

The Yale Institute for

Biospheric Studies



YIBS 1996-1997 Annual Report

- I. [Personnel Appointment](#)
- II. [Student Programs](#)
- III. [Publications](#)
- IV. [Visitors](#)
- V. [Sponsored Programs](#)
- VI. [Courses](#)
- VII. [Honors and Awards](#)
- VIII. [International Seminars, Conferences, Courses, And Research Projects](#)
- IX. [Faculty Council](#)
- X. [External Advisory Board](#)



YIBS 1996-1997 Annual Report

I. PERSONNEL APPOINTMENTS

- Raffaele Calabretta**, Postdoctoral Fellow, Department of Ecology and Evolutionary Biology;
Center for Computational Ecology
- Durland Fish**, Associate Professor, Department of Epidemiology and Public Health;
Center for Earth Observation
- Jacques A. Gauthier**, Professor, Department of Geology and Geophysics;
Center for ECOSAVE
- Jeffrey R. Powell**, Professor, Department of Ecology and Evolutionary Biology;
Center for ECOSAVE
- Thenkabil Prasad**, Postdoctoral Associate, Department of Geology and Geophysics;
Center for Earth Observation
- David K. Skelly**, Assistant Professor, School of Forestry and Environmental Studies;
Center for Computational Ecology

II. STUDENT PROGRAMS

a) Hitachi America Summer Internships - undergraduates

Program in Organismal Biology

Zina Deretsky
Lorky Libaridian
Hanna Norfleet
Kara Rodgers
Gabriella Redwine
David Seelig
John Sykes

Studies in the Environment

Rebecca Birch
Leana Hicks
Everett Meyer
Kristen Vose Michaelides
Robert Trostle

b) Summer Internship Grant for Studies in the Environment-Rising Seniors

Rebecca Birch
Leana Hicks
Andrea Kirk

Everett Meyer
Robert Trostle

c) G. Evelyn Hutchinson Prize - Graduates

Biology

H. Bagheri-Chaichian
Ashley Carter
Jeanhee Chung
Martin Hanczyc
Alexander Kerr

Forestry

Laura Ahearn
Andrew Beckerman
Robert H. Fraser
Aarti Gupta
Kris H. Johnson

Una Smith
Geology & Geophysics

Cynthia Marshall
Craig Van Boskirk

Toral Patel-Weynand
Murray B. Rutherford
Daniel S. Smith



YIBS 1996-1997 Annual Report

III. PUBLICATIONS

a) CENTER FOR BIOLOGICAL TRANSFORMATION

Francino, M. P., L. Chao, M. A. Riley, and H. Ochman. 1996. Patterns of substitutions in enterobacterial genes are generated by transcription-coupled repair. *Science* 272:107-108.

Jeong, E. Y., Ornston, L. N., and S. H. Choi. 1996. Cloning of *catBCIJFD* genes for catechol degradation into chromosomal *pobA* and genetic study of the recombinant *Acinetobacter calcoaceticus*. *Biosci. Biotech. Biochem.* 60:949-956.

Riley, M. A. and D. Gordon. 1996. The ecology and evolution of bacteriocins. *J. Industrial Microbiol.* 17:151-158.

Tan, Y. and M. A. Riley. 1996. Rapid invasion of colicinogenic bacteria with novel immunity functions. *Microbiology* 142:2175-2180.

Wagner, R. and M. A. Riley. 1996. Low synonymous site variation at the *lacY* locus in *Escherichia coli* suggests the action of positive selection. *J. of Molecular Evolution* 42:79-94.

Zawadzki, P., M. A. Riley and F. M. Cohan. 1996. Homology among nearly all plasmids infecting three *Bacillus* species. *J. of Bacteriology* 178:191-198.

Bolker, J. A., M. Butler, J. Kissinger, and M. A. Riley. 1997. Addressing the Gender Gap in Evolutionary Biology. *TREE* 12:46-47.

Kok, R. G., D'Argenio, D. A., and L. N. Ornston. 1997. Combining localized PCR mutagenesis and natural transformation in direct genetic analysis of a transcriptional regulator gene, *pobR*. *J. Bacteriol.* 179:4270-4276.

Riley, M. A. 1997. Molecular Evolution. In *LIFE*, (G. Orions, et al. eds.), Sinauer Publ. (Sunderland).

Tan, Y. and M. A. Riley. 1997. Nucleotide polymorphism in colicin E2 genes clusters: Evidence for positive selection. *Mol. Bio. Evol.* 14:666-673.

Tan, Y. and M. A. Riley. 1997. Positive selection and recombination, major molecular mechanisms of colicin diversification. *TREE* 12:348-351.

Wernegreen, J., E. Harding, and M. A. Riley. 1997. Rhizobium gone native: Unexpected plasmid stability of indigenous *R. leguminosarum* bv. *trifolii*. *Proc. Natl. Acad. Sci. USA* 94:5483-5488.

Williams, P. A., Shaw, L. M., Pitt, C. W., and M. Vreci. 1997. *xyUW*, two genes at the start of the upper pathway operon of Tol plasmid pWWO, appear to play no essential part in determining its catabolic phenotype. *Microbiology* 143:101-107.

b) CENTER FOR COMPUTATIONAL ECOLOGY

Dudgeon, S. and L. W. Buss. 1996. Growing with the flow: On the Gitchoff, maintenance and malleability of colony form in the hydroid *Hydractinia*. *Am. Nat.* 147:667-691.

Gitchoff, P. and G. P. Wagner. 1996. Recombination induced hypergraphs: a

- new 37-approach to mutation-recombination isomorphism. *Complexity* 2:43.
- Rannala, B. and J. A. Hartigan. 1996. Estimating gene flow in island populations. *Genet. Res.* 67:147-158.
- Wagner, G. P. 1996. Homologues, natural kinds and the evolution of modularity. *American Zoologist* 36:36-43.
- Wagner, G. P. 1996. Apparent stabilizing selection and the maintenance of neutral genetic variation. *Genetics* 143:617-619.
- Wagner, G. P. and L. Altenberg. 1996. Complex adaptations and the evolution of evolvability. *Evolution* 50:967-976
- Baatz, M. and G. P. Wagner. 1997. Adaptive inertia caused by hidden pleiotropic effects. *Theoretical Population Biology* 51:49-66.
- Schmitz, O. 1997. Press perturbations and predictability of ecological interactions in an old-field food web. *Ecology* 78:55-69.
- Schmitz, O. J. and G. Booth. 1997. Modeling food web complexity: The consequences of individual-based, spatially explicit behavioral ecology on trophic interactions. *Evolutionary Ecology* 11:379-398.
- Wagner, G. P., Booth, G., and H. Bagheri-Chaichian. 1997. A population genetic theory of canalization. *Evolution* 51:329-347.
- Bagheri-Chaichian, H. and G. P. Wagner. 1997. Representational issues in the evolution of physiological adaptations. *S-European Journal for Semiotic Studies*, in press.
- Booth, G. 1997 *Swarm Geko: A 2-D floating world for ecological modeling*. *Artificial Life*, in press.
- Fontana, W. and L. W. Buss. 1997. The barrier of objects: From dynamical systems to bounded organizations. In: J. Casti (ed.) *Boundaries and Barriers*. Addison- Wesley, Redwood City, CA., in press.
- Johnston, K. and O. Schmitz. 1997. Wildlife and climate change: Assessing the sensitivity of selected species to simulated doubling of atmospheric carbon dioxide. *Global Change Biology* 3, in press.
- Laubichler, M. D. 1997. The riddle of context dependency. *European J. Semiotic Studies*, in press.
- Schmitz, O., Beckerman, A., and S. Litman. 1997. The trophic dynamic consequences of adaptive foraging by herbivores. *Evol.* 11, in press
- Stadler, P. And G. P. Wagner. 1997. The algebraic theory of recombination spaces. *Evolutionary Computation*, in press.
- Wagner, G. P. 1997. The structure of biological concepts and its relation to the dynamics of biological organizations. *S-European Journal for Semiotic Studies*, in press.
- Wagner, G. P., Laubichler, M. D. and H. Bagheri-Chaician. 1997. Genetic measurement theory of epistatic effects. *Genetica*, in press.
- Wagner, G. P. and P. Stadler. 1997. Complex adaptations and the structure of recombination spaces. *Proceeding of the First International Conference, in Algebraic Engineering*, in press.

c) CENTER FOR EARTH OBSERVATION

- Fish, D. 1996. Remote sensing and landscape epidemiology. *Advances in the Astronautical Sciences* 911057-911063.

Fraser, R. H., Barten, P. K., and C. Dana Tomlin. 1996. "SEDMOD: Spatially explicit delivery model for sediment and associated nonpoint source pollutants". American Water Resources Association Symposium on "GIS and Water Resources", Ft. Lauderdale, September 1996, pp 137-146.

Dister, S. W., Fish, D., Bros, W. E., Frank, D. H., and B. L. Wood. 1997. Landscape characterization of peridomestic risk of Lyme Disease using satellite imagery. *Journal of the American Society of Tropical Medicine and Hygiene*, in press.

Smith, R. B., Gleason, A. C., Gluhosky, P. A., and V. Grubisic. 1997. The wake of St. Vincent. *Journal of the Atmospheric Sciences* 54(5):606-623.

d) CENTER FOR ECOLOGY AND SYSTEMATICS OF ANIMALS ON THE VERGE OF EXTINCTION (ECOSAVE)

Schaller, G. B. and E. S. Vrba. 1996. Description of the giant munjac (*Megamuntiacus vuquangensis*) in Laos, *Journal of Mammalogy* 77(3):675-683.

Vrba, E. S. 1996. Climate, heterochrony, and human evolution. *Journal of Anthropological Research* 52(1):1-28.

Gatesy, J., Amato, G., Vrba, E., Schaller, G. and DeSalle, R. 1997. A cladistic analysis of mitochondrial ribosomal DNA from Bovidae. *Molecular Phylogenetics and Evolution* 7(3):303-319.

Maisano, J. and J. Gauthier. 1997. Patterns of ossification and fusion in xantusiid lizards. Abstract in *Proceedings of the American Association of Ichthyologists and Herpetologists*, Seattle, Washington.

Vrba, E. S. 1997. Species' habitats in relation to climate, evolution, migration and conservation. In B. Huntley, W. Cramer, A. V. Morgan, H. C. Prentice and J. R. M. Allen (eds), *Past and Future Rapid Environmental Changes: Spatial and Evolutionary Responses of Terrestrial Biota*, pp. 275-286. *Proceedings of NATO Advanced Research Workshop on the Science of Global Environmental Change*, Crieff, Scotland, June 1995. NATO ASI Series 1, Vol. 47, Springer Verlag, Heidelberg, Germany.

Saltonstall, K., Amato, G. and J. Powell. 1997. Mitochondrial DNA variability in Grauer's Gorillas of Kahuzi-Biega National Park, Zaire. *Journal of Heredity*, in press.

Vrba, E. S. 1997. Habitat theory in relation to the evolution in African Neogene Biota and Hominids. In T. G. Bromage and F. Schrenk (eds.), *African Biogeography, Climate Change, and Early Hominid Evolution*. Plenum Press, New York, in press.

Vrba, E. S. 1997. (Monograph of some 200 manuscript pages.) *New Fossils of Alcelaphini and Caprinae (Bovidae, Mammalia) from Awash, Ethiopia, and Phylogenetic Analysis of Living and Extinct Alcelaphini*. *Paleontologia africana*, in press.

Vrba, E. S. 1997. New quantitative multiphasic growth models and the evolution of prolonged growth exemplified by human brain evolution. *Journal of Theoretical Biology*, in press.

Vrba, E. S. and Schaller, G. B. 1997. Phylogeny of Bovidae (Mammalia) based on behavior, glands and skull morphology. In Vrba, E. S. and Schaller, G. B. (eds.) *Deer, Antelopes, Giraffes, and Relatives: Past, Present, and Future*. Yale University Press, New Haven, Connecticut, in press.

e) CENTER FOR THE STUDY OF GLOBAL CHANGE

Torgersen, T., Turekian, K. K., Turekian, V. C., Tanaka, N., DeAngelo, E. and J.

O'Donnell. 1996. ²²⁴Ra distribution in surface and deep water of Long Island Sound: Sources and horizontal transport rates. *Cont. Shelf Res.* 16, 1545-1559.

Williams, G., Marcantonio, F. and K. K. Turekian. 1997. The behavior of natural and anthropogenic osmium in Long Island Sound, an urban estuary in the eastern U.S., *Earth Planet. Sci. Letters* 148, 341-347.

IV. VISITORS

a) CENTER FOR COMPUTATIONAL ECOLOGY

Susan Oyama, City University of New York
Egberth Leight, Smithsonian Institution
Peter Stadler, University of Vienna
Da-Yong Zhang, Lanzhou University, China

b) CENTER FOR THE STUDY OF GLOBAL CHANGE

Jeffrey P. Severinghaus, Graduate School of Oceanography, University of Rhode Island
Lee R. Kump, Department of Geosciences, Pennsylvania State University
Maureen Raymo, Department of Earth, Atmosphere and Planetary Science, Massachusetts Institute of Technology
Dan Sandweiss, Department of Anthropology, University of Maine

George Philander, Department of Geological and Geophysical Sciences, Princeton University
Rita R. Colwell, University of Maryland Biotechnology Institute, University of Maryland
Lloyd Keigwin, Woods Hole Oceanographic Institution
Paul Mayewski, University of New Hampshire
Richard Fairbanks, Lamont Doherty Earth Observatory (Columbia University)

Katherine Freeman, Pennsylvania State University
Wallace S. Broecker, Lamont Doherty Earth Observatory (Columbia University)
Tim Eglinton, Woods Hole Oceanographic Institution
Jeffrey Bada, Scripps Institution of Oceanography
John Hayes, Woods Hole Oceanographic Institution
Stephen A. Macko, University of Virginia

V. SPONSORED PROGRAMS

Cambodian Genocide Program, organized by the Center for International and Area Studies

Conference on *Deer, Antelopes, Giraffes, and Relatives: Past, Present and Future*, organized by George Schaller and Elisabeth Vrba

Fisheries for the Future, organized by the F&ES Center for Coastal and Watershed Systems and the Program in Organismal Biology

Seminars presented at Yale University in April 1997 by Margaret Catley-Carlson, President, Population Council, on *Women's Reproductive Health: Mountains, Molehills, and Mifeprestone RU-486* and *Population, Poverty and the Environment: Achievable Agenda or Inevitable Abyss?*

10th Anniversary of the Yale Student Environmental Coalition (YSEC) with Frances Beinecke as the keynote speaker

The Yale Institute for

Biospheric Studies



YIBS 1996-1997 Annual Report

VI. COURSES

Spring 1997

Observing the Earth from Space (G&G 362b; F&ES 306b)
World Population (461b)

VII. HONORS OR AWARDS

Oswald Schmitz, Member, Scientific Advisory Board, MISTIK Forest Management Ltd., Saskatchewan, Canada
Karl K. Turekian, 1997 Maurice Ewing Medalist of the American Geophysical Union
Gunter Wagner, Member, Austrian Academy of Sciences

VIII. INTERNATIONAL SEMINARS, CONFERENCES, COURSES, AND RESEARCH PROJECTS

Seminar series on population issues
Conference on deer, antelopes, giraffes, and relatives: past, present, and future
Course offered jointly by the Department of Biology and the School of Forestry and Environmental Studies on *Fisheries for the Future*-12 week series bringing to campus leading experts to discuss the fisheries crisis and new ideas for management and conservation
New antelope fossils in Ethiopia
Collaboration on a new giant species of Muntjac in Vietnam
Conservation genetics of Galápagos tortoises
Mitochondrial DNA variability in Grauer's Gorillas of Kahuzi-Biega National Park, Zaire
Characterizing the relationship between changes in land use and infectious diseases in the Anatolia Region of Southeastern Turkey using remote sensing and geographic information systems
The evolution and ecology of deep-sea fishes off the coast of the Philippine Island of Luzon
The age of Homo Sapiens

IX. MEMBERS OF THE FACULTY COUNCIL

D. Allan Bromley-Dean of Engineering
Richard L. Burger-Director, Peabody Museum of Natural History
Mary Helen M. Goldsmith-Chair, Studies in the Environment
John C. Gordon-Dean, School of Forestry and Environmental Studies
Pierre C. Hohenberg-Deputy Provost, Science and Technology
Douglas R. Kankel-Chair, Department of Molecular, Cellular, and Developmental Biology
Michael H. Merson-Chair, Epidemiology and Public Health
Jeffrey R. Powell-Chair, Program in Organismal Biology
Gustav Ranis-Director, Center for International and Area Studies
Ronald B. Smith-Director, Center for Earth Observation
Karl K. Turekian-Director, Center for Global Change
J. Rimas Vaisnys-Department of Electrical Engineering
Elisabeth S. Vrba-Director, YIBS and Center for ECOSAVE

Gunter P. Wagner-Director, Center for Computational Ecology; Chair,
Department of Ecology and Evolutionary Biology
Robert J. Wyman-Department of Molecular, Cellular, and Developmental
Biology

X. MEMBERS OF THE EXTERNAL ADVISORY BOARD

Edward A. Adelberg-New Haven, CT
Edward P. Bass-Fort Worth, Texas
Frances Beinecke-New York, New York
Coleman P. Burke-New York, New York
John R. Bermingham-Denver, Colorado
William J. Cronon-Madison, Wisconsin
Duane Dickson-Chicago, Illinois
Strachan Donnelley-Garrison, New York
Michael J. Donoghue-Cambridge, Massachusetts
W. Daniel Hillis-Glendale, California
F. Donald Hudson-Boston, Massachusetts
Thomas E. Lovejoy-Washington, D. C.
George G. Montgomery, Jr.-San Francisco, California
Michael J. Novacek-New York, New York
Nicholas Pappas-Wilmington, Delaware
William K. Reilly-Washington, D. C.
Ralph C. Schmidt-New York, New York
Nelson S. Talbott-Cleveland, Ohio
Joseph H. Williams-Tulsa, Oklahoma