and Immunology, and School of Education staffer **Nancy Pinkerton**, with the assistance of HumBio undergraduates.

The first half of the afternoon featured presentations by student participants of last summer's Darwin Safari, a Bing Overseas Seminar to the United Kingdom. During this three week trip, Siegel led a group of fifteen undergraduates through England, Scotland, and Wales to examine Darwin's life and times. In their presentations, Human Biology students **Rebecca Tisdale**, **Anne Stake** and others shared stories of their travels and their research on Darwin's education, home life, and contemporaries.

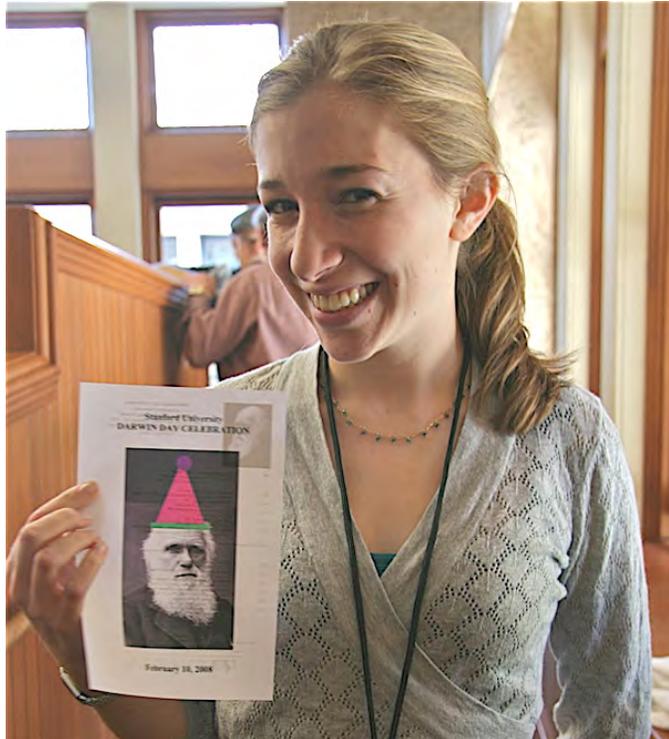
After a short break to enjoy Darwin's birthday cake, the symposium continued with presentations on how Darwin's legacy lives on today. It included talks by HumBio undergraduates, **Becca Briggs** and **Thomas Lew**, as well as professors **Bill Abrams** and Bill Durham. Professor **Michael Marmor** in Ophthalmology talked about the evolution of the eye; and not only did he begin with the ironic premise that the brain is an out-pouching of the eye, but he delivered the entire talk in rhyming poetic verse. The symposium concluded with a talk by special guest **Peter Boyd**, curator of the Shrewsbury Museum. Dr. Boyd flew in

from Shrewsbury, the English town where Darwin was born—and one of the first stops on the Darwin Safari.

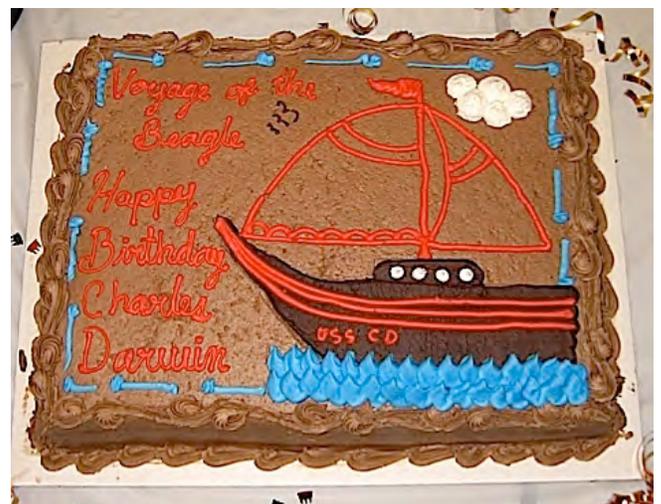
Darwin enthusiasts worldwide are already preparing for next year's bicentennial of Charles Darwin's birth and the 150th anniversary of the publication of "The Origin." In honor for these momentous occasions, Darwin Day Symposium organizers, Durham and Siegel, are planning a joint course on Darwin this coming autumn quarter. For Human Biology students who wish to study Darwin abroad, Professor Durham will be leading a sophomore college course to the Galapagos in September and Professor Siegel will be teaching a course on Darwin at the Stanford-in-Oxford Campus next spring. In addition, Alumni can accompany Professor Durham on a three-week "Voyage of the Beagle by Private Jet" offered through [Stanford Travel Study](#).

For the latest update on Darwin Day and similar events, be sure to bookmark the HumBio

website: [www.stanford.edu/dept/humbio](http://www.stanford.edu/dept/humbio) §



*Rebecca Tisdale (HB '09)*



## Core, cont'd

cultural evolution, from the origins of our species to modern social and cultural diversity.

Below is a summary of major HumBio Core topics covered. §

### Thank You!

Stanford's Program in Human Biology extends its sincere appreciation to the generous contributions of our supporters. §



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- Newsletter.....  
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This newsletter is available online:  
[www.stanford.edu/dept/humbio/](http://www.stanford.edu/dept/humbio/)

## Fall Core at a Glance:

### A-Side

- Biological Evolution
- Ecology
- Classical Genetics
- Population Genetics
- Molecular Genetics

### B-Side

- Hominid Evolution
- Language
- Culture
- Evolution of Social Complexity
- Social Theory

## We'd Like to Hear from You:

Our alumni, students and faculty are a community focused on making a difference in the world. You can strengthen this community by staying in touch and sharing your stories. Please send us news about your achievements, or ideas for this newsletter. And visit the [HumBio website](http://www.stanford.edu/dept/humbio), <http://www.stanford.edu/dept/humbio>, for updates on your former classmates.

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*Professor Robert Siegel with students on "The Great Britain Darwin Safari."*