

CENTER FOR SYSTEMATIC BIOLOGY & EVOLUTION

2009 ACTIVITY REPORT

THE
ACADEMY
OF NATURAL
SCIENCES

STAFF MEMBERS (2009)

ADMINISTRATION

Dr. Ted Daeschler, Vice President
Steven Dilliplane
Lori McCole
John Norton
Kristen Kepics
Dan Snyder (*retired May 2009*)

BOTANY

Dr. Ernie Schuyler, Curator Emeritus
Dr. Tanya Livshultz, Assistant Curator
Elana Benamy
Alina Freire-Fierro
Amanda Labadie
Dr. Rick McCourt
Miguel Pérez
Lauren Spitz

DIATOM HERBARIUM

Dr. Marina Potapova, Assistant Curator
Jennifer Beals
Alys Kirsch

ENTOMOLOGY

Dr. Daniel Otte, Curator/Chair
Dr. Jon Gelhaus, Curator
Greg Cowper
Jason Weintraub

ICHTHYOLOGY

Dr. John Lundberg, Curator, Chaplin Chair
Dr. Katriina Ilves
Kyle Luckenbill
Dr. Mark Sabaj-Pérez

INVERTEBRATE PALEONTOLOGY

John Sime

MALACOLOGY

Dr. Robert Robertson, Curator Emeritus
Dr. Gary Rosenberg, Curator/Pilsbry Chair
Paul Callomon
Judy-Lynn Goldberg
Amanda Lawless
Dr. David Robinson, USDA APHIS

ORNITHOLOGY

Dr. Nate Rice

VERTEBRATE ZOOLOGY

Dr. Ted Daeschler, Associate Curator/Chair
Ned Gilmore
Fred Mullison

VIREO

Doug Wechsler, Director
Daniel Thomas

JESSUP & MCHENRY FELLOWS

Lucja Fostowicz-Frelik
Fabio Laurindo DaSilva
Alexey Reshchikov

BY THE NUMBERS

Research Visitors303
Student Visitors.....425
Other Visitors.....1,790
TOTAL.....2,518

Outgoing Loans.....525

Specimens/Lots Loaned12,229

Information Requests1,700

FIELD WORK

Botany – *Colombia, Costa Rica, Ecuador, Pennsylvania, Thailand, Utah*

Diatoms – Pennsylvania

Entomology – *Canada, Colorado, Mississippi, Mongolia, New Jersey, Ohio, Pennsylvania, South Africa*

LMSE – Delaware, Pennsylvania

Malacology – China, *Philippines (Bohol, Cebu & Mactan Islands)*

Vertebrate Paleontology – Pennsylvania

PROPOSALS

BOTANY

- *Digitization of Latin American, African and other type specimens of plants at the Academy of Natural Sciences of Philadelphia, Global Plants Initiative (GPI), Mellon Foundation Award.*
- *Evolution of Pollination Mechanisms in Apocynaceae (the Milkweed Family), National Science Foundation.*
- *Pollination biology of primitive milkweeds and their closest relatives in South Africa, American Philosophical Society.*

DIATOMS

- *Algal Research and Ecological Synthesis for the USGS National Water Quality Assessment (NAWQA) Program Cooperative Agreement 3, Year 3*, Co-PI with **Don Charles** (Patrick Center for Environmental Research).
- *Algal Research and Ecological Synthesis for the USGS National Water Quality Assessment (NAWQA) Program Cooperative Agreement 3, Year 4*, Co-PI with **Don Charles** (Patrick Center for Environmental Research).
- *MSB: A phylogenetic analysis of the diatom family Achnanthidiaceae*, National Science Foundation.

ENTOMOLOGY

- *Costa Rica and Pacific Cricket Collections*, National Science Foundation.
- *Digital Species Index to The Academy of Natural Sciences' Entomology Collection*, Institute of Museum and Library Services.
- *Origins and diversity of Diplura and Protura in North America*, National Science Foundation.
- *Renovation of ANSP Entomology Department Research Collection & Associated Lab*, National Science Foundation. ARI-R².
- *Survey and Inventory of the Aquatic Insects of the Altai and Hangai Mountain Drainages, Mongolia*, National Science Foundation Award.
- *Survey of Southern African Orthopteroid Insects*, National Science Foundation.

MALACOLOGY

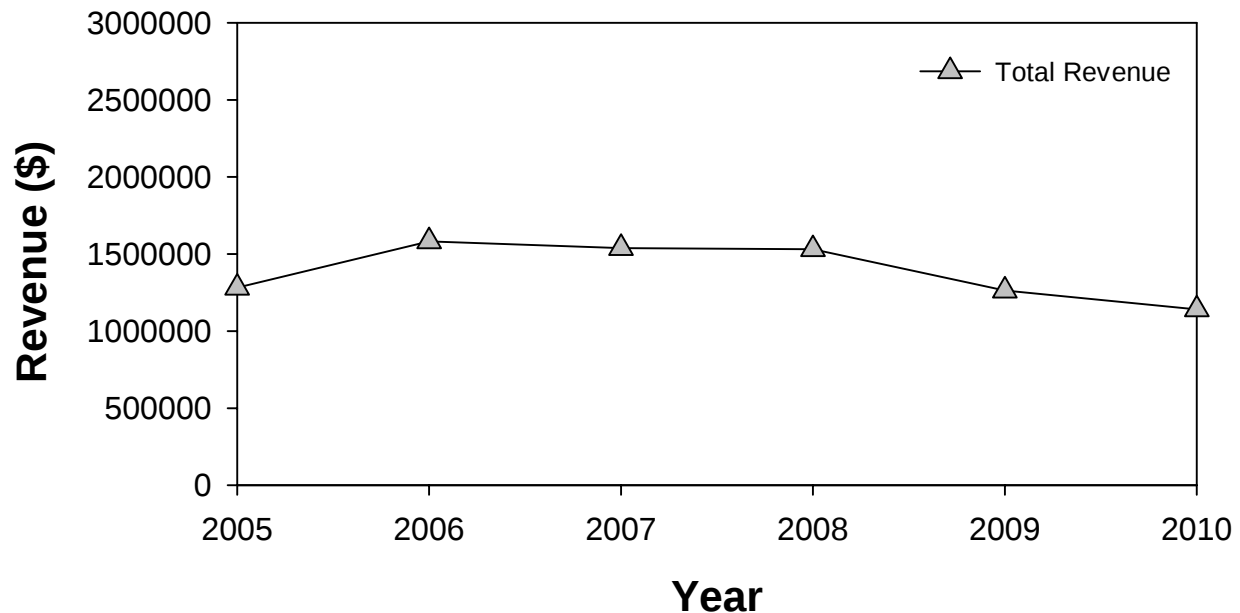
- *Using information and communication technologies (ITC) to enhance quality, effectiveness, and collaboration in the Philippine Mollusk Symbiont-ICBG Subaward*, Oregon Health Sciences University, NIH.
- *Toward a global database of marine mollusks*, Ocean Biogeographic Information System.

VERTEBRATE PALEONTOLOGY

- *Collaborative Research: The Late Devonian Tetrapodomorph Tiktaalik roseae*, National Science Foundation. GEO-SGP.
- *REU Site: Collections-Based Research Experiences for Undergraduates at the Academy of Natural Sciences*, National Science Foundation. BIO-REU.

GRANT REVENUE

Below is the revenue for CSBE from 2005 through 2009. Values for 2010 are projected.



PRESENTATIONS

- Akın, Ç., C. C. Can Bilgin, H. Hotz, P. Beerli, R. Westaway, T. Ohst, G.D. Guex, S. N. Litvinchuk, **T. Uzzell**, M. Bilgin, J. Plötner. Use of genetic divergence in water frogs to constrain geodynamics and landscape development in the eastern mediterranean region. International Workshop on Active Tectonic Studies and Earthquake Hazard Assessment in Syria and Neighboring Countries, Damascus, Syria.
- Cowper, G. W.** Pentatomidae of the Franklin Parker Preserve. American Entomological Society, Philadelphia, PA.
- Cowper, G. W.** The childhood journals of Morgan Hebard. American Entomological Society 150th Anniversary Meeting, Philadelphia, PA.
- Dahdul, W. and **J. G. Lundberg**. Systematic Revision of the South American Catfishes of the Subgenus *Megalonema* Eigenmann, 1912 (Siluriformes: Pimelodidae). Catfish Symposium, Joint Meeting of Ichthyologists and Herpetologists, Portland, OR.
- Freire-Fierro, A.** Academy of Natural Sciences Herbarium (PH) and LAPI. Latin American Plants Initiative (LAPI) Meetings, Medellin, Colombia.
- Freire-Fierro, A.** North American *Polygala* (Polygalaceae) and Nuttall: A nomenclatural tale. Botanical Society of America Annual Meeting, Snowbird, UT.
- Gelhaus, J. K.** A brachypterous crane fly from the Parker Preserve = new species? American Entomological Society, Philadelphia, PA.

- Gelhaus, J. K.** Philip Haimbach: Diaries of a promising young naturalist. American Entomological Society 150th Anniversary, Philadelphia, PA.
- Gelhaus, J. K.** Sampling methods for the Insect Survey of the Franklin Parker Preserve 2006-2009. American Entomological Society, Philadelphia, PA.
- Hardman, M., J. Sullivan, and J. Lundberg.** Claroteid Catfishes of the Congo Basin. Catfish Symposium, Joint Meeting of Ichthyologists and Herpetologists, Portland, OR.
- Horwitz, R., A. Geneva, S. Moser, S. Tsang, D. Keller, and P. Overbeck.** Regional and local population structure of *Notropis bifrenatus* (Cyprinidae) from extirpated and extant populations, using museum and recent specimens. American Fisheries Society Annual Meeting, Nashville, TN.
- Livshultz, T.** Phylogeny of crown clade Apocynaceae: nuclear locus supports surprising milkweed sister-group. Botanical Society of America Annual Meeting, Snowbird, UT.
- Livshultz, T. and E.M. Kramer.** Expression patterns of A- and C-class MADS-box genes identify the corona of *Asclepias syriaca* (Apocynaceae) as staminal appendages. Botanical Society of America Annual Meeting, Snowbird, UT.
- Luckenbill, K. and J. G. Lundberg.** The Extrordinary Weberian Apparatus and Occiput of Hypophthalmus (Siluriformes, Pimelodidae). Joint Meeting of Ichthyologists and Herpetologists, Portland, OR.
- Lundberg, J. G.** New views of global freshwater biogeography as seen from the top (and side branches) of the growing tree of catfish life. University of Turku, Finland.
- Lundberg, J. G.** Hotter than expected: the impacts of big inventories on understanding tropical fish diversity. University of Turku, Finland.
- Lundberg, J. G., J. Sullivan, M. Rocha, M. Hardman, J. Muriel-Cunha, M. Littmann, and F. Bockmann.** South American Pimelodoid and Pimelodid Catfishes: Species Diversity and Phylogeny. Catfish Symposium, Joint Meeting of Ichthyologists and Herpetologists, Portland, OR.
- Mabee, P., J. Balhoff, W. Dahdul, C. Kothari, H. Lapp, J. G. Lundberg, P. Midford, T. Vision, and M. Westerfield.** Phenoscape: Evolutionary Morphology Linked to Genes Using Informatics. Joint Meeting of Ichthyologists and Herpetologists, Portland, OR.
- Mason, S.** Butterflies & Skippers of the Franklin Parker Preserve. American Entomological Society, Philadelphia, PA.
- Otte, D.** "An Improbable Tale". Dan Otte Symposium, University of Lethbridge, Lethbridge, Alberta.
- Otte, D.** Taxon Search: On the adventures and misadventures of an entomologist. Joseph Leidy Medal lecture at the Academy of Natural Sciences, Philadelphia, PA.
- Potapova, M.** Preliminary data on the phylogeny of the family Achnanthidiaceae (Bacillariophyta). Joint Annual Meeting of the American Society of Plant Biologists and the Phycological Society of America, Honolulu, HI.
- Potapova, M.** Serving the community of diatomists: Dr. Reimer's legacy at the ANSP Diatom Herbarium. 20th North American Diatom Symposium, Milford, IA.
- Rosenberg, G.** Biodiversity and Biodiversity Informatics of Marine Mollusks. PMS-ICBG Symposium at University of the Philippines, Manila.
- Rosenberg, G.** Philippine Molluscan Diversity. PMS-ICBG Symposium, Oregon Health Sciences University, Portland, OR.
- Rosenberg, G.** Phylogenetic analysis of Jamaican Pleurodontidae (Mollusca: Gastropoda). American Malacological Society Annual Meeting. Ithaca, NY.

- Sabaj Pérez, M. H.** Fish Collection Management: Standard Practices and Lessons Learned. Universidad de Antioquia, Medellín, Colombia.
- Sabaj Pérez, M. H.** Piscatorial Highlights from the Peruvian Leg of the trans-Continental Catfish Expedition. 30th Anniversary Convention of the Catfish Study Group, Wigan, Lancashire, UK.
- Sabaj Pérez, M. H.** The work of the All Catfish Species Inventory. 30th Anniversary Convention of the Catfish Study Group, Wigan, Lancashire, UK.
- Sabaj Pérez, M. H.** Travelogue: 2005 Expedition to the Peruvian Amazon. Aquarium Club of Lancaster County, Lancaster, PA.
- Sabaj Pérez, M. H.** Vicious Fishes: Fish Tales from the Peruvian Amazon. Academy of Natural Sciences of Philadelphia, Philadelphia, PA.
- Sabaj Pérez, M. H., M. Arce H., J. Birindelli, and L. Sousa.** Doradidae: In Complete Classification. Catfish Symposium, Joint Meeting of Ichthyologists and Herpetologists, Portland, OR.
- Schaefer, S., **M. H. Sabaj Pérez, A. Geneva,** and P. Chakrabarty. Andean Astroblepid Catfishes: Pattern and Scale of Species Diversity. Catfish Symposium, Joint Meeting of Ichthyologists and Herpetologists, Portland, OR.
- Sullivan, J. P. and J. G. Lundberg.** The Rag-gene Catfish Tree and the “Big Bang” Theory of Siluroid Global Diversification. Catfish Symposium, Joint Meeting of Ichthyologists and Herpetologists, Portland, OR.
- Westneat, M. and **J. G. Lundberg.** A MegaTree for all Fishes: a Higher-Level Framework for Vertebrate Evolution. Joint Meeting of Ichthyologists and Herpetologists, Portland, OR.

HIGHLIGHTS

INTERDEPARTMENTAL HAPPENINGS

- The Center for Systematic Biology & Evolution created new and updated versions of the Collections Policy and the Collections Disaster Management Policy.

BOTANY

- The department has added three interns this year: **Lauren Spitz** (Flora of Pennsylvania), **Jennifer Prevatt** (illustration), and **Gloria Rosales** (molecular systematics).
- **Ernie Schuyler** (Curator Emeritus), **Tanya Livshultz** and **Alina Freire-Fierro** participated in several local field trips hosted by the Philadelphia Botanical Club.

DIATOMS

- 3,540 permanent diatom slides were accessioned into the Diatom Herbarium.

ENTOMOLOGY

- Major field projects resulted in significant collection growth, particularly from Mongolia (**Jon Gelhaus**), South Africa (**Dan Otte**), and the ongoing survey of the Franklin Parker Preserve in collaboration with the American Entomological Society.
- The High Lonesome Ranch insect survey in western Colorado continued in 2009 with spring and summer field trips adding approximately 6,000 specimens to the collection.
- Research associates and other research collaborators added nearly 1,860 specimens from various locations in Canada and the United States.

ICHTHYOLOGY

- Past work during the 1950-1970s in the Bahamas undertaken by the **Charles C. G. Chaplin** family and former Academy Ichthyology Curator **James E. Böhlke** produced uniquely important specimen collections, field notes, photographs and films, books and journal publications that document the marine life of the Bahamas as it was a half-century ago. Recent visual surveys and new collections made at sites previously worked by Chaplin and Böhlke suggest considerable change in the coral reef ecosystem. A pledge of support from Charles' son, **Gordon Chaplin**, for a new research fellow at the Academy provides an opportunity to further document and understand faunal and habitat change in the Caribbean region.
- **Katriina Ilves** has been appointed as the Academy's Chaplin post-doc. Katriina's primary research interests encompass resolving evolutionary relationships of fishes using molecular and morphological datasets, with emphasis on the application of phylogenetic knowledge to questions about phylogeographic history and conservation of marine taxa. As the Chaplin post-doc, Katriina will be re-surveying sites in the Bahamas sampled 40-60 years ago (see above bullet) to evaluate the effects of a half-century of human impacts on the diversity of reef fishes. In addition to this resurvey work, Katriina is planning a Caribbean-wide comparative phylogeographic study to further explore the origins of fish diversity by identifying biogeographic boundaries and/or ecological mechanisms using molecular model-based approaches.

- A total of 9,092 specimens in 1,412 lots were newly cataloged into the Academy's fish collection, a big year for Ichthyology with nearly 6 times as many specimens as cataloged in 2008. The large influx was due mostly to the cataloging of specimens (5,402 in 831 lots) collected during a 2006 expedition to the Bahamas by **Loren Kellogg** and Academy Trustee **Gordon Chaplin**. This collection marks the return of the department to the Bahamas, an area for which we have perhaps the largest and most important collection of fishes in the world with ~58,372 specimens in 10,302 lots dating back to 1890.
- 2009 marked the official close of the highly successful All Catfish Species Inventory (ACSI), a project began in 2003 with an award from the National Science Foundation. **John Lundberg** and **Mark Sabaj Pérez** were two of six Co-Principal Investigators on this collaborative project involving over 450 participants in 53 countries.

INVERTEBRATE PALEONTOLOGY

- Volunteer **John Sime** cleaned, re-ordered and mapped the collection in addition to returning hundreds of lots to their correct locations.

LMSE

- **Jason Weintraub** continued research on butterfly species *S. Idalia*.
- **Richard Horwitz** received additional funding in late 2009 to continue molecular research on the bridle shiner using both historic and recently collected specimens from the Academy's collection.
- **Gloria Rosales** completed a three-month internship working on developing new DNA markers for *Apocynaceae*.

MALACOLOGY

- 279 new species and 53 new genera were added to the collection in 2009.
- The department contributed three exhibits and extensive support to the 27th annual Philadelphia Shell Show (October), including logistical and other aid with the Preview Party fund-raiser that raised \$26,000 for the Academy and the Center for Molluscan Studies.
- Collections Manager **Paul Callomon** attended the Annual Meeting of the Malacological Society of Japan (April); conducted field work in Kyoto Prefecture, Japan (April); sponsored visit to the Dalian Shell Museum, Dalian, China (April); and attended the Annual Meeting of American Malacological Society, Ithaca, NY (July).

MAMMALOLOGY

- Mammal specimens for **J.K. Townsend**'s expedition to the Northwest Pacific Coast in 1834-35 were used in an Academy exhibit.
- Mammal specimens collected by **Brooke Dolan** in China were used in an exhibit in the Academy's library.
- The Academy's specimen of the extinct Falkland Island Wolf was used in a study on their evolutionary history. See: In Evolutionary History of the Falklands Wolf. Graham J. Slater, Nicholas H. Rawlence, Jeremy J. Austin, Alan Cooper, Robert K. Wayne. Current Biology – 3 November 2009 (Vol. 19. Issue 20, pp.R934-R938)

- Several years ago, Dr. Kristofer Helgen of the National Museum of Natural History discovered a possible new species of Flying Fox from an old specimen in the Academy's collection. After careful examination, it was discovered that it indeed was not described and that the species is extinct. Dr. Helgen and his associates published a paper in 2009 describing the species.
Helgen, K.M, L.E. Helgen and D.E. Wilson. 2009. Pacific flying foxes (Mammalia: Chiroptera): Two new species of *Pteropus* from Samoa, probably extinct, *American Museum Novitates*, (3646): 1-37

MINERALOGY

- Five new steel cabinets were purchased and installed with a grant from the Pennsylvania Museum & Historical Commission. A portion of the **William S. Vaux** mineral collection was re-housed into the new cabinets.
- The entire **Adam Seybert** mineral collection was moved into a new steel cabinet in the mineral vault. The original Seybert mineral cabinet, crafted in 1825, is undergoing restoration.
- Dr. Peter Leavens, Emeritus Professor in the Department for Geological Sciences at the University of Delaware, visited the collection several times to help identify rare, valuable and historically notable specimens.

ORNITHOLOGY

- A President's dinner was held to recognize the department and cultivate donors. Approximately 100 historic and iconic bird specimens and archive related materials were displayed. The Academy's archivist, **Clare Flemming**, included clothing worn by John Audubon, equipment used by Witmer Stone, numerous rare books and one-of-a-kind art pieces. The keynote presentation was given by Scott Weidsensaul and focused on his recent book, "Of a Feather," which includes much of the early history of the Academy. At least 50 donors and staff attended the hugely successful event. **Jim Macaleer**, current Chairman of the Board, remarked that the event was "the new gold standard for Academy events." Host of the event and long term trustee Minturn Wright remarked that the President's dinner was "the best ANSP event I have attended in 35 years."
- Specimens from the bird collection were used in the following special exhibitions: J.K. Townsend exhibition; Dolan archivist reception; Ornithology President's Dinner; Darwin exhibition in the Drexel University library; and an historical exhibition of bird specimens from the Haverford bird collection at Haverford University; a wetlands class by **Jerry Mead**.
- Two special events were held in the department during the annual American Ornithologists' Union meeting in Philadelphia – a University of Kansas reunion and an Academy staff reunion. During the AOU meeting, the collections hosted 70 visitors for the two parties, 70 scientific visits, and about 24 visitors for tours and museum visits.
- This year we added several research associates to the department: **Dr. Julie Reich** (ANSP), **Dr. David Mizrahi** (New Jersey Audubon), **George Armistead** (Field Guides), and **Glenn Seeholzer** (Cornell/LSU), and **Dr. Frank Gill** as Emeritus Curator.

VERTEBRATE PALEONTOLOGY

- The department participated in the planning and activities of the Academy's first Paleopalooza, which was held during President's Day weekend, 2009.
- Staff were closely involved in many aspects of the development and installation of the Academy's exhibit "*Hadrosaurus foulkii*: The dinosaur that changed the world".
- **Jason Downs** completed his three-year postdoctoral fellowship and moved on to a teaching position at Swarthmore College in September.
- **Ted Daeschler**, Vice President for the Center for Systematic Evolution & Biology, participated in the Master Planning process for the Academy.
- Through the Academy's Jessup Fellowship program, the department hosted **Lucja Fostowicz-Frelik**, a Polish scientist, for three weeks to work on fossil and recent Lagomorphs (rabbits and pikas).
- **Ted Daeschler** sat on the Program Committee for the 2009 Annual Meeting of the Society of Vertebrate Paleontology.

VIREO

- Accessioned 5,393 new images including 64 species new to the collection, bringing the total to 157,076 images.
- Increased images available online by 9% (6,255) to bring the total to 73,688.
- Added 95 additional species to the online collection.
- Number of registered users grew by 17% (1,030) for a total of 7,195.
- The VIREO website was updated with an advanced search feature that allows for more dynamic and precise search results.
- Supplied historical images and Crawford Greenewalt's innovative photography equipment for the pollination exhibit featured at Longwood Gardens.
- Supplied 1,378 photos that were used in BirdsEye, an application available for the iPhone.
- VIREO/IPR (Intellectual Property Rights) staff took on the responsibility for licensing the use of Academy property and artifacts for filming and commercial shooting. Six commercial shoots were licensed for: one feature film, three documentaries, a series of DVDs, and an article and cover for a music magazine.
- Over 150 publications and exhibits worldwide used 2,054 licensed VIREO images.

PUBLICATIONS

- Bahls, L., **M. Potapova**, M. A. Fallu, and R. Pientiz. 2009. *Aulacoseira canadensis* and *Aulacoseira crassipunctata* (Bacillariophyta) in North America. *Nova Hedwigia*, Beiheft 135: 167-184.
- Bartlett, C. R.** 2009. A new genus of New World Tropidocephalini (Hemiptera: Delphacidae: Delphacinae), with the description of two new species. *Entomological News* 120(4): 443-452.
- Bartlett, C. R.** 2009. Diversity in New World Stenocranine Planthoppers (Hemiptera: Delphacidae). *Transactions of the American Entomological Society* 135(4): 443-486.
- Becker, M. A., J. A. Chamberlain, Jr., **J. G. Lundberg**, W. J. L'Amoreaux, R. B. Chamberlain, and T. M. Holden. 2009. Acanthomorph fish fossils with probable beryciform relationships (Actinopterygii: Teleostei: Beryciformes) from the Late Cretaceous-Early Tertiary of New Jersey. *Proceedings of the Academy of Natural Sciences of Philadelphia* 158:159–181.
- Berning, B. and **S. Podenas**. 2009. Amber – archive of deep time. *Denisia* 26: 1-294.
- Birindelli, J. L. O., L. M. Sousa, and **M. H. Sabaj Pérez**. 2009. Morphology of the gas bladder in thorny catfishes (Siluriformes: Doradidae). *Proceedings of the Academy of Natural Sciences of Philadelphia* 158:261–296.
- Callomon, P.** and M. A. Snyder. 2009. On the genus *Fusinus* in Japan V: further species, an unnamed form and discussion. *Venus* 67 (3-4): 159-172.
- Callomon, P.** and M. A. Snyder. 2009. On some *Fusinus* from the East and South China Seas (Mollusca: Gastropoda: Fascioliariidae), with description of a new species. *Proceedings of the Academy of Natural Sciences of Philadelphia* 158: 209-219.
- Callomon, P.**, M. A. Snyder, and R. G. Noseworthy. 2009. A new species of *Fusinus* from Korea (Gastropoda: Fascioliariidae). *Venus* 68 (1-2): 1-8.
- Callomon, P.** and **R. Robertson**. 2009. The department of Malacology at the Academy of Natural Sciences of Philadelphia. *American Conchologist* 37 (1): 4-10.
- Cione, A. L., W. M. Dahdul, **J. G. Lundberg**, and A. Machado-Allison. 2009. An unusually large, fossil piranha-like fish (Characidae: Serrasalminae) from the late Miocene of Argentina. *Journal of Vertebrate Paleontology* 29(2):350–358.
- Cox Fernandes, C., **J. G. Lundberg**, and **J. P. Sullivan**. 2009. *Oedemognathus exodon* and *Sternarchogiton nattereri* (Apterodontidae, Gymnotiformes): the case for sexual dimorphism and conspecificity. *Proceedings of the Academy of Natural Sciences of Philadelphia* 158:193–207.
- Cressler III, W. L.**, C. Prestianni & **B. A. LePage**. (Available online 12 October 2009). Late Devonian spermatophyte diversity and paleoecology at Red Hill, north-central Pennsylvania, U.S.A. *International Journal of Coal Geology*.
- Daeschler, E. B.**, J. A. Clack and N. H. Shubin. 2009. Late Devonian tetrapod remains from Red Hill, Pennsylvania, USA: how much diversity? *Acta Zoologica* 90 (suppl. 1):306-317.
- Day, W. H. and **G. W. Cowper**. 2009. The early meeting sites of the American Entomological Society in Philadelphia, PA, 1859-1876. *Transactions of the American Entomological Society* 135(4): 397-406.

- Downs, J. P.** and Donoghue, P. C. J. 2009. Skeletal histology of *Bothriolepis canadensis* (Placodermi, Antiarchi) and evolution of the skeleton at the origin of jawed vertebrates. *Journal of Morphology* 270:1364-1380.
- Earle, J.** 2009. Stoneflies (Plecoptera) from Mount Misery Brook in the New Jersey Pinelands, with nine new Stonefly records for New Jersey, U.S.A. *Entomological News* 120: 2, 157-170.
- Eberhard, W. G. and **J. K. Gelhaus.** 2009. Genitalic stridulation during copulation in a species of crane fly, *Tipula* (Bellardina) sp. (Diptera: Tipulidae). *Revista de Biologia Tropical* (International Journal of Tropical Biology) Supplement 57: 251-256.
- Enache, M.** and **M. Potapova.** 2009. A new species of Sellaphora (Sellaphoraceae) from Hannaberry Lake, Arkansas, USA. *Acta Botanica Croatica* 68: 231-237.
- English, J. and **M. Potapova.** 2009. *Aulacoseira pardata* sp. nov., *A. nivalis* comb. nov., *A. nivaloides* comb. et stat. nov., and their occurrences in western North America. *proceedings of the Academy of Natural Sciences of Philadelphia* 158: 37-48.
- Freire-Fierro, A., T. Livshultz.** 2009. PH - Academy of Natural Sciences of Philadelphia Herbarium. *The Vasculum* 4(2): 2-6.
- LaPolla, J. S.** 2009. Taxonomic revision of the Southeast Asian ant genus *Euprenolepis*. *Zootaxa* 2046: 1-25.
- LePage, B. A.** 2009. Earliest occurrence of *Taiwania* (Cupressaceae) from the Early Cretaceous of Alaska: Evolution, biogeography, and paleoecology. *Proceedings of the Academy of Natural Sciences of Philadelphia* 158: 129-158.
- Luckenbill, K. R.** and **J. G. Lundberg.** 2009. CAT scan-based images of the skeleton of the Asian catfish *Cranoglanis* (Siluriformes: Cranoglanididae). *Proceedings of the Academy of Natural Sciences of Philadelphia* 158:297–299.
- Meve, U., Laurente, O., Alejandro, G.J., and **T. Livshultz.** 2009. Systematics of *Clemensiella* (Apocynaceae-Asclepiadoideae). *Edinburgh Journal of Botany* 66:447-457.
- Nyari, A. S., A. T. Peterson, **N. H. Rice,** and R. G. Moyle. 2009. Phylogenetic relationships of flowerpeckers (Aves: Dicaeidae): Novel insights into the evolution of a tropical passerine clade. *Molecular Phylogenetics and Evolution* 53:613-619.
- O'Neill, J. and **E. P. McLean.** 2009. Peter Collinson and the Eighteenth-Century Natural History Exchange, (American Philosophical Society: Memoir 264.
- Otte, D.** 2009. Caribbean Crickets by D. Otte and D. Perez-Gelabert: Corrections and Synonymies and a Note on the Type of *Gryllodes greeni* Chopard (Orthoptera: Grylloidea). *Transactions of the American Entomological Society* 135(4): 487-491.
- Otte, D.** 2009. New status for the grasshopper Genus *Eximacris* Otte 1984 (Orthoptera: Acrididae). *Transactions of the American Entomological Society* 135(4): 493.
- Otte, D.** and D. Perez-Gelabert. 2009. *Caribbean Crickets*. Publications on Orthopteran Diversity. The Orthopterists' Society. 792 pp.
- Plötner, J, F. Köhler, **T. Uzzell,** P. Beerli, R. Schreiber, G. Guex, and H. Hotz. 2009. Evolution of serum albumin intron-1 is shaped by a 5' truncated non-long terminal repeat retrotransposon in western Palearctic water frogs (Neobatrachia). *Molecular Phylogenetics and Evolution* 53(3): 784-91.
- Podenas, S.** and G. O. Poinar. 2009. New crane flies (Diptera: Limoniidae) from Burmese Amber. *Proceedings of the Entomological Society of Washington* 111(2): 470-492.
- Podenas, S.** and N. L. Evenhuis. 2009. Two new species of *Holorusia* Loew (Diptera: Tipulidae) from Vanua Levu, Fiji. *Bishop Museum Occasional Papers* 103: 63-68.

- Rosenberg, G.** 2009. Malacolog Version 4.1.1 A Database of Western Atlantic Marine Mollusca. URL: <http://www.malacolog.org/>.
- Rosenberg, G.,** E. F. García, and F. Moretzsohn. 2009 Gastropods (Mollusca) of the Gulf of Mexico. Pp. 579-699 in D. L. Felder and D. K. Camp, eds., *The Gulf of Mexico: Origins, Waters and Marine Life*. Texas A&M University Press.
- Sabaj Pérez, M. H.** 2009. Photographic atlas of fishes of the Guiana Shield. p. 53–93 In: Vari, R. P., C. J. Ferraris, Jr., A. Radosavljevic, and V. A. Funk, eds. Checklist of the freshwater fishes of the Guiana Shield. *Bulletin of the Biological Society of Washington*, no. 17.
- Schmidt-Lebuhn, A. and **E. Tripp** (Illustration by **A. Labadie**). 2009. *Ruellia saccata*, a New Species of Acanthaceae from Bolivia. *Novon* 19(4): 115-119.
- Taschereau, E., L. Simard , J. Brodeur , **J. Gelhaus**, G. Bélair and J. Dionne. 2009. Seasonal ecology of the European Crane Fly (*Tipula paludosa*) and species diversity of the family Tipulidae on golf courses in Québec, Canada. *International Turfgrass Society Research Journal* 11: 681- 693.
- Tripp, E. A., J. C. Lendemer**, and R. C. Harris. 2010[2009]. Resolving the genus *Graphina* Müll. Arg. in North America: new species and treatments for *Acanthothecis*, *Carbacanthographis*, and *Diorygma*. *The Lichenologist*, 42(1): 55-71
- Tripp, E. A.,** T. F. Daniel, **J. C. Lendemer**, and **L. A. McDade**. 2009. New molecular and morphological insights prompt transfer of *Blechum* to *Ruellia*. *Taxon*, 58(3): 893-906.
- Turgeon, D. D., W. G. Lyons, P. M. Mikkelsen, **G. Rosenberg**, and F. Moretzsohn. 2009. Bivalves (Mollusca) of the Gulf of Mexico. Pp. 711-744 in D. L. Felder and D. K. Camp, eds. *The Gulf of Mexico: Origins, Waters and Marine Life*. Texas A&M University Press.
- Wallace, M. S., **C .R. Bartlett**, L. L. Deitz, and M. J. Rothschild. 2009. New State Records of Treehoppers (Hemiptera: Membracidae) for Delaware, Maryland, Mississippi, Pennsylvania, and West Virginia. *Proceedings of the Entomological Society of Washington* 111(3): 734-738.
- Williams, C. J., **B. A. LePage**, A. H. Johnson, and D. R. Vann. 2009. Structure, biomass, and productivity of a late Paleocene Arctic forest. *Proceedings of the Academy of Natural Sciences of Philadelphia* 158: 107-127.
- Wood, H.** 2009. *Codonorchis lessonii*: our southernmost Orchid. *Orchid Digest* 73(2): 114–118.
- Wood, H.** 2009. *Dactylorhiza aristata*: Asian orchid immigrant into the Aleutians and Alaska. *Orchid Digest* 73(1): 52--55.
- Wood, H.** 2009. Hunting wild orchids in southwest Nova Scotia III: *Platanthera lacera* and *P. psycodes*. *Orchids* 78(8): 490–494.
- Yang, H., M. Pagani, D. E. G. Briggs, M. A. Equiza, R. Jagels, Q. Leng & **B. A. LePage**. 2009. Carbon and hydrogen isotope fractionation under continuous light: Implications for paleoenvironmental interpretations of the High Arctic during Paleogene warming. *Oecologia* 160: 461-470.
- Zhu Guanghua, J, J. Wood, and **H. Wood**. 2009. *Dendrobium*. In *Flora of China*. V. 25, Orchidaceae. Publisher in English: St. Louis, MO: Missouri Botanical Garden.