

**NEWS in Evolutionary Biology**  
**San Diego State University**  
**December 2008**



Welcome! This is our first Electronic Newsletter designed to update you on the latest faculty and student research in Evolutionary Biology at SDSU! We also wish to encourage you to contribute to our program, which supports undergraduate and graduate student research in EB.

As former students and faculty at SDSU we thank you for supporting our program. You are the reason that we enjoy a long-standing strength and excellent reputation in Evolutionary Biology! We have a record of success in mentoring MS students and we will soon begin accepting students in our Joint Doctoral Program in EB with UC Riverside.

We need your help to continue to provide our students with excellent research opportunities and resources!

**Donate Now**

---

Please help us to support our program activities and student research. The Evolutionary Biology Program Area has two donation accounts, administered by the Campanille Foundation of San Diego State University:

**EB EDUCATION AND RESEARCH FUND**

This fund is used to support EB program activities including travel and honoraria for speakers, student conference registration, student research supplies, and small equipment items.

**EB SCHOLARSHIP**

This is a small, competitive grant to support graduate student research. These funds may be used for research supplies, field work costs, and travel to professional meetings.

TO DONATE: Go to <http://giveonline.sdsu.edu/giving>

Put dollar amount under "**Donation amount**". Leave next two menus alone.

Under "**Please direct my gift to another school, department or program:**" type either: "**EB Education and Research Fund**" or "**EB Scholarship**". Continue with payment.

**Ecology and Evolutionary Biology Seminar Series, Spring 2009**

---

**Darwin Month February 2009**

During February, 2009 the Evolutionary Biology Program Area at SDSU is pleased to sponsor four lectures focused on Darwin's work. The university community is invited to attend these lectures which are part of the Monday Afternoon Ecology and Evolutionary Biology Seminar Series held at 4:00 pm in the Gold Auditorium, BioScience Center. Each lecture will be preceded by a reception at 3:30 pm in the foyer of the Gold Auditorium.

February 2 **Dr. Kevin Burns**

Dept. of Biology, SDSU

"On the Origin of Darwin's Finches"

February 9 **Dr. J. David Archibald**

Dept. of Biology, SDSU

"The Tree of Life: Perceptions of the History of Life Before and After Darwin"

February 16 **Dr. Kelly Hughes**

Dept. of Biology, Univ. Utah

"Debunking the 'Posterchild' of Intelligent Design: The Bacterial Flagellum"

February 23 **Dr. Robert Zeller**

Dept. of Biology, SDSU

"Devo-Evo : What embryological processes can teach us about the evolution of animals"

## **EB Joint-Doctoral Program**

---

A joint-doctoral program in Evolutionary Biology between SDSU and the University of California Riverside has recently been approved by the Senate on both campuses! We anticipate that recruitment for the first class of doctoral students will begin during the 2008-2009 academic year, with the first students beginning in fall 2009. Details of the program will be forthcoming on our Joint-Doctoral Program link from the EB web site.

## **EB Faculty Activities**

---

The Evolutionary Biology faculty have assumed a number of important administrative positions this fall. **Dr. David Archibald** continues as the Graduate Coordinator of Biology. **Dr. Andy Bohonak** begins his first term as Vice Chair of Biology. **Dr. Annalisa Berta** is serving as interim coordinator for the EB Program Area and is actively involved in planning our Joint-Doctoral Program with U.C. Riverside, for which she will be Coordinator beginning fall 2009.

**Dr. Annalisa Berta**, along with Dr. John Gatesy at University of California, Riverside and Dr. Tom Deméré of the San Diego Natural History Museum, will collaborate on a National Science Foundation funded research project addressing "Enduring Questions of Life." Their project, "How toothless giants feed," will study the origins and evolution of the feeding mechanism of the baleen whales, among the largest organisms on earth. Congratulations, Annalisa!

The SDSU Herbarium (LS 267, Life Science South) joins the Consortium of California Herbaria on 21 April 2008 (John Muir's birthday). Our herbarium has over 18,000 specimens of plants, all of which are databased, and 89% of which are from California. The California records will now be accessible through The Jepson Interchange, organized through UC-Berkeley. The Interchange allows searches of records by scientific name, herbarium, county, locality, collector, date of collection, and accession number. All records are displayed, and those that are geo-referenced may be mapped in several different formats. The Interchange has become an invaluable resource for plant systematists and ecologists.

**Dr. Rulon Clark** is senior author of a recent paper in *Molecular Ecology* - Integrating individual behaviour and landscape genetics: the population structure of timber rattlesnake hibernacula (Feb. 2008, vol. 17:719-730), which was highlighted in a Perspective of that issue.

## **EB Student Research News**

---

The Plant Systematics Lab at SDSU presented 4 papers and posters at the Botany 2008 meetings in Vancouver, B.C., Canada, 26-30 July 2008. Dr. Michael Simpson and graduate students Matt Guillems, Kristen Hasenstab, and Michael Silveira presented research findings on phylogenetic relationships in *Calyptidium* (Portulacaceae), *Cryptantha* (Boraginaceae), and *Pogogyne* (Lamiaceae), respectively, and research associate Nuri Pierce presented findings on pollen heteromorphism in *Conostylis* (Haemodoraceae). Good work by all!

## 2008 EB Scholarship Winner

---

**Justin Hoesterey** M.S. Student in the Bohonak Lab was the recipient of the EB Scholarship. Below he describes his research and use of the scholarship.

My research involves using both mitochondrial and nuclear genetic markers to study the population genetics of the tule mosquito, *Culex erythrothorax*, a species that is locally very abundant in San Diego County. The funds from the 2008 Evolutionary Biology Scholarship were used towards the purchase of special expensive fluorescently labeled primers necessary for genotyping microsatellite loci. Currently, I am using these special primers to screen and develop novel microsatellite markers for this species, as there has been no previous genetic work done on this species. Once these microsatellite markers are developed, I plan on using them to specifically examine the role that watersheds play in affecting the population structure of *C. erythrothorax*. In addition, I also hope to contribute



information that may aid managers in the control of this species, as it is considered a pest species due to its opportunistic biting habits, and its potential to spread disease.

## EB Alumni News

---

Three of our Master of Science alumni, **Brad Hollingsworth** (an adjunct in E.B.), **Drew Stokes**, and **Scott Tremor**, were featured in a Quest article of the San Diego Union Tribune. These scientists surveyed (respectively) the snakes and lizards, bats, and land mammals of a region near the Salton Sea of Imperial County, California. The data obtained on animal wildlife diversity will be used to assess the need for protecting this land.

**Megan McKenna**, now at Scripps Institute of Oceanography and a former M.S. student of Dr. Annalisa Berta and Dr. Ted Canford, was a co-author of a research article that made the cover of The Anatomical Record: Cranford, T. W., M. F. McKenna, M. S. Soldevilla, S. M. Wiggins, J. A. Goldbogen, R. E. Shadwick, P. Krysl, J. A. St. Ledger, and J. A. Hildebrand. 2008. Anatomic geometry of sound transmission and reception in Cuvier's beaked whale (*Ziphius cavirostris*). The Anatomical Record 291:353-378.



**Dr. Michael Novacek** was awarded the SDSU Alumni Association's Alumni of Distinction Award (the "Monty" award) for 2008! He received the award on 29 March 2008 at the annual Alumni Association banquet.

Dr. Novacek received his M.S. degree in Biology at SDSU in 1974, his thesis entitled "Insectivora of the later Eocene (Uintan) of San Diego County, California". He subsequently received his PhD from U. C. Berkeley, and was an assistant and associate professor in Biology at SDSU from 1976-1982. Shortly after his SDSU career, he obtained a position at the American Museum of Natural History in New York City, where he has been Vice President and Provost for science since 1994.

Dr. Novacek is known both for scholarly works and popular books in paleontology, and has had numerous media appearances, including a PBS Nova series special.

## Scientific Publications in EB- 2008

---

Aevermann B.D\*. and Waters E.R. 2008. The duplication and retention of the small heat shock protein gene family in *Caenorhabditis elegans* and *Caenorhabditis briggsae*. *Genetica*. Oct 17 2007; [Epub ahead of print]. Print publication expected Summer 2008.

Archibald, J. D. 2008. Edward Hitchcock's pre-Darwin (1840) "Tree of life." *Journal of the History of Biology*. Online First.

Arenas-Mena, C. 2008. HeBlimp and HeT-Brain expression in an indirectly developing polychaete correlates with endodermal and neural precursors. *Journal of Experimental Zoology Part B: Molecular and Developmental Evolution*. (In press)

Averianov, A. O., Archibald, J. D., and Ekdale, E. G. 2008 (in press). Deltatheroidan Mammal *Sulestes* from the Late Cretaceous of Uzbekistan. *Journal of Vertebrate Paleontology*.

Bohonak, A. J. 2008. Genetic drift in human populations. in *Encyclopedia of Life Sciences*, cross-listed in *Handbook of Human Molecular Evolution*. John Wiley and Sons, Ltd. <http://www.els.net/> [DOI: 10.1002/9780470015902.a0005440.pub2]

Clark, R. W., Brown W. S., Stechert, R., and K. W. Zamudio. 2008. Integrating individual behavior and landscape genetics: the population structure of timber rattlesnake hibernacula. *Molecular Ecology* 17:719-730.

Crawford, N. G.\*, J. Zalidvar-Rae, C. Hagen, A. Schable, E. B. Rosenblum, M. G. Ritchie, T. W. Reeder, J. A. Graves, and T. C. Glenn. 2008. Thirteen polymorphic microsatellite DNA loci from whiptails of the genus *Aspidoscelis* and related cnemidophorine lizards. *Molecular Ecology Resources* 8:219-223.

Deméré, T.A., M. R. McGowen\*, A. Berta. and J. Gatesy. 2008. Morphological and molecular evidence for step-wise evolutionary transition from teeth to baleen in mysticete whales. *Systematic Biology* 57:15-37.

Deméré, T.A. and A. Berta. 2008. Cranial anatomy of the toothed mysticete *Aetiocetus weltoni* and its implications for aetiocetid phylogeny. *Zoological Journal of Linnean Society* 154(2): 308-352.

de Quieroz, K. and T. W. Reeder. 2008. Squamata - Lizards. In B. I. Crother (ed.), *Scientific and Standard English Names of Amphibians and Reptiles of North America North of Mexico*, pp. 24-45. SSAR Herpetological Circular No. 37.

Desnues C.G., B. Rodriguez-Brito\*, S. Rayhawk\*, S. Kelley, T. Tran\*, M. Haynes, H. Liu, D. Hall\*, F.E. Angly\*, R.A. Edwards, R.B. Thurber, P. Reid, J. Siefert, V. Souza, D.L. Valentine, B.K. Swan, M. Breitbart, F. Rohwer. 2008 (in press). Biodiversity and biogeography of phages in modern stromatolites and thrombolites. *Nature*.

Dinsdale E.A., R.A. Edwards, D. Hall\*, F. Angly\*, M. Breitbart, J.M. Brulc, M. Furlan\*, C. Desnues, M. Haynes, L. Li, L. McDaniel, M.A. Moran, K.E. Nelson, C. Nilsson, R. Olson, J. Paul, B. Rodriguez-Brito\*, Y. Ruan, B.K. Swan, R. Stevens, D.L. Valentine, R.V. Thurber, L. Wegley\*, B.A. White, and F. Rohwer. 2008 (in press). Functional metagenomic profiling of nine biomes. *Nature*.

Ellis, D.\*, R.W. Bizzoco, and S.T. Kelley. 2008. Halophilic Archaea identified in fumarole steam vapor from vents around the world. *Environmental Microbiology* 10: 1582-1590.

Kunin, V., S. He, F. Warnecke, S.B. Peterson, H.G. Martin, M. Haynes, N. Ivanova, L.L. Blackall, M. Breitbart, F. Rohwer, K.D. McMahon, P. Hugenholtz (2008, in press). A bacterial metapopulation adapts locally to phage predation despite global dispersal. *Genome Research*.

Lutz, K., N. Diaz, R.A. Edwards, F. Rohwer, S.T. Kelley, and J. Stoye. 2008. Taxonomic classification of short environmental DNA fragments. *Nucleic Acids Research E-Pub*.

Paquin, P., N. Dupérré, J.C. Cokendolpher, K. White, and M. Hedin. 2008. The fundamental importance of taxonomy in conservation biology: the case of the eyeless *Cicurina bandida* (Araneae: Dictynidae) of Central Texas, including new synonyms and the description of the male of the species. *Invertebrate Systematics*, In Press.

Pierce, Nuri and Michael G. Simpson. 2008. Polyaperturate pollen types and ratios of heteromorphism in the monocot genus *Conostylis* R. Br. (Haemodoraceae). *Australian Systematic Botany* (in press).

Resning SA, Lang D, Zimmer AD, Terry A, Salamov A, Shapiro H, Nishiyama T, Perroud PF, Lindquist EA, Kamisugi Y, Tanahashi T, Sakakibara K, Fujita T, Oishi K, Shin-I T, Kuroki Y, Toyoda A, Suzuki Y, Hashimoto S, Yamaguchi K, Sugano S, Kohara Y, Fujiyama A, Anterola A, Aoki S, Ashton N, Barbazuk WB, Barker E, Bennetzen JL, Blankenship R, Cho SH, Dutcher SK, Estelle M, Fawcett JA, Gundlach H, Hanada K, Heyl A, Hicks KA, Hughes J, Lohr M, Mayer K, Melkozernov A, Murata T, Nelson DR, Pils B, Prigge M, Reiss B, Renner T \*\*, Rombauts S, Rushton PJ, Sanderfoot A, Schween G, Shiu SH, Stueber K, Theodoulou FL, Tu H, Van de Peer Y, Verrier PJ, Waters E, Wood A, Yang L, Cove D, Cuming AC, Hasebe M, Lucas S, Mishler BD, Reski R, Grigoriev IV, Quatrano RS, Boore JL. 2008. The *Physcomitrella* genome reveals evolutionary insights into the conquest of land by plants. *Science*. 2008 Jan 4; 319(5859): 64-9.

Thomas, S.M.\* and M. Hedin. 2008. Multigenic phylogeographic divergence in the paleoendemic southern Appalachian opilionid *Fumontana deprehendor* Shear (Opiliones, Laniatores, Triaenonychidae). *Molecular Phylogenetics & Evolution*, 46, 645-658.

Townsend T.M., E.R. Alegre\*, S.T. Kelley, J.J. Wiens, T.W. Reeder. 2008. Rapid Development of Multiple Nuclear Loci for Phylogenetic Analysis Using Genomic Resources. *Molecular Phylogenetics and Evolution* 47: 129-142.

Vink, C.J., M. Hedin, M.R. Bodner, W.P. Maddison, C.Y. Hayashi, and J.E. Garb. 2008. Actin 5C, a promising nuclear gene for spider phylogenetics. *Molecular Phylogenetics & Evolution*, In Press.

Vandergast, A. G., A. J. Bohonak, S. A. Hathaway, J. Boys\*\* and R. N. Fisher. In press. Are hotspots of evolutionary potential adequately protected in southern California? *Biological Conservation*.

Vandergast, A. G., E. A. Lewallen\*, J. Deas\*\*, A. J. Bohonak, D. B. Weissman, and R. N. Fisher. In Press. Loss of genetic connectivity and diversity in urban microreserves in a southern California endemic Jerusalem cricket (Orthoptera: Stenopelmatidae: *Stenopelmatus "santa monica"*). *Journal of Insect Conservation*.

Viaud-Martinez, K. A.\*, R. L. Brownell, Jr., A. Komnenou and A. J. Bohonak. In press. Genetic isolation and morphological divergence of Black Sea bottlenose dolphins. *Biological Conservation*.

Waters E.R., B. D. Aevermann\*, Z. Sanders-Reed\*\*. 2008. Comparative analysis of the small heat shock proteins in three angiosperm genomes identifies new subfamilies and reveals diverse evolutionary patterns. *Cell Stress and Chaperones* Published OnLine First. Print publication expected Summer 2008.

Waters, E.R., S. Nguyen\*\*, R. Eskandar\*\*, J. Behan\*\*, and Z. Sanders-Reed\*\*. 2008. The recent evolution of a pseudogene: diversity and divergence of a mitochondrial-localized small heat shock protein in *Arabidopsis thaliana*. *Genome* 51:177-86.

Wiens, J. J., C. A. Kuczynski, S. A. Smith, D. Mulcahy, J. W. Sites, Jr., T. M. Townsend, and T. W. Reeder. 2008. Branch length, support, and congruence: testing the phylogenomic approach with 20 nuclear loci in snakes. *Systematic Biology* (in press).

## Contact Us

---

Please let us know any news about you. Contact Annalisa Berta with your news item.