

SCOTT VERNON EDWARDS

Alexander Agassiz Professor of Organismic and Evolutionary Biology
Curator of Ornithology, Museum of Comparative Zoology

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PERSONAL

BORN: Honolulu, Hawaii, USA 7 July 1963; married, two children.

EDUCATION

1981 - 1986 B.A. (Biology) Harvard University, *magna cum laude*. Thesis: Mitochondrial DNA variation and the phylogeny of African Mole-Rats (Rodentia: Bathyergidae)

1986 - 1992 Ph.D. (Zoology/Museum of Vertebrate Zoology) University of California, Berkeley. Thesis: Mitochondrial DNA evolution in social babblers (Aves: *Pomatostomus*)

9/92 - 9/94 Alfred P. Sloan Postdoctoral Fellow in Molecular Evolution, Center for Mammalian Genetics, U. Florida, Gainesville (W. Potts & E. K. Wakeland labs; evolution of MHC genes in birds).

POSITIONS HELD

6/13 – 6/15. Division Director, Division of Biological Infrastructure (DBI), Biology Directorate, National Science Foundation (temporary position).

12/03 – pres. Alexander Agassiz Professor of Organismic and Evolutionary Biology & Curator of Ornithology, Museum of Comparative Zoology, Harvard University

9/03 – 12/03. Professor of Biology, University of Washington

1/03 – 12/03. Adjunct Associate Professor of Genome Sciences, University of Washington

1/00 – 12/03 Associate Professor of Zoology and Curator of Genetic Resources, Burke Museum

1/95 - 2000 Assistant Professor of Zoology and Curator of Genetic Resources, Burke Museum . Active research program in the Department of Zoology and Burke Museum; active teaching program (see below); in charge of growth and dissemination of large (~22,000 specimens) frozen tissue collection (mostly birds).

6/87 - 5/92 Graduate Student, University of California, Berkeley, Museum of Vertebrate Zoology; (Advisors: N. Johnson, M. Slatkin. lab research conducted in A. C. Wilson lab, Department of Biochemistry, Division of Molecular and Cellular Biology; mitochondrial DNA evolution and population biology of birds).

5/85 - 6/86 Undergraduate, Harvard Biological Laboratories, Harvard University (R. L. Honeycutt lab; mitochondrial DNA variation and phylogeny of African mole-rats [Bathyergidae]).

FELLOWSHIPS

Visiting Fellow, Institute for Applied Ecology, University of Canberra, Canberra, Australia (May 2012)

Harvard Club of Australia Visiting Fellow, Comparative Genomics Group (J. Marshall-Graves Lab), Research School of Biological Sciences Australian National University, Canberra, Australia (short sabbatical, 11-12/05)

3/02 – 6/02 Visiting Researcher, Avian Immunobiology Group (J. Kaufman Lab), Institute for Animal Health, Compton, U. K. [sabbatical leave from UW]

9/01 – 3/02 Visiting Fellow, Comparative Genomics Group (J. Marshall-Graves Lab), Research School of Biological Sciences Australian National University, Canberra, Australia [sabbatical leave from UW].

RECENT TEACHING, HARVARD UNIVERSITY

- Biology and Diversity of Birds (OEB 190): Spring 2005, 2007, 2009, 2012
- Class field trips for OEB 190 to Panama (2012), Mexico (2009,2007), Costa Rica (2005) and locally
- Frontiers of Evolutionary Biology/Phylogenomics (OEB275r): Spring 2008, 2009, Fall 2009, 2011
- Molecular Ecology and Evolution (OEB 125): Fall 2004, 2006, 2008, Spring 2011
- Topics in Evolutionary Biology (OEB275r): Fall 2005, 2007, 2011, 2012, Spring 2006
- Graduate Curriculum Planning Course for “Genomics, Evolution and Infectious Disease” (w/P. Sabeti) (OEB282) Spring 2010
- Evolutionary Genomics and the Museum (OEB275rb), Spring 2013 (connected by video to 4 campuses, including U. New Mexico, UC Berkeley, and Occidental College).

HONORS

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| 1986 | Thomas T. Hoopes Prize for senior honors thesis, Harvard University |
| 1992 | Ernst Mayr Award for best student presentation, Society of Systematic Biologists |
| 1992 -1994 | Alfred P. Sloan Foundation Postdoctoral Fellowship in Molecular Studies of Evolution |
| 1999,2006 | Elected Member (1999) and Fellow (2006), American Ornithologists' Union |
| 2009 | Elected Fellow, American Academy of Arts and Sciences |
| 2009 | Elected Fellow, American Association for the Advancement of Science |

SERVICE TO ACADEMIC SOCIETIES

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| 2001 – 2003 | Council Member, Society for the Study of Evolution |
| 2001 – 2003 | Council Member, Society of Systematic Biologists |
| 2006 | President, Society of Systematic Biologists |
| 2004-2006 | Council, American Genetic Association (publisher of <i>Journal of Heredity</i>) |
| 2011 | President, American Genetic Association |
| 2012 | President, Society for the Study of Evolution |

SCIENTIFIC, PUBLIC, and EDUCATIONAL SERVICE

National/International Service

Faculty participant, Mentoring workshop for the BRAINS initiative (“Broadening the Representation of Academic Investigators in Neuroscience”), University of Washington, Bainbridge Island, Sept. 2014

NIH Study Section, Genetic Variation and Evolution (GVE), National Institute of General Medical Sciences, National Institutes of Health (October 2012 – present)

Alan T. Waterman Award Committee Member, National Science Foundation (2012-2013)

National Center for Biotechnology Information (NCBI) Board of Scientific Counselors, November 2012 – present)

Evaluation Committee, Museum für Naturkund, Berlin, Germany (10/12)

Board of Advisors, National Museum of Natural History, Smithsonian Institution (April 2011 – present)

External Advisory Board, National Center for Biological Sciences, Bangalore, India (January 2010)

Scientific Advisory Board, Flybase (2010 – present)

Member, Committee for Research and Exploration, National Geographic Society (2001 – 2009)

Member, Scientific Advisory Board, Max Planck Institute for Evolutionary Biology, Plön, Germany (2007 – pres.)

Board of Directors, Cornell Laboratory of Ornithology (2007 – 2013.)

Board of Directors, Massachusetts Audubon Society (2007 – pres.)

Committee Member, National Academy of Sciences Working Group on High-end Computing (2007)

Scientific Planning Committee, International Ornithological Congress (Brazil and Japan meetings, 2008 – present)

Scientific Advisory Board, National Evolutionary Synthesis Center (NESCent; 2004 – 2009)

National Human Genome Research Institute Comparative Genome Evolution Working Group (04-07).
Member, NSF Population and Evolutionary Processes Cluster Working Group on New Frontiers in Evolutionary Biology (3/05)

Evolutionary Synthesis Center (ESC) Workshop Participant, NSF (5/01)

Invited Faculty, Workshop in Molecular Evolution, Woods Hole, MA (1999-pres.)

Committee of Visitors for National Science Foundation Population Biology (8/00) and for Division of Environmental Biology (6/06)

Reviewer for Australian Research Council Grants, Marsden Fund Grants (New Zealand) and NSERC grants (Canada)

Contributor, Tree of Life Web Project (<http://www.tolweb.org/Passeriformes/15868>)

University Service

University of Washington

University of Washington Faculty Fellows Panel, 2000, 2002

Participant, Fred Hutchinson Cancer Research Center Science Education Program; Science helper in grade school teacher training for NSF-funded project “Hands on Science in Seattle Schools” (1995-1997)

Participant, U. Washington Howard Hughes High-School Program for Minority High School Science Students (1995-2003)

Harvard University

Faculty Council, Harvard University, 2004-2007; Summa degrees subcommittee

Faculty Representative, Administrative Board, Harvard University, 2006-2007

Curatorial consultant, Harvard Museum of Natural History exhibit “Nests and Eggs”

OEB Departmental Seminar organizer, 2004-2009

OEB Graduate Admissions Committee, 2006-2009

Committee on College Life (2007, 2008)

Committee on General Education (2007-2009)

Dean’s Priorities Committee (2008-2009).

International Travel Awards Committee (2012,2013)

Hoopes Prize Committee (senior theses: 2007-2011, 2013)

FAS Standing Committee on Public Service (2012 – pres.)

FAS Standing Committee on Professional Conduct (2013 – pres.)

EDITORIAL AND GRANT PANEL SERVICE

National Science Foundation Panel member: Dissertation Improvement Grants (12/93); Collections and Biotic Resources (3/97); Population Biology (10/98, 6/01,10/02); Symbiosis Defense & Self-Recognition (3/08)

Grant reviewer for science foundations in Australia, Canada, United Kingdom, Austria, Italy, Germany, France, Chile, New Zealand and Poland.

Associate Editor for: *Ecology & Evolution* (2011 – present); *PeerJ* (2012-present); *Frontiers in Phylogenetics, Phylogenomics, and Systematics* (2103- present); *Conservation Genetics* (2003 – 2006); *Molecular Biology and Evolution* (2003- 2010); *Systematic Biology* (1998 - 2001); *Journal of Molecular Evolution* (1998-2000); *Evolution* (1999-2002); *American Zoologist* (1999 - 2003)

Guest Editor for: *PNAS* (2010), *PLoS Genetics* (2013), *Journal for Ornithology* (2010-2011), *Systematic Biology* (2009)

Reviewer for *Science*, *Nature*, *Nature Communications*, *PNAS*, *PLoS Biology*, *Evolution*, *Molecular Biology and Evolution*, *Molecular Ecology*, *Behavioral Ecology and Sociobiology*,

Immunology Today, Immunogenetics, Molecular Phylogenetics and Evolution, Systematic Biology, Bioscience, Auk, Journal of Avian Biology, and several others.

EXTERNAL THESIS EXAMINER/READER

Robert Kusmierski, PhD Thesis on "Molecular Phylogenies of Bowerbirds Inferred from Mitochondrial Cytochrome B and Nuclear Intron Sequences", La Trobe University, Melbourne, Australia 9/97

Michele D. Binder, MSc Thesis on "Isolation and Characterisation of a Novel Avian Sex-specific Gene", University of Melbourne, Melbourne, Australia, 2/98

Mustafa Abdul Rahman, PhD Thesis on "Biogeography of Avifauna and Patterns of Variation in Little Spiderhunter (*Aracnothera longirostra*) in Southeast Asia", University of Queensland, Brisbane, Australia, 3/01.

Åsa Langefors, Ph.D., "Genetic Variation in Mhc Class II B in Atlantic Salmon: Evolutionary and Ecological Perspectives". Lund University, Lund, Sweden, 9/99

Ulf Johansson, Ph.D., "Higher level molecular systematics of Passeriformes", Swedish Museum of Natural History, Stockholm" 11/02

Camille Bonneaud, Ph.D. "Immunogenetics and Ecology of the House Sparrow (*Passer domesticus*). CNRS, Paris 9/04

Robert Ekblom, Ph.D., "Immunoecology of the Great Snipe (*Gallinago media*): Mate Choice, MHC Variation, and Humoral Immunocompetence in a Lekking Bird". Uppsala University, Uppsala 11/04.

Laura Buggiotti, Ph.D. "Avian evolutionary genomics: studies of *Ficedula* flycatchers". University of Turku, Turku, Finland. 12/07.

Camilla Whittington, Ph.D. "Evolution of venom: gene discovery in the platypus". University of Sydney, Sydney, Australia. 3/11.

Anna Runemark, Ph.D., "Island biogeography and population divergence in the Skyros wall lizard", Lund University, Sweden. 5/12.

FIELDWORK HIGHLIGHTS

Eastern Mongolia, Museum of Comparative Zoology general collecting (June 2012)

Bon Portage Island, Nova Scotia; Chemical ecology and behavioral genetics of Leach's Storm Petrels (July 2009, 2010, 2011)

West Texas, general museum collecting and surveying for *Mycoplasma* in avian populations (6/11)

Massachusetts, Harvard Forest. Ornithological specimen collection with MCZ staff (08/08)

Kimberly/Top End, Northern Australia, Collection of museum specimens and tissues from Australian passerines (11/05)

General ornithological museum collecting, Washington State (1996-2003)

Tern Island, French Frigate Shoals, Northwest Hawaiian Islands: Collection of blood samples from

seabird colonies with emphasis on albatrosses (5/01)

Northern Territory, Queensland, Western Australia. Collection of museum specimens and tissues from treecreepers (*Climacteris*) and other passerines (8-9/97)

Eastern Australia (Queensland, New South Wales). Collection of museum specimens and tissues from treecreepers (*Climacteris*) and other passerines (8-9/96, 2/02, 9/02, 11/05, 6/07)

Fly River region, Papua New Guinea: Collection of blood samples for dissertation research (4/90)

Australia: Continent-wide collection of tissue specimens for dissertation research (1987, 1990)

CONFERENCES/SYMPOSIA CHAIRED/ORGANIZED

SSE 2013 Symposium: "The Role of Field Expeditions in 21st Century Evolutionary Biology". Annual meeting of the Society for the Study of Evolution, Snowbird, Utah.

Vice Chair and Chair, Gordon Conference in Ecological and Evolutionary Functional Genomics, 2007 (Newport, Rhode Island) and 2009 (Tilton, New Hampshire), respectively.

Chair, Annual meeting of the American Genetic Association, "Genomics and Biodiversity". National Laboratory of Genomics for Biodiversity, Irapuato, Mexico (July 2011)

Co-organizer: Mathematical and Computational Approaches in High-Throughput Genomics, Workshop III: Evolutionary Genomics, UCLA, November 2011

GRANTS

Research Grants

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| 1986 -1990 | National Science Foundation Graduate Fellowship (~\$67,000) |
| 1989 | Frank M. Chapman Memorial Award (American Museum of Natural History) |
| 1989 | National Science Foundation Dissertation Improvement Grant (\$12,000) |
| 1987,1988 | Carl B. Koford and Louise Kellogg research awards (Museum of Vertebrate Zoology) |
| 1990 -1991 | Ford Foundation Dissertation Fellowship (\$18,000) |
| 1991 | National Science Foundation Graduate Student Travel Award (\$3,000) |
| 1989,1996 | National Geographic Research Grants (Molecular biogeography of Australian birds; \$7,000 in 1990; \$19,700 in 1995) |
| 1995 | National Science Foundation Grant (3 yrs.; Behavioral and parasitological correlates of MHC polymorphism in Blackbirds; DEB 9419738; \$251, 000) |
| 1995 | University of Washington Royalty Research Grant (2 yrs.; Large-scale sequencing and the evolutionary tree for birds; \$25,000) |
| 1997 | U. Washington Nathan Shock Center For Excellence in the Basic Biology of Aging (1 yr., Cloning <i>Mhc</i> genes in Budgerigars, an avian model for aging; \$42,000) |
| 1997-1998 | National Science Foundation Grant (1.5 yrs., Evolution of class II Mhc genes in birds; DEB 9707458; \$105,000) |
| 1998 | National Geographic Society Online, Featured Grantee (Sept – Nov. 1998) |
| 1999 | National Science Foundation Grant (3 yrs., Concerted evolution of class II Mhc genes in birds; DEB 9815800; \$265, 000) |
| 2000 | National Geographic Research Grant (\$13,301); Conservation genetics of black-footed albatrosses caught in North Pacific fisheries' nets |
| 2000-2003 | Evolution of a Parasite and its Recently Colonized Host (NSF DEB (IRCEB)0077804 ; 4 yrs. G. Hill, PI; S. Roberts, S. Edwards, co-PIs; \$2,034,122; \$721,812 to S.V.E.). |
| 2001 | Minority Career Advancement Award for Sabbatical Supplement in Evolutionary |

- and Ecological Genetics – (NSF DEB-0129487; 1 yr., \$54,743)
- 2001-2005 Multilocus Tests of Speciation Models and Comparative Phylogeography of Australian Birds (P. Beerli co-PI; 4 yrs., NSF DEB-0108249; \$375,000)
- 2002 -2004 BAC Libraries for the Reptilia, Including Birds: Genomic Resources for Comparative Biology (NSF IBN-0207870; Edwards, PI; C. Amemiya, J. R. Macey, co-PIs; 2 yrs.; \$1,095,030)
- 2003 – 2006 Accomplishment-based renewal: Hitchhiking and Molecular Evolution of the Major Histocompatibility Complex in Birds (NSF, DEB0315806, 3 yrs., \$345,000)
- 2008-2011 NSF DEB 0743616 "COLLABORATIVE RESEARCH: Estimating Species Trees from Multilocus DNA Sequence Data" (co-PI, Dennis Pearl) \$450,000
- 2009-2012 NSF - MCB - 0817687: COLLABORATIVE RESEARCH: Evolution of Sex Chromosomes in Turtles. (PI, Nicole Valenzuela, Iowa State University; Edwards, co-PI) \$205,000
- 2008-2010 NSF DEB-0815705 - Collaborative Research: Multilocus Comparative Phylogeography of Pine-Oak Woodland Birds in North America (PI, Garth Spellman, Black Hill State University; co-PIs, John Klicka, and Scott Edwards) \$143,000
- 2009-2012 NSF IOS-0922640 - Collaborative Research: Molecular mechanisms of scent mediated self / non-self recognition in a pelagic seabird (PI, Gabrielle Nevitt, UC Davis) \$270,000
- 2009-2012 NSF IOS - 0923088 - Collaborative Research: Plumage redness and good genes in the House Finch - (PI, Geoff Hill, Auburn University, \$300,000)
- 2012-2014 NSF IOS-1258784 - Collaborative Research: A New Model For Chemical Ecology: Integrating Chemistry, Genetics and Behavior to Understand the Role of Individual Scent in a Colonial Nesting Seabird (Lead PI, Gabrielle Nevitt, UC Davis) \$270,000

Mentored NSF Dissertation Improvement Grants

Student

- 1999 Hopi Hoekstra Evolution and maintenance of XY females in natural populations of South American field mice (genus *Akodon*)
- 2003 Hollie Walsh Population Genetics of Black-footed Albatrosses using SNPs: Implications for Regional Differentiation, Mate Choice, and Species Conservation (NSF 0309076)
- 2009 June Lee Molecular Evolution of Reproductive Genes in Australian Fairy Wrens (Maluridae) (DEB 0909897)
- 2011 Maude Baldwin Function and Evolution of Sweet Taste Receptors in Birds (IOS 1111487)
- 2013 Shane Campbell-Staton Temperature-Dependent Biogeography and Limits of Thermal Tolerance in *Anolis carolinensis*

Museum collections grants

- 1999 NSF Collections Improvement Grant (1 yr., Improvement of Genetic Resources Collection at Burke Museum; DBI-9876809; \$78,760)
- 2006-2010 NSF Computerization of the Ornithology Collection, Museum of Comparative Zoology, Harvard University (DBI 0646400; 3 yrs., \$479,656)

Grants for student diversity, mentoring, conferences and workshops

- 1996 Research Corporation, Inc. -- M. J. Research Charitable Trust Grant (2 yrs., for training Seattle-area high school teacher in molecular techniques for eventual transfer to high school setting; \$14,000)
- 1997 U. Washington Faculty Undergraduate Mentoring Award (\$3,000)
- 1996-1997 NSF Research Opportunity Award (with Peter Wimberger as co-PI (supplement to DEB 9419738; \$18,000)
- 2001 NSF UMEB Supplement: Student Diversity at SSE 2001 (\$18,000)
- 2002 -2006 Undergraduate Diversity at the Society for the Study of Evolution and the Society of Systematic Biologists (NSF, DEB-0227714; UMEB Program, 4 yrs., \$60,000)

- 2008-2012 NSF DEB-0826811 (URM - Undergraduate Research & Mentoring): Undergraduate Diversity at SSE/SBB 2008-2012 (\$67,500)
- 2009 NSF DEB 0910551 - 2009 Evolutionary and Ecological Functional Genomics Gordon Research Conference
- 2010-2015 RCN-UBE: Advancing Integration of Museums into Undergraduate Programs (AIM-UP!). DEB 0956129; PI:Joseph Cook (\$485,648)
- 2011 NSF OISE 1118408 - US-Mexico workshop on evolutionary genomics of non-model species: next-gen sequencing, data management and hypothesis testing, Irapuato, Mexico, July 19-21, 2011 (co-PI; Stacey Lance, PI)

PUBLICATIONS

BOOKS

Audubon: Early Drawings. 2008. Richard Rhodes, Scott Edwards and Leslie Morris. Harvard University Press. 288 pages. [Reviewed favorably in the *NY Times*, *Wall Street Journal*, *Science* and many other venues).

JOURNAL PUBLICATIONS [Total 144; h-index 51 [Google Scholar]; * = not peer-reviewed; † = undergraduate student]

- Honeycutt, R. L., S. V. Edwards†, K. Nelson, and E. Nevo. 1987. Mitochondrial DNA variation and the phylogeny of African mole-rats (Rodentia: Bathyergidae). *Systematic Zoology* 36: 280-292.
- Kocher, T.D, W. K. Thomas, A. Meyer, S. V. Edwards, S. Pääbo, F. X. Villablanca and A. C. Wilson. 1989. Dynamics of mitochondrial DNA evolution in animals: amplification and sequencing with conserved primers. *Proceedings of the National Academy of Sciences (USA)* 86: 6196-6200.
- Edwards, S.V., and A.C. Wilson. 1990. Phylogenetically informative length polymorphism and sequence variability in mitochondrial DNA of Australian songbirds (*Pomatostomus*). *Genetics* 126: 695-711.
- Edwards, S.V., P. Arctander, and A.C. Wilson. 1991. Mitochondrial resolution of a deep branch in the genealogical tree for perching birds. *Proceedings of the Royal Society of London series B* 243:99-107.
- *Honeycutt, R.L., M.W. Allard, S.V. Edwards and D.A. Schlitter. 1991. Systematics and evolution of the family Bathyergidae. Pages 45-65 in P.W. Sherman, J.U.M. Jarvis and R.D. Alexander, eds. *The Biology of the Naked Mole-Rat*. Princeton University Press, Princeton, New Jersey.
- Edwards, S. V. & Naeem, S. 1993. The phylogenetic component of cooperative breeding in perching birds. *The American Naturalist* 141: 754-789.
- Edwards, S. V. 1993. Long-distance gene flow in a cooperative breeder detected in genealogies of mitochondrial DNA sequences. *Proceedings of the Royal Society of London series B* 252: 177-185.
- Edwards, S. V. 1993. Mitochondrial gene genealogy and gene flow among island and mainland populations of a sedentary songbird, the grey-crowned babbler (*Pomatostomus temporalis*). *Evolution* 47: 1118-1137.
- Bellchambers, K., E. Adams, S. Edwards. 1994. Observations of some birds of coastal and lowland Western Province, Papua New Guinea. *Muruk* 6: 28-39.
- Edwards, S. V. & Naeem, S. 1994. Homology and comparative methods in the study of avian cooperative breeding. *The American Naturalist* 143: 723-733.
- Edwards, S. V., M. Grahn and W. K. Potts. 1995. Dynamics of *Mhc* evolution in birds and crocodilians: amplification with degenerate primers. *Molecular Ecology* 4: 719-729.
- Edwards, S.V., E. K. Wakeland and W. K. Potts. 1995. Contrasting histories of avian and mammalian MHC genes revealed by class II B genes of songbirds. *Proceedings of the National Academy of Sciences*. 92: 12200-12204.
- Edwards, S. V. & M. Kot. 1995. Comparative methods at the species level: geographic variation in morphology and group size in grey-crowned babblers (*Pomatostomus temporalis*). *Evolution* 49: 1134-1146.
- Edwards, S. V., and W. K. Potts. 1996. Polymorphism of *Mhc* genes: implications for conservation genetics of

- vertebrates. Pp. 214-237 in *Molecular Genetic Approaches to Conservation* (T. B. Smith and R. K. Wayne, eds). Oxford University Press, Oxford.
- *Edwards, S. V. 1996. Short- and long-term evolution of *Mhc* class II B genes in birds: first glimpses. Pp. 169-178 in *Current Topics in Molecular Evolution* (M. Nei and N. Takahata, eds.). Penn State University Press, Institute of Molecular Evolutionary Genetics, Penn State University.
- Lum, P. Y., Edwards, S. V., and Wright, R. 1996. Molecular, functional and evolutionary characterization of the gene encoding HMG-CoA reductase in the fission yeast, *Schizosaccharomyces pombe*. *Yeast* 12: 1107-1124.
- Edwards, S. V., and P. Arctander. 1997. Congruence and phylogenetic re-analysis of perching bird cytochrome *b* sequences. *Molecular Phylogenetics and Evolution* 7: 266-271.
- *Edwards, S. V. 1997. Relevance of microevolutionary processes to higher level molecular systematics. Pp. 251-278 in *Avian Molecular Systematics and Evolution* (D. P. Mindell, ed.) Academic Press, New York.
- Edwards, S. V., K. Chesnut, K. Y. Satta, and E. K. Wakeland, 1997. Ancestral polymorphism of *Mhc* class II genes in mice: implications for balancing selection and the mammalian molecular clock. *Genetics* 148: 655-668.
- Edwards, S. V., Gasper, J., March, M. 1998. Genomics and polymorphism of *Agph-DAB1*, and *Mhc* class II B gene in Red-winged Blackbirds (*Agelaius phoeniceus*). *Molecular Biology and Evolution* 5: 236-250.
- Edwards, S. V., and P. Hedrick. 1998. Evolution and ecology of MHC molecules: from genomics to sexual selection. *Trends in Ecology and Evolution* 13: 305-311.
- *Edwards, S. V. 1998. Diversity of Birds. Pp. 358-369, in *Encyclopedia of Reproduction* (E. Knobil, J. D. Neill, Editors-in-Chief), Academic Press, San Diego, CA.
- Voelker, G. and S. V. Edwards. 1998. Can weighting improve bushy trees?: models of cytochrome *b* evolution and the molecular systematics of pipits and wagtails (Motacillidae). *Systematic Biology* 47: 589-603.
- *Edwards, S. V., C. Hess, J. Gasper, and D. Garrigan†. 1998. Toward an evolutionary genomics of the avian *Mhc*. *Immunological Reviews*, 167: 119-132.
- Garrigan, D †. and Edwards, S. V. (1999). Polymorphism across an intron exon boundary in an avian *Mhc* class II B gene. *Molecular Biology and Evolution* 16, 1599-1606.
- Hess, C. M., Gasper, J., Hoekstra, H., Hill, C. & Edwards, S. V. 2000 MHC class II pseudogene and genomic signature of a 32-kb cosmid in the House Finch (*Carpodacus mexicanus*). *Genome Research* 10: 13-23.
- Edwards, S. V. and Beerli, P. (2000). Perspective: Gene divergence, population divergence, and the variance in coalescence time in phylogeographic studies. *Evolution* 54, 1839-1854.
- Edwards, S. V., Gasper, J., Garrigan, D†., Martindale, D. A. and Koop, B. F. (2000). A 39-kb sequence around a blackbird *Mhc* class II B gene: ghost of selection past and songbird genome architecture. *Molecular Biology and Evolution* 17, 1384-1395.
- Edwards, S. V., Mónica C. Silva, Theresa Burg, Vicki Friesen and Kenneth I. Warheit. (2000). Molecular genetic markers in the analysis of seabird bycatch populations. In *Seabird Bycatch: Trends, Roadblocks and Solutions*. (ed. E. Melvin and J. Parrish), pp. 115-140: Alaska Seagrant Program.
- *Edwards, S. V., Nusser, J. and Gasper, J. (2000). Characterization and evolution of *Mhc* genes from non-model organisms, with examples from birds. In *Molecular Methods in Ecology* (ed. A. J. Baker), pp. 168-207. Cambridge: Blackwell Scientific.
- Hoekstra, H. E. and Edwards, S. V. (2000). Multiple origins of XY female mice (genus *Akodon*): phylogenetic and chromosomal evidence. *Proceedings of the Royal Society of London Series B Biological Sciences* 267, 1825-1831.
- Saunders, M.† and Edwards, S. V. (2000). Dynamics and phylogenetic implications of mtDNA control region in New World Jays (Aves: Corvidae). *Journal of Molecular Evolution* 51, 97-109.
- Gasper, J., Shiina, T., Inoko, H. and Edwards, S. V. (2001). Songbird genomics: analysis of 45-kb upstream of a polymorphic *Mhc* class II gene in Red-winged Blackbird (*Agelaius phoeniceus*). *Genomics* 75, 26-34. [cover article]
- Miura, G.† and Edwards, S. V. (2001). Cryptic differentiation and geographic variation in genetic diversity of Hall's Babbler (*Pomatostomus halli*). *Journal of Avian Biology* 32, 102-110.
- Hess, C. M. and Edwards, S. V. (2002). The evolution of major histocompatibility genes in birds. *Bioscience*. 52: 423-431.

- Edwards, S. V. and W. E. Boles. (2002). Out of Gondwana: the origin of passerine birds. *Trends in Ecology and Evolution* 17: 347-349.
- Birks, S. and Edwards, S. V. (2002). A phylogeny of megapodes (Aves: Megapodidae) based on nuclear and mitochondrial DNA sequences. *Molecular Phylogenetics and Evolution*. 23: 408-21
- Edwards, S. V., Fertil, B., Giron, A. and Deschavanne, P. J. (2002). A genomic schism in birds revealed by phylogenetic analysis of DNA strings. *Systematic Biology* 51: 599-613. [cover article]
- Zelano, B. and Edwards, S. V. (2002). An *Mhc* component to kin recognition and mate choice in birds: predictions, progress, and prospects. *American Naturalist*. 160: S225-S237.
- Waltari, E.† and Edwards, S. V. (2002). The evolutionary dynamics of intron size, genome size, and physiological correlates in archosaurs. *American Naturalist* 160: 539-552.
- Arbogast, B., Edwards, S. V., Wakeley, J. Beerli, P., and Slowinski, J. (2002). Estimating divergence times from molecular data on phylogenetic and population genetic time scales. *Annual Review of Ecology and Systematics* 33: 707-740.
- *Beerli, P., and Edwards, S. V. 2002. When did Neanderthals and modern humans diverge? *Evolutionary Anthropology* S1: 60-63.
- Brumfield, R. D. Nickerson, P. Beerli, and S. V. Edwards. (2002). The utility of single nucleotide polymorphisms in inferences of population history. *Trends in Ecology and Evolution*. 18: 249-256
- Wang, Z., Baker, A. J., Hill, G. E., Edwards, S. V. (2003). Reconciling actual and inferred population histories revealed by AFLP analysis in the House Finch. (*Carpodacus mexicanus*) *Evolution* 57: 2852-2864.
- *Edwards, S. V. (2003). Australo-Papuan Babblers. In *Encyclopedia of Birds* (Andromeda Oxford Ltd., Abingdon, U. K.)
- Edwards, S. V. and Dillon†, M. 2004. Hitchhiking and recombination in birds: evidence from *Mhc*-linked and unlinked loci in red-winged blackbirds (*Agelaius phoeniceus*). *Genetical Research* 84: 175-192.
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Edwards, S. V. 2011. A Bird's Eye View of Animal Evolution (review of *Animal evolution: Fossils, Genomes, and Trees*. Maximilian J. Telford and D. T. J. Littlewood. Oxford University Press, 2009. *Quarterly Review of Biology* 61: 331-333.

CORRESPONDENCE

Mayer, Gregory C., Jerry A Coyne, Jonathan B Losos, Johannes Foufopoulos, Neil Shubin, Douglas J Futuyma, Benjamin C Campbell, Scott V Edwards. 2013. Museums' Role: Increasing Knowledge. *Science* 339: 1148-1149.

Wu, S., S. Song, L. Liu, S.V. Edwards. 2013. Reply to Gatesy and Springer: The multispecies coalescent model can effectively handle recombination and gene tree heterogeneity. *Proceedings of the National Academy of Sciences* 110: E1180-E1180.

RECENT INVITED LECTURESHIPS & PLENARY LECTURES

Upcoming

Plenary Lecture: "From feathers to flightlessness: using comparative and population genomics to study the genetic basis of phenotypic evolution". Reunión Argentina de Biología Evolutiva, Cordoba, Argentina. July 2015.

Invited symposium talk: "From seabirds to songbirds: the phylogeography of avian resilience and invasion in Hawaii and beyond" Association of Tropical Biology and Conservation, Honolulu, HI, July 2015.

Allan Wilson New Zealand Lecture Tour: "Bird Evolution: From Dinosaurs to DNA". Multiple locations in

New Zealand.

Past Events

Invited faculty for 4-day workshop on species trees and phylogenetic estimation, the Scandinavian Research School in Systematics and the University of Gothenburg, Sweden. Nov. 2014.

“Building genealogies of species using the multispecies coalescent model”. Conference on Biomathematics and Ecology: Research and Education (BEER). Oct. 2014, Harvey Mudd College, CA.

“Population genomics and transcriptomics of adaptation of House Finches (*Haemorhous mexicanus*) to a rapidly evolving bacterial pathogen”. Invited talk, CNRS Symposium on Infectious Diseases as Drivers of Evolution: The Challenges Ahead”, Roscoff, France, Sept. 6-10, 2014.

“Conserved non-exonic elements as markers of phylogenomic history and regulatory innovation in birds” Invited symposium talk at 26th International Ornithological Congress, Tokyo, Japan, Aug. 18-25 2014.

“Opportunities and Challenges for Funding and Sustaining Natural History Collections”. iDigBio Symposium on Natural Collections in the 21st Century, University of Florida (April 2014)

“Rumors, myths and subtleties in the analysis of species trees”. Invited keynote address for iEvoBio symposium, Raleigh, NC, June 23, 2014.

“Genomes, Feathers and Flight: Biodiversity and Evolution through the Lens of Genomics”. Lecture for Symposium on EO Wilson Biodiversity Symposium, University of Alabama, April 2014.

“Genomes, feathers and flight: comparative genomics of birds and other reptiles”. February 10, 2014. Darwin Day Speaker, University of Virginia.

“Phylogenetics and the Coalescent Process”. Seminar at Workshop on Evolutionary Genomics, Universidad Austral de Chile, Valdivia, Chile (January 2014).

“Phylogenetics and Comparative Genomics”. Seminar at Workshop on Evolutionary Genomics, Fudan University, Shanghai, China (July 2013).

“Genomes, feathers and flight: comparative genomics of birds and other reptiles”. University of Mexico Research Day Speaker. April 2013

“Genomes, feathers and flight: comparative genomics of birds and other reptiles”. 2013 Roger Carpenter Lecturer in Comparative Biology at San Diego State University (May 2013)

“From reptiles to dinosaurs to birds: a view from the genome”. Virginia Commonwealth University Darwin Day Speaker, March 2013

“Genomic, geographic and temporal tracking of a rapidly evolving host-pathogen interaction”, 10th Symposium on Ecological Genomics, Kansas State University, Kansas City, MO (October 2012),

Plenary lecture: “Resolving the Tree of Life through Phylogenomics and the Multispecies Coalescent Model”, 2nd symposium on Evolutionary Genomics and Bioinformatics (symposium in honor of the 7th birthday of Wen-Hsiung Li), Kaohsiung, Taiwan (October 2012)

Plenary lecture: “Molecular Ecology in the 21st Century: Genomic Foundations of an Integrative Science”. German Zoological Society annual meeting, Konstanz, Germany (September 2012)

Public lecture: "Molecular Ecology in the 21st Century: Genomic Foundations of an Integrative Science", University of Canberra, Canberra, Australia (May 2012)

3rd Biological Evolution Workshop, Porto Alegre, Brazil. "Major Events in the Evolution of the Avian Genome." (November 2011)

2nd Latin American School for Evolution, Valdivia, Chile. "Principles of Genome Evolution as revealed by Comparative Genomics of Birds and Reptiles" (November 2011)

Sewall Wright Annual Graduate Student Speaker, University of Chicago, Department of Ecology and Evolution. "The phylogeography-phylogenetics continuum". (May 2011)

Symposium for the Opening Ceremony of the Paleontological Museum of Liaoning (PMOL), Shenyang Normal University, Shenyang, China. "Genomics and paleontology: opportunities for integration". (May 2011)

George C. Williams Memorial Lecture Graduate Student Invitee, Department of Ecology and Evolution, State University of New York, Stony Brook "Genomics of Host-Pathogen Evolution: A Tale of Birds and Bacteria" and "Population genetics and phylogenetics: where is the common ground?" (May 2011)

"From Dinosaurs to Birds", The HistoryMakers, a celebration of African-Americans in Science, Detroit Science Museum, February 2011 <http://www.idvl.org/thehistorymakers/>

"Symposium lecture: "Genomics of host-parasite co-evolution in House Finches and *Mycoplasma*" Darwin Now Symposium, Alexandria, Egypt (Nov. 2009)

Invited lecture, "Beyond Darwin's Dreams: Genomics of Host Parasite Co-Evolution", Darwin Symposium, Smith College, Massachusetts (Oct. 2009).

Invited lecture, "Species Trees: The Latest Twist on Darwin's Tree of Life", Darwin Symposium, Punta del Este, Uruguay (Sept. 2009).

Invited lecture, "Genomics of Host Parasite Co-Evolution", Darwin's Evolution Symposium, Stockholm Museum/University of Stockholm, May 2009.

Harvard Museum of Natural History: "The Ecology and Evolution of Nests and Eggs" (5/07), Special Lecture opening "Nests and Eggs" exhibit.

Plenary Lecture, European Society of Evolutionary Biology, (8/07) "Navigating the forest of gene trees, from phylogeography to phylogenomics".

Plenary Lecture, XXIV International Ornithological Congress, Hamburg, Germany: "Genomics and Ornithology" (8/06)

Songbird Genome Mapping Workshop, Sigtuna, Sweden: "Genomic parameters of relevance to QTL mapping in songbirds" (9/06)

Class of 1960 Annual lecture, Williams College, Williamstown, MA "Multilocus approaches to phylogeography and disease ecology" (11/06)

James P. Holland Memorial Lecture, Indiana University, Bloomington, IN: "From Archaeopteryx to Modern Birds: A DNA Trail" (2003)

PRESS WRITE-UPS/TV APPEARANCES

"Singing a Genetic Tune" by Eric Sorensen, Seattle Times. July 2000.

"NSF's Ark Draws Alligators, Algae and Wasps", by Jennifer Couzins. Science 297: 1638-39 (6 Sept. 2002).

"Avian Expert Joins Biology Department" by Risheng Xu, Harvard Crimson, Feb. 4, 2004.

"Collection takes flight: Edwards studies birds with genetic databases, not binoculars" by Steve Bradt, Harvard University Gazette, May 27, 2004. (<http://www.hno.harvard.edu/gazette/2004/05.27/03-edwards.html>)

"Unlocking the DNA Secrets of Birds" by Carolyn Johnson, Boston Globe, Feb. 15, 2005.

"Exhibit explores ivory-billed mystery: HMNH highlights Harvard collection, current debate" by Alvin Powell, Harvard Gazette, June 1, 2006. (<http://www.news.harvard.edu/gazette/2006/06.01/11-ivorybill.html>)

Numerous press articles and digital media covering our 2007 paper in *Nature*, including Zimmer, C. "Evolution - Jurassic genome" Science 315: 1358-1359.

Textbook appearance, "Interview" and "Inquiry Box" in section on "Mechanisms of Evolution", Biology, (8th ed.) N. A. Campbell and J. B. Reece (and others). Pearson-Benjamin Cummings, Boston (2008).

Generalist speaker, "EVOLVE", The History Channel (13 Episodes), aired Summer 2009.

Principal, "Beast Legends", 6-part miniseries on the zoological origins of mythological beasts (Yap Films, aired Canadian History Channel and US SyFy Channel, Fall 2010)

"Old specimens, fresh answers" May 12, 2011, by Alvin Powell. Harvard University Gazette. <http://news.harvard.edu/gazette/story/2011/05/old-specimens-fresh-answers/>

Numerous press articles and digital media covering our 2011 paper (Vo et al.) in *PNAS* on mercury levels in Hawaiian albatross, including Mercury rising. Nature News, April 18, 2011. By Nadia Drake. http://www.nature.com/news/2011/110418/full/news.2011.243.html?s=news_rss; numerous additional web articles on Vo et al. 2011 from BBC News, e! Science News, and other venues.

"Melding the Web and the tactile: Harvard, other schools create a virtual classroom that uses museum collections." Harvard Gazette, April 29, 2013. By Alvin Powell.

On camera-narrator and consultant, "Mysteries of the Museum" episode on Meinertzhagen and the case of the Fraudulent Forest Owlet". Filmed Nov. 2014 for Travel Channel, upcoming (2015).

CURRENT LAB PERSONNEL

Undergraduates: Julia Yu, Harvard '16; Harold Eyster, Harvard '17. *Graduate students:* Jonathan Schmitt (incoming); Phil Grayson (2013 – pres.), Allison Schultz (2011 – pres.), Maude Baldwin (2007 – pres.), Shane Campbell-Staton (2009-pres., co-advised w/J. Losos). *Postdoctoral Fellows:* Cassie Stoddard (Harvard Junior Fellow), Christie, Riehl (Harvard Junior Fellow), Simon Sin, Tim Sackton. *Visiting Scholars and Students:* Elisa Dierickx (Harvard Class of 2011), Betul Kacar.

PAST LAB PERSONNEL

Undergraduates: Amanda Lu, Zach Herring, Liz Schold, Bianca Lec, Grant Miura, Eric Waltari, Dan Garrigan, Matt Saunders, Nancy Chen, Elaine Vo, David Lum (and several others). *Graduate Students:* Chris Hess, Hollie Walsh, Bethanne Zelano, Corey Welch, Hopi Hoekstra, John Nusser (MSc), Monica C. Silva, Gary Voelker (co-advised), Ricardo Godinez, June Yong Lee, Shane Campbell-Staton (co-advised). *Postdoctoral Fellows:* Sharon Birks, Robb Brumfield, Zhenshan Wang, Bryan Jennings, Kara O'Keefe (co-advised with Paul Turner, Yale University), Charles Chapus, Patricia Brito, Christopher Balakrishnan, Anna Dubiec, Camille Bonneaud, Liang Liu, Christopher Organ, Susan Cameron, Miguel Alcaide, Andrew Shedlock, Daniel Janes, Christian Anderson, Niclas Backström, Mark Liu, Clemens Küpper, Frank Rheindt, Matt Fujita. *Visiting Students and Scholars:* Mary O'Connell (Dublin City University, Ireland), Tobias Lenz (Germany), Irene Salicini (Spain), Bei An (China), Patrick Albers (Germany), Moos Blom (Germany), Longying Wen (China), Gisele Dantas (Brazil). *Technicians:* Joe Gasper, Nancy Rotzel, Ingrid Soltero, Flavia Chen, Liz Schold.