

Durrell D. Kapan

Biographical details

United States Citizen

Born 7 August 1965, San Francisco, California

Married, spouse: Shannon N. Bennett, one child Anika Ku'ulei Kapan

Current position

Assistant Researcher, Center for Conservation and Research Training, Pacific Biosciences Research Center, University of Hawaii, Manoa

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Education

Ph.D. Thesis "Divergent natural selection and Müllerian mimicry in polymorphic *Heliconius cydno* (Lepidoptera: Nymphalidae)." Supervised by Prof. Dolph Schluter, Department of Zoology, University of British Columbia, Vancouver, BC, Canada. April 1998.

B.A. Zoology. Department of Zoology, University of California, Berkeley, California, U.S.A. May 1988.

Career

May 2006 – present. Assistant Researcher. Center for Conservation and Research Training, Pacific Biosciences Research Center, University of Hawaii, Manoa under Director Dr. Ken Kaneshiro. Currently investigating Evolutionary genetics and gene-expression of local adaptation in rare Hawaiian *Drosophila* in collaboration with Cam Muir from UH Hilo (UH NSF EPSCoR REAP award) and working to develop projects on the evolutionary ecology of infectious disease (Dengue virus, Leptospirosis) with researchers Dr. Shannon Bennett and Dr. Bruce Wilcox of the Asia Pacific Institute of Tropical Medicine and Infectious Disease, University of Hawaii, School of Medicine.

May 2006 – present. IGERT: Integrative Training in Ecology, Conservation and Pathogen Biology Core Curriculum Team Leader. Pacific Biosciences Research Center & Asia Pacific Institute of Emerging Infectious Diseases University of Hawaii, Manoa. I am presently teaching the core-curriculum I designed for the recently awarded Integrative Training in Ecology, Conservation and Pathogen Biology program (NSF-IGERT # 0549514). In collaboration with program director Dr. Bruce Wilcox of the Ecology of Infectious Disease program Asia Pacific Institute of Tropical Medicine and Infectious Disease, University of Hawaii, School of Medicine I designed the core curriculum for this program: BOT/ZOOL 690 Conservation Biology: theories and concepts of ecology, evolution and genetics underlying the generation, maintenance and loss of biological diversity and BOT/ZOOL 739: Topics in Ecology Conservation and Infectious Disease.

Spring 2006 – present. Faculty member Evolution, Ecology and Conservation Biology Program, University of Hawaii, Manoa under Director Bob Kinzie. In collaboration with faculty and students in Zoology, Botany, Agriculture and Engineering I am developing research on the

evolutionary ecology and population genetics of endemic Hawaiian flora and fauna and the invasive species and diseases that threaten them.

Fall 2005 – Spring 2006. Research Associate. Center for Conservation and Research Training, Pacific Biosciences Research Center, University of Hawaii, Manoa under Director Dr. Ken Kaneshiro. Helped develop ongoing research program on the ecology of *Leptospirosis* and its invasive mammal hosts in collaboration with the Ecology of Infectious Disease program Asia Pacific Institute of Tropical Medicine and Infectious Disease, University of Hawaii, School of Medicine with Dr. Bruce Wilcox and Dr. Shannon Bennett.

Fall 2002 – Spring 2005. Research Associate Center for Applied Tropical Ecology and Conservation. Founded applied Molecular Ecology, Evolution and Genetics (MEEG) program to applying molecular methods to evolution, ecology and conservation problems with Dr. W. O. McMillan, Dr. R. Tremblay and Dr. E. Melendez-Ackerman through NSF Centers for Research Excellence in Science and Technology program.

Fall 2000 - Fall 2002. Postdoctoral Researcher “The genetic architecture of warning colored *Heliconius* butterflies.” Department of Biology, University of Puerto Rico, Rio Piedras, Puerto Rico.

Fall 1998 - Summer 2000. Postdoctoral Teaching Fellow. Taught four courses (see Teaching below) and completed a series of crosses to determine the Mendelian genetics of polymorphism in *Heliconius* butterflies. Section of Integrative Biology, University of Texas, Austin.

Spring 1998. Postdoctoral Researcher. Applied disease dynamics of the Steller Sea Lion *Eumatopias jubatas*. Built a multifactor disease simulation model for Marine Mammal Research Unit, Department of Zoology, University of British Columbia.

Spring 1995 - Summer 1998. Principal Investigator. Led field research expeditions for my research program “Ecuador’s Rain Forest Butterflies” sponsored by Earthwatch, Watertown, Massachusetts.

1992 - 1997. Doctoral research. “Natural selection and mimicry in *Heliconius cydno*.” Created field research program to study the selective consequences of warning–color pattern in a species of *Heliconius* (Lepidoptera: Nymphalidae) butterfly in Ecuador.

1991. Field Researcher. Studied the morphology of song sparrows with Prof. Dolph Schluter and Prof. James N.M. Smith (Department of Zoology University of British Columbia).

1990. Field biologist, Entrix Associates, Walnut Creek, California.

1987. Field biologist, Bristle-thighed curlew nesting survey, US Fish & Wildlife Service. Found the third through fifth nests ever discovered, in a new population on the Yukon Delta, AK.

Publications

Kapan, D.D., Bennett, S.N., Ellis, B., Fox, J., Lewis, N., Spencer, J., Saksena, S. and B. A. Wilcox. Avian Influenza (H5N1) and the Evolutionary and Social Ecological Basis for Understanding Emerging Infectious Disease Risk. *Ecohealth*. 3: 187-194.

Kronforst, M.K., Kapan, D.D, and L.E. Gilbert. Parallel genetic architecture of parallel adaptive radiations in mimetic *Heliconius* butterflies. *Genetics*. 174: 535-539.

Kapan, D.D., Flanagan, N. S., Tobler, Gonzalez, J., Restrepo, M., Martinez, L., Maldonado, K., Ritschoff, C., Heckel, D. and W. O. McMillan. Localization of Müllerian mimicry genes on a dense linkage map of *Heliconius erato*. 2006. *Genetics*. 173: 735 – 757.

Kronforst, M.K., Young, L., McNeely, C., O’Neill, R., Kapan, D.D, and L.E. Gilbert. Autosomal coupling of mate preference and wing color preference cue in mimetic butterflies. 2006. *Proceedings of the National Academy of the Sciences*. 103: 6575-6580.

- Tremblay, R. L., Meléndez-Ackerman, E. and D.D. Kapan. Evidence for an Orchid Metapopulation I: Substrate dependent colonization and extinction rates. 2006. *Biological Conservation*. 129: 70-81.
- Tobler, A., Kapan, D.D., Flanagan, N.S., Gonzalez, C., Peterson, E., Jiggins, C.D., Spencer, J., Heckel, D. G. and W. O. McMillan. 2005. First generation linkage map of the warningly-colored butterfly *Heliconius erato*. *Heredity*. 94:408-417.
- Flanagan, N., Tobler, A., Davison, A., Pybus, O., Kapan, D.D., Planas, S., Linares, M., Heckel, D., and W.O. McMillan. 2004. The historical demography of Müllerian mimicry in the Neotropical *Heliconius* butterflies. *Proceedings of the National Academy of Sciences*. 101: 9704-9709.
- McMillan, W. O, Montéiro, A. and Kapan, D.D. 2002. Development and evolution on the wing. *Trends in Ecology and Evolution*. 17:125-133.
- Kapan, D.D. 2001. Three-butterfly system provides field test of Müllerian mimicry. *Nature*. 409: 338-340.
- Kapan, D.D. 1998. Divergent natural selection and Müllerian mimicry in polymorphic *Heliconius cydno* (Lepidoptera: Nymphalidae). Ph.D. Dissertation. University of British Columbia. April 1998

Manuscripts in preparation

- Bennett, S. N., Kapan, D. D., Drummond, A., Pybus, O., and Holmes, E. Sequence evolution reveals the epidemic fluctuations in effective population size in re-emergent Dengue fever. In prep. for submission to Science.
- Kapan, D.D. The three-butterfly solution to the mystery of polymorphism in Müllerian mimicry. In prep for submission to *Journal of Evolutionary Biology*.

Grants, Awards and Fellowships

NSF Ecology of *Leptospirosis* in Hawaii (B. Wilcox, S. Bennett, D. Kapan PI) In prep
We are currently preparing for resubmission to the NSF Ecology of Infectious Diseases program to study the ecology and evolution of this emerging pathogen of worldwide distribution.

UH NSF EPSCoR REAP proposal Phylogeography and Local Adaptation of Hawaiian Picture-winged *Drosophila* (Cam Muir and Durrell Kapan PIs) \$24,885
In collaboration with Cam Muir of UH Hilo we were awarded a Research Enhancement Activities Program (REAP) proposal to stud the phylogeography and local adaptation of Hawaiian Picture-winged *Drosophila*.

NSF 06-541 Interdisciplinary Training for Undergraduates in Biology and Math (L. Wilson PI)

Awarded

In collaboration with investigators in Mathematics, Biology and Engineering I helped author and am participating in this program that links biology and math professor mentors with undergraduates from both fields to team up and work on biomathematics research beginning in 2007.

NSF CREST-CATEC 0206200 (E. Cuevas PI) 2002 – 2007
CREST Center for Applied Tropical Ecology and Conservation (CATEC) \$5,000,000
Molecular Ecology, Evolution and Genetics (MEEG) subprogram (\$750,000)
<http://www.nsf.gov/pubs/2005/nsf0520/nsf0520.pdf>.

MEEG project uses modern high-resolution molecular methods to genotype threatened or endangered plant and animal species for evolutionary conservation ecology studies.

Role: Co-author of MEEG portion of grant, edited entire proposal. Coordinating investigator/post-doctoral researcher for MEEG subprogram through February 2005.

Effort: 100%

University of Texas ITAC Technology Fund grant **1999 – 2000**

Teaching improvement grant: multimedia and web based teaching in ecology \$7,500

Role: Principal Investigator

Effort: 100%

Earthwatch, Watertown, Massachusetts **1995 – 1998**

Research Project “Ecuador’s rain forest butterflies.” \$68,072

11 expeditions totaling over 22 field weeks in lowland rainforest study sites in W. Ecuador.

Role: Principal Investigator

Effort: 100%

University of British Columbia, Vancouver, Canada **1990 – 1995**

University Graduate Fellowship \$53,500 Cdn.

Explorers Club, New York **1994**

Exploration Grant \$1,200 U.S.

Sigma-Xi, Research Triangle Park, NC **1994**

Grant-in-Aid of Research (two awards) \$640 U.S.

Sigma-Xi, Research Triangle Park, NC **1993**

Grant-in-Aid of Research (two awards) \$500 U.S.

Workshops and professional development

- Mathematical Modeling of Infectious Diseases: Dynamics and Control. Institute for Mathematical Sciences, National University of Singapore and Regional Emerging Diseases Intervention (REDI) Centre, Singapore September, 2005.
- “Write Winning Grants Workshop – FASEB MARC Program” sponsored by NIH and the University of Hawaii Manoa, Honolulu, on March 4-5, 2005.
- “Development of microsatellite markers” a weeklong workshop on microsatellite marker development and data analysis at the University of Puerto Rico, Rio Piedras, March 2004.
- “Complexity in Evolutionary Biology: Genetic Algorithms, Cellular Automata and Adaptive Landscapes” a short course on the mathematics of biological complexity offered by the University of Tennessee, Knoxville, on October 1-4, 2000.

Teaching Experience

2006. Developed and taught, Conservation of Biodiversity, Biological Invasions and Emerging Infectious Disease (Zoo/Bot 690) graduate course, University of Hawaii—Manoa.

2006. Developed and taught, Applied Laboratory in Biodiversity, Biological Invasions and Emerging Infectious Disease (Zoo 739) graduate course, University of Hawaii—Manoa.

2004. Guest Lecturer, Landscape Genetics (Biology 6417) graduate course, University of Puerto Rico—Rio Piedras.

1999-2000. Developed & taught lecture/quantitative lab/field course Basic Ecology with (Zoology 369W) and without writing component (Zoology 369), Section of Integrative Biology, University of Texas, Austin.

1998-99. Instructor, Introduction to Ecology, Evolution and Conservation Biology (Biology 304), Department of Zoology, University of Texas, Austin.

1997. Instructor, Evolutionary Ecology (Biology 418), Department of Zoology, University of British Columbia.

1996. Teaching assistant, Insect Ecology (Biology 411), University of British Columbia.

1996. Teaching assistant, Evolutionary Ecology (Biology 418), University of British Columbia.

1995-1998. Principal investigator. As P.I. of “Ecuador’s rain forest butterflies” expeditions, I successfully trained over sixty Earthwatch volunteers to perform butterfly capture-recapture, plant and bird study in challenging rain forest conditions.

1995. Teaching assistant. Theoretical Population Biology Graduate Course (Zoology 527), University of British Columbia.

1993 - 1994. Teaching assistant. Animal Behavior (Biology 410), University of British Columbia.

1988. Instructor. Field Ornithology, Clatsop Community College, Astoria, Oregon. I designed and taught college level field course in Ornithology.

1983 - 1988. Field instructor. California Natural History, California Adventures, University of California, Berkeley. Designed and led many natural history trips and mini-courses throughout California.

Presentations

- The three-butterfly problem: polymorphism, mimicry & speciation. Invited seminar to Nasa Astrobiology Institute. University of Hawaii. Manoa. October 23, 2006.
- An evolutionary ecological approach to understanding avian influenza (H5N1) risk. Invited presentation. ECOHEALTH ONE. Madison, WI. October 8, 2006.
- “EVOLVE! Ecology and genetics of diversity in Neotropical *Heliconius* butterflies” Evoluncheon seminar for admission to graduate faculty in Ecology, Evolution and Conservation (EECB) program. University of Hawaii. Manoa. February 3, 2006.
- “Comparative linkage maps in convergent *Heliconius* mimicry,” Evolution and Development Series. University of Hawaii. Department of Zoology. May 6, 2005.
- “Three-butterfly problem and Müller’s model of mimicry,” Invited speaker, University of Puerto Rico, Department of Mathematics, October 22, 2004.
- “Natural selection and the geographic mosaic of Müllerian mimicry,” Invited speaker, University of Hawaii, Department of Botany, September 8, 2004.
- “Weaving a common thread: From the hunt for the genetic basis of an adaptive radiation to conservation genetics of island species,” Invited speaker, University of Hawaii, Evolution, Ecology, Conservation Biology “evoluncheon”, Department of Zoology, September 3, 2004.
- “Dispersal in an orchid metapopulation,” Symposium, Dispersal in fragmented landscapes, Université catholique de Louvain, Louvain-la-Neuve, Belgium, April 4, 2004.
- Invited speaker at the second International Congress of *Heliconius* biology at the Smithsonian Tropical Research Institute in Panama, 3-4 August 2002.
- Invited speaker at the Association for Tropical Biology “biology of *Heliconius*” symposium in Bloomington Indiana, 27 June 2000.

- Invited seminars also presented at the Universidad Central, Quito, Ecuador. January 13, 1998; University of Victoria. November 28, 1997; Center for Quantitative Science and Department of Zoology at the University of Washington. March 1996 and the California Academy of the Sciences, San Francisco, California. December 1994.
- Society for the Study of Evolution meetings. 2005, 2001, 2000, 1998, 1997 and 1996.
- Third International Ecology and Evolution of Butterflies Conference. August 16, 1998.
- Earthwatch Principal Investigator's Conference. October 1996.
- Pacific Ecology Conference. Friday Harbor Laboratories. February 1996.
- Departmental seminars at the following institutions: University of Puerto Rico, November 2001; University of Texas, Austin, 28 February 2000; University of British Columbia, November 27, 1996; and the University of Texas, Austin, September 1994.

Professional Memberships

Society for the Study of Evolution, the Association for Tropical Biology, American Association for the Advancement of Science

Reviews

Manuscripts - American Naturalist, Evolution, Evolution and Development, Proceedings of the National Academy of the Sciences, Proceedings of the Royal Society London B, Theoretical Population Biology.

Textbooks - Ricklefs and Miller. 1999. *Ecology*. 4th Edition. W.H. Freeman and Co. and Purves, Orians, Heller and Sadava. 1998. *Life: the science of biology*. 5th Edition. Sinauer/Freeman.

Additional Professional activities

- Co-supervised three undergraduate directed studies students who were funded by the NIH RISE (Research Initiative for Scientific Enhancement) Program and the NSF REU (Research Experiences for Undergraduates) Programs. University of Puerto Rico 2000-2005.
- Co-supervisor of Hector Alejandro Merchan, Colombian Masters student with Dr. Mauricio Linares, Universidad de Los Andes, Bogota, Colombia. 2000-2001.
- Graduate discussion group Spring 1998: Critical review of "Hilborn, R. and M. Mangel. 1997. *The Ecological Detective: Confronting Models with Data*. Princeton University Press." University of Texas, Department of Integrative Biology.
- Co-supervision of six independent study student research projects with Dr. L.E. Gilbert at the University of Texas, Austin 1998 – 2000.
- Co-sponsorship of two Masters Students, Universidad Central, Quito, Ecuador 1997-98.

Community activities

1995-1998. Formed "Friends of Bilsa Reserve" an informal non-profit group of educators and former volunteers dedicated to preservation of the Bilsa Reserve run by the Fundación Jatun Sacha. We raised funds for land purchases, teaching salaries for five local schools (for students unable to pay tuition), student research projects, staff salaries, & community education/outreach.

1985, 1989. Creator & coordinator, Haystack Rock Awareness Program, City of Cannon Beach, Oregon, an educationally based habitat protection program, funded by the City of Cannon Beach, that is still active today. The program includes 60 volunteers, three paid natural history interpreters and a manual, see <http://www.hrap.org/>.

Relevant skills

Spoken and written Spanish, natural history experience in E. Pacific rim from W. Alaska to Ecuador, continental areas of Arizona, New Mexico, Texas, N. Mexico and E. Coast as well as Caribbean islands, care and rearing of insects and their tropical host-plants in enclosed environments, mist-netting and banding of birds, extensive tropical lowland rainforest wilderness research experience, international expedition leadership and management, mountain first aid treatment of people, land-cruisers, scientific equipment and mules, computer expertise on three flavors of operating systems, statistical and mathematical modeling and database programming, analog and digital biological photography.

References

Dr. Dolph Schluter (thesis supervisor).
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