# Biological Diversity of the Guiana Shield 2010
# Biographical Sketches

**ADMINISTRATION & BOTANY**
Christian Feuillet
Vicki A. Funk
Kaslyn Holder-Collins
Carol L. Kelloff
Karen Redden
Kenneth Wurdack
Charles Zartman

**ECOLOGICAL NICHE MODELING**
Robert P. Anderson
Aleksandar Radosavljevic

**ENTOMOLOGY**
Seán G. Brady
Matthew L. Buffington
Michael William Gates
Robert R. Kula
John S. LaPolla
Ted R. Schultz
Jeffrey Sosa-Calvo
Jessica Ware

**ICHTHYOLOGY**
Calvin Barnard
Jonathan W. Armbruster
Richard P. Vari

**HERPETOLOGY**
Ross D. MacCulloch
Brice P. Noonan
Robert Reynolds (away from office, no biosketch included)

**MAMMALS**
Burton Lim
Mark Engstrom (away from office, no biosketch included)

**ADMINISTRATION & BOTANY**

**Christian Feuillet**
**Vicki A. Funk**
**Kaslyn Holder-Collins**
**Carol L. Kelloff**
**Karen Redden**
**Kenneth Wurdack**
**Charles Zartman**

**Christian P. Feuillet**
SI-NMNH Research Associate

Department of Botany, MRC-166, United States National Herbarium
National Museum of Natural History, Smithsonian Institution
P.O. Box 37012, Washington, DC 20013-7012
(202) 633-0898 - Fax (202) 786-2563; feuillec@si.edu

**Major Professional Interests / Areas of Expertise**
Systematics of Gesneriaceae & Passifloraceae and New World Aristolochiaceae & Boraginaceae.
Northern South American floristic.
Plant architecture.

**Current Professional Position**
Research associate in the Department of Botany, Smithsonian Institution.

**Educational History (France)**
University of Rouen: Biology–Geology 1971; Chemistry–Biology 1972
University of Science & Technology of Languedoc, Montpellier: Animal Physiology 1973
Mandatory Military Service: Paris, Dec 1973 - Nov 1974
University Paris VI Pierre & Marie Curie, Sobonne: Plant Physiology 1977, Genetics 1977, Botany 1978; Masters in Plant Biology 1978; Ph. D. in Tropical Botany 1981.

**Career**
15 Nov. 1981 – 30 June 1997 Plant taxonomist with ORSTOM (now IRD = Institut de Recherche pour le Développement).
15 Nov. 1981. in the Laboratoire de Phanérogamie, Muséum National d'Histoire Naturelle de Paris.
4 July 1982. in the ORSTOM Center, Cayenne, French Guiana.
20 Aug. 1988. in the Dept. of Botany, Smithsonian Institution.
1988 to present Research Collaborator and Research Associate, Smithsonian Institution.

**Advisory Positions**
1988 - present: Member of the Commission for Flora Neotropica.
1985 - 1997: Member of the Advisory Board of the Flora of the Guianas Project for ORSTOM.
1987 - 1993: Member of the Special Committee on Registration of IAPT (the International Association of Plant Taxonomists)
1988 - 1992: Elected, Commission Scientifique - Sciences du Monde Végétal (ORSTOM).

**Smithsonian Collaborations**
Long term collaborations with
the Gesneriaceae group (Larry Skog and John Boggan)
the Biological Diversity of the Guianas Programs (V. Funk, C. Kelloff, and S. Alexander)

**Achievements**
>100 publications as author or editor
40 lectures & posters
>100 new taxa & new combinations

(c-i)
Feuillet C. 2009. Two new *Episcia* species from Venezuela. Gesneriads 2009(3): 22–24.
Feuillet C. 2009. Checklist of the plants of the Guiana Shield. 1. An update to the Angiosperms. J. Bot. Res. Inst. Texas 3(2): 799–814. (25 Nov 2009)
Feuillet C. 2008. Folia taxonomica 10. New species of *Nautilocalyx* (Gesneriaceae, Episcieae) from the Venezuelan Guayana. J. Bot. Res. Inst. Texas 2(2): 825–836. (9 Dec 2008)
Skog L.E. & C. Feuillet. 2008. Gesneriaceae. In M.J. Jansen-Jacobs (ed.), Flora of the Guianas ser. A, 26. 136 pages. Publ.: Royal Botanic Gardens, Kew.
Feuillet C. 2008. Folia taxonomica 11. Conspectus of *Varronia* (Cordiaceae, Boraginales) in the Guiana Shield with three new combinations. J. Bot. Res. Inst. Texas 2(2): 837–842.
Feuillet C. & J.M. MacDougal 2007 [2006]. Passifloraceae. In K. Kubitzki, The Families and Genera of Vascular Plants IX : 270-281. Springer, Berlin. (Sent to me 19 Dec 2006)

(ii)
Feuillet C. 2009. Folia taxonomica 12. *Paradrymonia* (Gesneriaceae: Episcieae) from the Guiana Shield: *P. maguirei*, a new species from Amazonas, and distribution and floral morphology of *P. maculata*. J. Bot. Res. Inst. Texas 3(1): 133–138.
Feuillet C. 2009. Folia taxonomica 13. *Passiflora curva* (Passifloraceae), a new species from French Guiana in subg. *Passiflora* supersect. *Coccinea*. J. Bot. Res. Inst. Texas 3(2): 577–579.
Feuillet C. & J. Vanderplank. 2009. Folia taxonomica 14. Notes on *Passiflora* supersection *Coccinea* (Passifloraceae) from the Guiana Shield. J. Bot. Res. Inst. Texas 3(2): 581–582.
Feuillet C. 2009. Folia taxonomica 15. Five new species of *Paradrymonia* subgenus *Paradrymonia* (Gesneriaceae, Episcieae) from the Venezuelan Guayana. J. Bot. Res. Inst. Texas 3(2): 583–592.
Feuillet C. 2009. Folia taxonomica 16. *Dilkea* (Passifloraceae) 1. *Epkia*, a new subgenus and five new species from western Amazonia and the Guianas. J. Bot. Res. Inst. Texas 3(2): 593–604.

**V. A. Funk**
SI-NMNH Botanist, Director BDG

U.S. National Herbarium, National Museum of Natural History
Smithsonian Institution MRC 166, P.O. Box 37012, Washington, D. C. 20013-7012, U.S.A
Phone: 202-633-0950; Fax: 202-786-2563; Email: Funkv@si.edu

**(a) Professional Preparation**

B. S., Murray State University, Biology and History, 1969

M. S., Murray State University, Biology, 1975. Thesis: A Floristic and Geologic Survey of Selected Seeps of Calloway County, Kentucky.

Ph. D., Ohio State University, December 1980. Thesis: The Systematics of *Montanoa* Cerv. (Compositae or Asteraceae).

Postdoctoral Fellow, New York Botanical Garden, 1980-1981

**(b) Appointments**

**Senior Research Scientist - U.S. National Herbarium, NMNH, Smithsonian Institution, 18 April 2004 – present** (Research Scientist & Curator – NMNH-SI, 1981-2004)

**(c-i) Publications**

Garcia-Milagros, E. & **V. A. Funk**. *Submitted*. Improving our ability to use information from museum specimens: georeferencing the U.S. national Herbarium using Google Earth.

**Funk, V.A**., A. Susanna, T. Stuessy & R. Bayer, eds. 2009. *Systematics, Evolution, and Biogeography of the Compositae.* IAPT: Vienna. (1000 pages) [including 13 chapters within the volume]

Vari, R. P., C. J. Ferraris, Jr., A. Radosavlejevic, & **V. A. Funk**. 2009. Checklist of the freshwater fishes of the Guiana Shield. *Bulletin of the Biological Society of Washington* 17: 1-95.

**Funk, V.,** P. Berry, Hollowell, T., & C. Kelloff. 2007. A Checklist of the Plants of the Guiana Shield. *Smithsonian Contributions to Botany* 55: 1-584.

**Funk, V. A.** & K. Richardson. 2002. Biological Specimen Data in Biodiversity Studies: Use it or lose it. *Systematic Biology* 51: 303-316. [Introduction in same issue: Funk, V. A., A. Sakai, & K. Richardson. 2002. Biodiversity: the interface between systematics and conservation. *Systematic Biology* 51(2): 235-363.]

**(ii)**

**Funk, V. A.** & C. L. Kelloff. 2009. Introduction. Bulletin of the Biological Society of Washington, no. 17: 1-6.

Hollowell, T., T. McDowell, **V. A. Funk**, C. L. Kelloff, and D. Gopaul. 2005. Smithsonian Plant Collections, Guyana: 1990-1991, Tim McDowell. Contributions from the United States National Herbarium 50: 1-150. [several of these have been published]

**Funk, V. A.** 2004. Revolutions in Historical Biogeography. In *Foundations in Biogeography*, (Brown, J., M. Lomolino, and D. Sax, eds.). University of Chicago Press. Pages 647-777.

Ferrier, S. …(other authors)…, **V. A. Funk**,…. 2004. Mapping more of terrestrial biodiversity for Global Conservation assessment: A new approach to integrating disparate sources of

biological and environmental data. BioScience 54: 1101-1109.

Kelloff, C. & **V. A. Funk**. 2004. Phytogeography of Kaieteur Falls, Potaro Plateau, Guyana: flora distributions and affinities. Journal of Biogeography 31: 501-513.

**(d) Synergistic Activities**

Director, Smithsonian Institution's Biological Diversity of the Guiana Shield Program, 1987-present. The position involves providing scientific, administrative, logistical, and financial direction for the program (Annual Budget -$100,000). A field based operation that sponsors expeditions to different places on the Guiana Shield. BDG has collected plants, birds, spiders, butterflies, ants, and some other insects. BDG collaborates with ca. 350 plant specialists around the world. For more than 20 years we have collected, processed, databased and georeferenced over 45,000 plant specimens; over 40,000 are now available on line using Google Earth [see http://botany.si.edu/bdg/expeditions.html ] Our website has lists and pdfs of our publications [ http://botany.si.edu/bdg/resource.html]

Director, NMNH Summer Intern Program for undergraduates, 1988-1990. I continue to work with the intern program and over the years I have had a total of 36 interns.

The International Compositae Alliance, I helped start this international organization and we have over 300 members. We have had several international meetings, the next one is scheduled for Montreal 2010. www.compositae.org

The Centre for the Study of Biological Diversity, University of Guyana, was started by the BDG program and all funds for the building have been raised outside of Guyana: Royal Bank of Canada and USAID. It has a new building and a dynamic group of students. We started a publication from the centre as well, the latest volume is: DaSilva, P., V. A. Funk, and C. Kelloff (eds.). 2008. *Contributions to the Study of Biological Diversity* volume 3.

Over the years I have sponsored 14 Fellows and 18 graduate students and 36 undergraduate trainees and interns; this year I have one postdoc and two graduate students (committee member).

National Science Foundation, DEB, Systematics, Collections, and/or Survey and Inventory Panel member, 1991-2009. Participated in over 20 panels reading and providing written comments on 15-20 proposals per panel meeting; last panel was 2009; also, many NSF workshops.

**(e) Collaborators & Other Affiliations**

(a) Collaborators and Co-Editors. (I have left off anyone from SI): **Baldwin**, B, UC Berkeley; **Bayer**, RJ, Memphis Univ; **Blackmore**, S, RBGE; C. **Specht**; **Clarke**, HD; UNC Asheville; **DaSilva**, P, Univ Guyana; **Dillon**, M, Field Museum; **Gemeinholzer**, B, Berlin; **Gillespie**, L, Ottawa; **Hoch**, P, MO; **Holland**, AE, Queensland Herbarium, Australia; **Keeley**, S, Univ Hawaii; **Koekemoer**, M., SANBI South Africa; **McDowell**, T, East Tenn State; **McPherson**, T., Univ Conn, **Moran**, E, Duke Univ; **Panero**, J, UT Austin; **Schilling**, E, Univ Tenn; **Skvarla**, J, Univ Oklahoma; **Susanna**, A, & **Garcia-Jacas**, N, Barcelona Botanical Garden; **Watson**, L, Miami of Ohio; **Wortley**, AH, RBGE.

*Graduate and Postdoctoral Advisors.*

PhD adisor: Tod Stuessy, University of Vienna

Posdoc advisor: Art Cronquist, who knows

**Kaslyn Holder-Collins**
UG Science Officer

**139 Campbellville Housing Scheme, Georgetown, Guyana, South America**
**Tel: 592-227-1880, Cell: 592-623-0855, Work: 592-222-2329**
**Email: triola_holder@yahoo.com**

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|---|---|
| Objective | To secure the role as in country Principle Investigator |
| Personal<br>Nationality:<br>Date of Birth:<br>Gender:<br>Marital Status: | <br>Guyanese<br>July 13, 1982<br>Female<br>Married |
| Profile | Scientific Officer with a wealth of Knowledge and experience in the filed of Biology. A very observant, responsible, reliable, humble and dedicated individual.<br><br>• Proven ability to work in unison with staff, volunteers, and directors.<br>• Ability to direct complex projects from concept to fully operational status.<br>• Goal-oriented individual with strong leadership capabilities.<br>• Organized, highly motivated, and a good problem solver. |
| Education<br><br>1998-2002<br><br>2003-2005 | <br><br>**Degree in Biology (Majored in Biology and Minored in Chemistry)** University of Guyana, Turkeyen, Guyana.<br><br>**Diploma in Education (Focus on Science)** University of Guyana, Turkeyen, Guyana. |

| Professional Experience | |
|---|---|
| July-August 1998 | Work Study at the **National Dairy Insemination Programme** |
| 1999-2002 | Acted in leadership roles, interacted with fellow students through **Campus Crusade for Christ** |
| 2003-2005 | Assisted in the organizing of several activities, cultural events through **Campus Crusade for Christ** etc |
| 2003-Present | Lectured CSEC Integrated Sciences and CAPE Biology at **Queens College** one of the premier Secondary Schools in Guyana |
| 2005-Present | Leader of the flaming sword, involve in coordinating a group of people in community service through **Lifespring Ministries** |
| 2006-2007 | ***Scientific Officer*** **at the University of Guyana, Faculty of Natural Sciences, Department of Biology, Centre for the Study of Biology Diversity** involved in curating herbarium specimens, preparing and facilitating presentation, preparing verification permits for the Environmental Protection Agency (EPA), collection of specimens for laboratory exercises, assist students in plant research, conduct research |
| 2006-Present | Assistant lecturer- BIO 222 (Survey of the Animal World-The Vertebrates), BIO 121 (Introductory Biology 11) |
| 2008 | Laboratory facilitator- Bio 326 (Mycology), Bio 121 (Introductory Biology 11), BIO 221 (Phanerogamic Botany), BIO 311 (Taxonomy) |
| 2009-Present | Lecturer- AGR 121 (Agricultural Zoology)<br>Laboratory facilitator- BIO 111 (Introductory Biology 1) |

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|---|---|
| Training | |
| 2006-2007 | Received training on different aspects of butterfly catching, identification and preparation, Warwick University, United Kingdom |
| 2008 | Received training in Herbarium Management Practices, UWI Herbarium St. Augustine Trinidad in collaboration with Kew Herbarium, United Kingdom |
| 2009 | Received training in Monitoring and Communicating Biodiversity, Preston Montford Field Study Centre, Shrewsbury, United Kingdom |
| 2010 | Co-coordinator of Fungal Training (Mycology In Guyana) |
| Research | |
| 2005 | Assisted Australian Scientist in research based on the *Victoria amazonica* Guyana National Flower |
| | Conducted research on topics in Biology that teachers feel/find difficult to teach |
| 2006 | Surveyed the plant diversity in Crab Island for Delta Energy and petroleum Company |
| 2006-2007 | Active researcher in the Biodiversity and Ecology of the Butterflies of the North Rupununi District Research |
| 2007-2009 | Assisted in HIV research conducted by International Labour Organization |
| 2008 | Conducted research in Lake Mainstay on Butterfly Diversity |
| 2008 | Assisted in research on needs assessment of teenage mothers in Bartica through the Ministry of Education |
| 2009 | Conducted research in Lake Mainstay on Pineapple Farming |

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|---|---|
| Workshops | |
| 2006-Present | Facilitate training for CSBD Volunteers in the areas of Herbarium Management Practices. |
| 2007 | Facilitated training on the East Coast Demerara for teachers on Disaster Preparedness for OXFAM |
| 2008 | Facilitated training on the ECD for teacher on Psycho-social Support |
| Honors & Awards | |
| 1994-1998 | Honoured by Saint Stanislaus College for being a discipline and hard working student |

**Carol L. Kelloff**
SI-NMNH Museum Specialist, Asst. Director BDG

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**(a) Professional Preparation**

Ph.D. George Mason University, Environmental Science and Public Policy 2002. Plant Diversity of Kaieteur National Park, Guyana: Using plant data as a tool in conservation and development.

M.S., George Mason University, Biology. 1990. Thesis: A Systematic Study of the Eastern North American Lady Fern (*Athyrium filix-femina*)

B.S., Elmira College, Biology. 1986.

**(b) Appointments**

Museum Specialist - U.S. National Herbarium, NMNH, Smithsonian Institution, 1987 - present

**(c-i) Publications**

**Kelloff, C.L**. 2008. Structure and diversity of a riparian forest at Kaieteur National Park, Guyana. J. Bot. Res. Inst. Texas 2(1):521-545.

**Kelloff, C.L.** and V.A. Funk. 2004. Phytogeography of the Kaieteur Falls, Potaro Plateau, Guyana: floral distributions and affinities. Journal of Biogeography 31: 501-513.

**Kelloff, C.L.** 2003. The use of biodiversity data in developing Kaieteur National Park, Guyana for ecotourism and conservation. *Contributions to the Study of Biological Diversity* 1: 1-44. University of Guyana. Georgetown, Guyana.

**Kelloff, C.L**. & V.A. Funk, 1998. Preliminary Checklist of the Plants of Kaieteur National Park, Guyana. Biological Diversity of the Guianas Program, Smithsonian Institution, Washington, DC.

**Kelloff, C.L** & G. McKee. 1998. A New Species of *Hecistopteris* from Guyana, South America. American Fern Journal 88(4):155-157.

**(ii)**

Aymard, G. & **C.L. Kelloff**. (submitted). Dilleniaceae. in: M.J. Jansen-Jacobs (ed). Flora of the Guianas, series A: Phanerogams.

Funk, V.A., T. Hollowell, P. Berry, **C. Kelloff**, S.N Alexander. 2007. Checklist of the plants of the Guiana Shield (Guyana, Surinam, French Guiana, Venezuela: Amazonas, Bolivar, Delta Amacuro). Contributions from the United States National Herbarium 55: 1-584.

**Kelloff, C. L**., J. E. Skog, L. Adamkewicz, C.R. Werth. 2002. "Differentiation of Eastern North American *Athyrium filix-femina* taxa evidence from allozymes and spores." American Fern Journal **92**(3): 185-213

Strong, M.T. & **C.L. Kelloff.** 1994. Intertidal Vascular Plants of Brent Marsh, Potomac River, Stafford County, Virginia

**Kelloff, C.L**., L.B. Kass, & T.J. Kowalski. 1990. Thomas F. Lucy's "Upper Susqushanna Flora" Herbarium rediscovered. Rhodora 92(869):1-10

**(d) Synergistic Activities**

Assistant Director, Smithsonian Institution's Biological Diversity of the Guiana Shield Program, 1987 – present. The position involves administration of the Program, including implementing and monitoring of the budgets and employment/contract procedures, accession & collection management of incoming collections, exchange program for incoming and outgoing collections, ordering & shipping of field supplies. Coordinating field expedition and assisting with logistics. International relationships with foreign universities, governments, embassies, and the scientific community. Writing grant proposals and fund raising. See our website at http://botany.si.edu/bdg/

The Centre for the Study of Biological Diversity, University of Guyana, was started by the BDG program and all funds for the building have been raised outside of Guyana: Royal Bank of Canada and USAID. We helped with the set-up of the collection halls and trained the Scientific Officers in the curation of the collections. Kelloff assisted in the design of the new building and with the layout of the new collection halls and library. We started a publication from the Centre as well, the latest volume is: DaSilva, P., V. A. Funk, and **C. Kelloff** (eds.). 2008. *Contributions to the Study of Biological Diversity* volume 3.

Fieldwork: Organized or participated in a dozen plant collecting expeditions to Guyana, Suriname, French Guiana, San Salvador, and the Bahamas.

**(e) Collaborators & Other Affiliations**

(a) Collaborators and Co-Editors (*excluding SI staff*). **Aymard-C**., G., BioCentro-UNELLEZ ; **Berry**, P., Univ. of Michigan; **Boudrie,** M., Limoges, France; **Clarke**, H.D., UNC Asheville; **Cremers**, G. Muséum National d'Histoire Naturelle; **DaSilva**, P. University of Guyana; **Gillespie**, L, Ottawa**; Henkel**, T.W. Humbolt State Univ.; **Kass**, L.B. Elmira College; **Kowalshi**, A. New York; **McDowell**, T, East Tenn State; **Skog**, J. George Mason University; **Werth,** C., Texas Tech University.

**Karen M. Redden**
SI-NMNH Research Associate

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Phone: 202-663-0920; Fax: 202-786-2563
Email: redden.karen@gmail.com; redden@si.edu

**(a) Professional Preparation**

| | | | |
|---|---|---|---|
| George Mason University, VA | Biology | B.S. | 1991 |
| George Mason University, VA | Biology/Botany | M.S. | 1999 |
| George Washington University, DC | Systematics/Evolution | Ph.D. | 2006 |
| George Washington University, DC | Legume Systematics | 2006 | 2008 |
| Smithsonian Institution-NMNH-Botany | Legume Systematics | 2008 | 2009 |

**(b) Appointments**

**Adjunct Faculty: (Biology), University of the District of Colombia (Jan 2010-present)**
**Adjunct Faculty: (Biology, Environmental Policy)-George Washington University, Washington, DC, Jan, 2010-present**
**Adjunct Faculty: (Evolution, Environmental Science, Biology)-Trinity College, Washington, DC,** 1998-2000; **2009-present**
**Research Associate, U.S. National Herbarium, NMNH, Smithsonian Institution, 2001-pres.**
Lead Investigator, - Organization for Tropical Studies- Global Partnerships & Programs - Guyana Country Education Study, 2008-2009
Research Assistant/Contractor, U.S. National Herbarium, NMNH, Smithsonian Inst., 2000-04
Museum Technician (Botany), Cape Hatteras National Seashore, Manteo, NC, May-Oct., 2000
Teaching Assistant: (Biology and Plant Taxonomy)-George Washington University, Washington, DC, Sept, 2001-Dec, 2006
Teaching Assistant: (Tropical Field Botany, Bahamas and Costa Rica)-George Mason University, Fairfax, VA, USA, 1998-2002
Laboratory Instructor: (Biology, Plant Biology, & Scientific Thought and Process)-George Mason University, Fairfax, VA, 1997-2000

**(c-i) Publications**

**Redden, K. M.,** P. S. Herendeen, K.J. Wurdack, and A. Bruneau. (in press). Morphological and molecular phylogenetic analysis of the Brownea clade (Detarieae, Caesalpinioideae) from Northeastern South America. Systematic Botany.

**Redden, K. M.** (2008) A New Species of *Paloue* (Leguminosae: Caesalpinioideae: Detarieae) from Guyana, South America. Brittonia (60) 3: 257-260.

**Redden, K. M.** and P.S. Herendeen (2006). Morphology and Phylogenetic Analysis of *Paloue* and related genera in the Brownea clade (Detarieae, Caesalpinioideae). International Journal of Plant Sciences 167(6) 1229-1246.

**(ii)**

Stergios, B., B.B. Klitgaard & **K. M. Redden.** (2008). Caesalpiniaceae. In Hokche, O., P. E. Berry and O. Huber, eds. Nuevo Catálogo de la Flora Vascular de Venezuela. Fundación

Instituto Botánico de Venezuela, Caracas.
Aymard, G.A., P.E. Berry, R.S. Cowan, Nidia L. Cuello A., A. Delgado Salinas, P.R. Fantz, R.H. Maxwell, **K. M. Redden**, V.E. Rudd, M. Sousa, D.R. Wind. (2007). Leguminoseae-Faboideae. Pages 346-365 in V. Funk, T. Hollowell, P. Berry, C. Kelloff, and S. N. Alexander. Checklist of the Plants of the Guiana Shield (Venezuela: Amazonas, Bolivar, Delta Amacuro; Guyana, Surinam, French Guiana). *Contributions from the United States National Herbarium*, volume 55.
**Redden, K. M.** (2002). Key to the species of Fabaceae of La Selva Biological Station, Costa Rica. Tropical Plant Systematics OTS 02-9: 134-138.

**(d) Synergistic Activities**

Fieldwork: PI of 18 botanical expeditions to remote areas of Guyana, French Guiana, Venezuela, Costa Rica and Andros Island, Bahamas. Plant collections include over 6000 plants specimens that are identified and distributed to herbaria worldwide, vouchered silica samples shared with specialists, preserved floral and anatomical specimens and photographs of all of the 2000 most recent collections. All material can be viewed and is available at Smithsonian Institution's Biological Diversity of the Guiana Shield's website (http://botany.si.edu/BDG/expeditions.html).

Teaching and training: All expeditions included an extensive training component in which Amerindians, undergraduates, and graduate students from the host country, US and/or Canada were trained in the process of plant collections, identification and preservation. Advised and mentored students from the University of Guyana with senior projects, herbarium techniques and botany and systematics. Developed and instructed undergraduate General Biology laboratory and lecture, graduate advisor for undergraduate students at George Mason University, teaching assistant for tropical botany, general biology, general botany, systematics and scientific thought and process courses

Peer reviewer of manuscripts for *Brittonia*, *International Journal of Plant Sciences* and *Systematic Botany*.

**(e) Collaborators & Other Affiliations**

**Collaborators and Co-Editors**

Patrick Herendeen (Chicago Botanic Gardens), Vicki Funk (Smithsonian Institution, NMNH-Botany), Kenneth Wurdack (Smithsonian Institution, NMNH – Botany), Anne Bruneau (Institut de recherche en biologie végétale (IRBV), Université de Montréal)

**Graduate[1] and Postdoctoral Advisors[2]**

Patrick Herendeen[1,2], (Chicago Botanic Gardens), Elizabetha Wells[1] (George Washington University), Sheri Church[1] (George Washington University), Marc Allard[1] (George Washington University), Vicki Funk[1,2] (Smithsonian Institution, NMNH - Botany)

**Kenneth J. Wurdack**
SI-NMNH Botanist, Associate Curator

**(a) Professional Preparation**

| | | |
|---|---|---|
| University of Maryland, College Park | Biochemistry | B.S. 1990 |
| University of North Carolina, Chapel Hill | Biology | M.S. 1994 |
| University of North Carolina, Chapel Hill | Biology | Ph.D. 2002 |
| Smithsonian Institution | Botany | 2002-2005 |

**(b) Appointments**

Research Scientist & Associate Curator of Botany, Department of Botany, Smithsonian Institution (2005-present); Research Associate, Department of Botany, Smithsonian Institution (2004-2007); Visiting Scientist, Department of Botany, Smithsonian Institution (2003-2004); Post-doctoral Fellow, Department of Systematic Biology-Botany, Smithsonian Institution (2002-2003); Laboratory Manager, Cullman Program for Molecular Systematic Studies, The New York Botanical Garden (2000-2002).

**(c) Publications – (i) most closely related to proposed project**

**Wurdack, K. J.,** and C. C. Davis. 2009. Malpighiales phylogenetics: gaining ground on one of the most recalcitrant clades in the angiosperm tree of life. American Journal of Botany 96: 1551–1570.

Daniell, H., **K. J. Wurdack**, A. Kanagaraj, S.-B. Lee, C. Saski, and R. K. Jansen. 2008 The complete nucleotide sequence of the cassava (*Manihot esculenta*) chloroplast genome and multiple losses of the *atpF* intron in Malpighiales. Theoretical and Applied Genetics 116: 723–737.

Davis, C. C., M. Latvis, D. L. Nickrent, **K. J. Wurdack** and D. A. Baum. 2007. Floral gigantism in Rafflesiaceae. Science 315: 1812. [30 Mar 2007]

**Wurdack, K.** J., P. Hoffmann, and M. W. Chase. 2005. Molecular phylogenetic analysis of uniovulate Euphorbiaceae (Euphorbiaceae sensu stricto) using plastid *rbcL* and *trnL-F* DNA sequences. American Journal of Botany 92: 1397–1420.

Davis, C. C., and **K. J. Wurdack**. 2004. Host-to-parasite gene transfer in flowering plants: phylogenetic evidence from Malpighiales. Science 305: 676–678.

**(c) Publications – (ii) other significant publications**

Hoffmann, P., H. Kathriarachchi, and **K. J. Wurdack**. 2006. A phylogenetic classification of Phyllanthaceae (Malpighiales; Euphorbiaceae sensu lato). Kew Bulletin 61: 37–53.

Kathriarachchi, H., P. Hoffmann, R. Samuel, **K. J. Wurdack**, and M. W. Chase. 2005. Molecular phylogenetics of Phyllanthaceae inferred from five genes (plastid *atpB*, *matK*, 3' *ndhF*, *rbcL*, and nuclear *PHYC*). Molecular Phylogenetics and Evolution 36: 112–134.

**Wurdack, K. J.,** P. Hoffmann, R. Samuel, A. de Bruijn, M. van der Bank, and M.W. Chase. 2004. Molecular phylogenetic analysis of Phyllanthaceae (Phyllanthoideae pro parte, Euphorbiaceae sensu lato) using plastid *rbcL* DNA sequences. American Journal of Botany 91: 1882–1900.

Kress W. J., **K. J. Wurdack**, E. A. Zimmer, L. A. Weigt, and D. H. Janzen. 2005. Use of DNA barcodes to identify flowering plants. Proceedings of the National Academy of Sciences (USA) 102: 8369–8374.

Davis, C. C., C. O. Webb, **K. J. Wurdack**, C. A. Jaramillo, and M. J. Donoghue. 2005. Explosive radiation of Malpighiales supports a mid-Cretaceous origin of modern tropical rain forests. American Naturalist 165: E36–E65.

**(d) Synergistic Activities**

Reviewer for journals (last 60 months): American Journal of Botany, Annales Botanici Fennici, Annals of Botany, Annals of the Missouri Botanical Garden, Blumea, Brittonia, Kew Bulletin, Molecular Phylogenetics and Evolution, Systematic Botany, Taxon Tree Genetics & Genomes.

Core team member for scientific content and scripts for NMNH public exhibits (e.g., permanent exhibit on co-evolution, "Butterflies and Plants: Partners in Evolution," that opened in 2008; "Orchids: Take a walk on the wild side," 2007 temporary exhibit, "Orchids through Darwin's eyes," 2009 temporary exhibit).

Core member of expeditions to collect plants in Guyana (2007-present)

**(e) Collaborators & Other Affiliations**

**(i) Collaborators and Co-editors**

Williman R. Anderson (University of Michigan), Michael Barfuss (Botanisches Institut und Botanischer Garten, Universität Wien), David Baum (University of Wisconsin), Reed Beaman (University of Florida), Paul Berry (University of Michigan), Anne Bruneau (Universite de Montreal), Anette de Bruijn (Royal Botanic Gardens, Kew), Kenneth M. Cameron (University of Wisconsin), Nico Cellinese (University of Florida), Mark W. Chase (Royal Botanic Gardens, Kew), Priscila Chaverri (University of Maryland), Henry Daniell (University of Central Florida), Charles C. Davis (Harvard University), Piero Delprete (Brazil), Jose A. De-Nova (Instituto de Ecologia, Veracruz, Mexico), Michael J. Donoghue (Yale University), Alexander Doweld (Gaertnerian Institution, Moscow), James A. Doyle (University of California,), Lynn J. Gillespie (Canadian Museum of Nature), Pat Herendeen (Chicago Botanic Garden), Andrew L. Hipp (Morton Arboretum), Petra Hoffmann (Royal Botanic Gardens, Kew), David Horvath (USDA), Robert K. Jansen (University of Texas), Daniel H. Janzen (University of Pennsylvania), Anderson Kanagaraj (University of Central Florida), Hashendra Kathriarachchi (Botanisches Institut und Botanischer Garten, Universität Wien), Geoffrey C. Kite (Royal Botanic Gardens, Kew), Maribeth Latvis (University of Florida), Seung-Bum Lee (University of Central Florida), David C. Lees (The Natural History Museum, London), Jeffrey J. Morawetz (University of Wisconsin), Timothy Motley (Old Dominion University), Daniel L. Nickrent (Southern Illinois University), Helene Ralimanana (Royal Botanic Gardens, Kew), James L. Reveal (Cornell University), Ricarda Riina (University of Michigan), Zachary S. Rogers (Missouri Botanical Garden), Rosabelle Samuel (Botanisches Institut und Botanischer Garten, Universität Wien), Chris Saski (Clemson University), Pam and Doug Soltis (University of Florida), Victoria Sosa (Instituto de Ecologia, Veracruz, Mexico), Victor W. Steinmann (Instituto de Ecología, Michoacán, Mexico), Todd Stuessy (Institute of Botany, Vienna), Benjamin van Ee (Harvard University), Campbell O. Webb (Harvard University)

**(ii) Graduate Advisors and Postdoctoral Sponsors**

Graduate: Clifford R. Parks (emeritus) and Patricia Gensel (University of North Carolina).
Postdoctoral: Elizabeth A. Zimmer and Laurence J. Dorr (Smithsonian).

**(iii) Postgraduate-Scholar Sponsorships (2)**

Benjamin van Ee (currently Harvard University), Jay F. Bolin (Smithsonian), James W. Horn (Smithsonian). Total number of sponsorships: 3.

**CHARLES EUGENE ZARTMAN**

Instituto Nacional de Pesquisas da Amazônia
Av. André Araújo, 2936, Aleixo, CEP 69060-001,
Manaus - AM, Phone: 55-92-3643-3377; email: charles.zartman@inpa.gov.br

**(a) Professional Preparation**

Bowdoin College, ME Biology B.S. 1993
Western Carolina University, NC Biology/Botany M.S. 1996
Duke University, NC Botany Ph.D. 2004
Louisiana State University, LA Ecology 2004-2006
Instituto Nacional de Pesquisas Systematics/Floristics of 2006-2007 da Amazônia (INPA), Manaus, Brazil Phanerogams
Fundação à Amplio de Pesquisas Systematics/Ecology of 2007-2008 no Amazonas (Fapeam), Criptogams São Gabriel da Cachoeira, Brazil

**(b) Appointments**

Researcher: Instituto Nacional de Pesquisas da Amazônia/ Coordenação de Pesquisas em Botânica (INPA/CPBO), Manaus, Brazil. 2008-present.
Instructor: Organization for Tropical Studies (OTS) Field Courses in Amazonia Iquitos, Peru and Manaus Brazil 2003-2006.
Teaching Assistant: (Biology and Plant Taxonomy), Duke University, Durham, NC, 1998-2004.

**(c-i) Publications**

Zartman, C. E., and A. L. Ilkiu-Borges. 2007. Guide to the epiphyllous liverworts of Central Amazonia. Editora INPA, Manaus, Brazil.150 pgs.
Zartman, C. E. and A. J. Shaw. 2006. Metapopulation extinction thresholds in rainforest remnants. The American Naturalist 167: 177-189.
Zartman, C. E., and H. E. Nascimento. 2006. Are patch-tracking metacommunites dispersal limited? Inferences from abundance-occupancy patterns of epiphylls in Amazonian forest fragments. Biological Conservation 127: 46-54.
Zartman, C. E., S. Mc.Daniel, and A. J. Shaw. 2006. Experimental habitat fragmentation increases linkage disequilibrium but does not affect genetic diversity or population structure in the Amazonian liverwort *Radula flaccida*. Molecular Ecology 15: 2305-2315.
Zartman, C. E. 2003. Forest fragmentation effects on epiphyllous bryophyte communities in central Amazonia. Ecology 84: 948-954.
Zartman, C. E., and A. L. Ilkiu-Borges. 2007. Guide to the epiphyllous liverworts of Central Amazonia. Editora INPA, Manaus, Brazil.150 pgs.

**(ii)**

Boyle, S.A., A.T. Smith, W.R. Spironello & C.E. Zartman. *In Press*. The behavioural ecology of northern bearded sakis (*Chiropotes satanus chiropotes*) living in forest fragments of central Brazilian Amazonia. *Em* Evolutionary Biology and Conservation of Titis, Sakis and Uacaris. Barnett A, L. Viega, S. Ferrari and M. Norconk (eds). Cambridge University Press.

Pharo, E. J., and C. E. Zartman 2006. Bryophytes in a changing landscape: The hierarchical effects of habitat fragmentation on ecological and evolutionary processes. Biological Conservation 135: 315-325.
Zartman, C. E. and I. Ackerman. 2002. A new species of *Vitalianthus* (Lejeuneaceae) from the Brazilian Amazon. The Bryologist 105(2):267-269.
Vanderpoorten, A. and C. E. Zartman. 2002. The *Bryum bicolor* complex in North America. The Bryologist 105(1): 128-139.
Moore, G., R. Guaglianone and C. E. Zartman. 2002. *Rhynchospora pseudomacrostachya***,** a new Brazilian species of Cyperaceae. Brittonia 54: 340-343.
Zartman, C. E. and J. D. Pittillo. 1998. Spray cliff communities of the Chattooga Basin. Castanea 63(3): 217-241.

**(d) Synergistic Activities**

Fieldwork: Botanical consultant and PI in multidisciplinary biological expeditions in conservation units throughout the state of Amazonas, Brazil including Cujubim Sustainable Development Reserve, (Rio Jutaí), Sucunduri State Park (Rio Sucunduri), Aripuanã State Park (Rio Aripuanã), Uatumã Biological Reserve (Rio Uatumã), and the Tabocais State Park (Rio Pauini) resulting in approximately 3,000 vouchered samples deposited at INPA/CPBO and shared with specialists.

Teaching and training: Principal advisor of three master's level students at INPA/CPBO and co-advisor of two doctorate students at INPA and the Universidade Federal de Pernambuco (UFPE) on research projects related to the taxonomy, ecology and conservation of neotropical bryophytes. Instructor of graduate level courses in the INPA/CPBO on topics including the evolution of early land plants and bryophyte biology.

Editorial Contributions: Botany area editor for *Acta Amazonica*, peer reviewer of manuscripts for *Systematic Biology, Biological Conservation, Ecology, Journal of Biogeography,The Bryologist.*

**(e) Collaborators & Other Affiliations**

**Collaborators and Co-Editors**

Paul Manos (Duke University), Pedro Acevedo (Smithsonian Institution, NMNH-Botany), Alain Vanderpoorten (University of Liège, Belgium), Denise Pinheiro da Costa (Instituto de Pesquisas/ Jardim Botânico do Rio de Janeiro), Kirsten M. Fisher (California State University).

**Graduate and Postdoctoral Advisors**

J. D. Pittillo (Western Carolina Univeristy), A. J. Shaw (Duke University)
K. Harms (Louisiana State University).

# ECOLOGICAL NICHE MODELING

**Robert P. Anderson**
**Aleksandar Radosavljevic**

**Robert P. Anderson**
http://web.sci.ccny.cuny.edu/~anderson

**PROFESSIONAL PREPARATION**

| | | |
|---|---|---|
| Kansas State University | Biology | B.A., *cum laude*, 1994 |
| University of Kansas | Biology | Ph.D., honors, 2001 |
| American Museum of Natural History | Vertebrate Zoology | Postdoctoral Fellow, 2001–2003 |

**APPOINTMENTS**

2009–present: Associate Professor, City College of New York; Doctoral Faculty, City Univ. of New York (Subprogram in Ecology, Evolutionary Biology, and Behavior).

2003–2008: Assistant Professor, City College of New York; Doctoral Faculty, City Univ. of New York (Subprogram in Ecology, Evolutionary Biology, and Behavior).

2003–present: Research Associate, Mammalogy, American Museum of Natural History.

2001–2003: Roosevelt Postdoctoral Research Fellow, American Museum of Natural History.

2001: Graduate Research Assistant, on grant "Modeling potential distribution of invasive species for management decisions," to A. Townsend Peterson, Univ. of Kansas.

1996–1997, 1999–2001: Graduate Curatorial Assistant, Division of Mammalogy, Univ. of Kansas Natural History Museum and Biodiversity Research Center.

1998–2000: Graduate Teaching Assistant (Introduction to Biostatistics, Introduction to Biostatistics Laboratory, and Principles of Biology Laboratory), Univ. of Kansas.

1999: Graduate Research Assistant, on grant "Training in distributed database technology and synthetic analytical applications for sharing and understanding biodiversity information," to A. Townsend Peterson, Univ. of Kansas.

1995–1998: National Science Foundation Graduate Research Fellow, Univ. of Kansas.

**FIVE MOST-RELEVANT PUBLICATIONS**

**Anderson, R. P.** and A. Raza (in press) The effect of the extent of the study region on GIS models of species geographic distributions and estimates of niche evolution: preliminary tests with montane rodents (genus *Nephelomys*) in Venezuela. Journal of Biogeography. 16 pp. in proof.

Elith, J., C. H. Graham, **R. P. Anderson**, M. Dudík, S. Ferrier, A. Guisan, R. J. Hijmans, F. Huettmann, J. R. Leathwick, A. Lehmann, J. Li, L. G. Lohmann, B. A. Loiselle, G. Manion, C. Moritz, M. Nakamura, Y. Nakazawa, J. M. Overton, A. T. Peterson, S. J. Phillips, K. Richardson, R. Scachetti-Pereira, R. E. Schapire, J. Soberón, S. Williams, M. S. Wisz, and N. E. Zimmerman. 2006. Novel methods improve prediction of species' distributions from occurrence data. Ecography, 29:129–151. pdf Wiley

Phillips, S. J., **R. P. Anderson**, and R. E. Schapire. 2006. Maximum entropy modeling of species geographic distributions. Ecological Modelling, 190:231–259. pdf Science Direct

**Anderson, R. P.** and E. Martínez-Meyer. 2004. Modeling species' geographic distributions for conservation assessments: an implementation with the spiny pocket mice (*Heteromys*) of Ecuador. Biological Conservation, 116:167–179. pdf Science Direct

**Anderson, R. P.** 2003. Real vs. artefactual absences in species distributions: tests for *Oryzomys albigularis* in Venezuela. Journal of Biogeography, 30:591–605. pdf Wiley

**FIVE OTHER SIGNIFICANT PUBLICATIONS**

**Anderson, R. P.** and E. E. Gutiérrez. 2009. Taxonomy, distribution, and natural history of the genus *Heteromys* (Rodentia: Heteromyidae) in central and eastern Venezuela, with the description of a new species from the Cordillera de la Costa. In: R. S. Voss and M. D. Carleton (editors),

Systematic mammalogy: contributions in honor of Guy G. Musser. Bulletin of the American Museum of Natural History, 331:33–93. pdf AMNH

**Anderson, R. P.** and S. A. Jansa. 2007. Genetic comparisons between *Heteromys desmarestianus* and the newly described *H. nubicolens* (Rodentia: Heteromyidae) in northwestern Costa Rica. Mammalian Biology, 72:54–61. pdf Science Direct

**Anderson, R. P.**, M. Weksler, and D. S. Rogers. 2006. Phylogenetic analyses of spiny pocket mice (Heteromyidae: Heteromyinae) based on allozymic and morphological data. Journal of Mammalogy, 87:1218–1233. pdf Bioone

**Anderson, R. P.,** M. Gómez-Laverde, and A. T. Peterson. 2002. Geographical distributions of spiny pocket mice in South America: insights from predictive models. Global Ecology and Biogeography, 11:131–141. pdf Wiley

**Anderson, R. P.,** A. T. Peterson, and M. Gómez-Laverde. 2002. Using niche-based GIS modeling to test geographic predictions of competitive exclusion and competitive release in South American pocket mice. Oikos, 98:3–16. pdf Wiley

**SYNERGISTIC ACTIVITIES**

1. Coauthor of book under contract with Princeton Univ. Press: *Ecological Niches and Geographic Distributions: A Modeling Perspective*. Peterson, A. T., J. Soberón, R. G. Pearson, **R. P. Anderson**, E. Martínez-Meyer, M. Nakamura, and M. B. Araújo.
2. Development of maximum entropy (Maxent) method for modeling species distributions with S. J. Phillips and R. E. Schapire (Phillips et al., 2006); http://www.cs.princeton.edu/~schapire/maxent/).
3. Invited presenter/instructor, *Species Distribution Modeling Methods for Conservation Biologists*, Center for Biodiversity and Conservation, American Museum of Natural History, Southwest Research Station, Arizona, 16–20 October 2006. http://geospatial.amnh.org/remote_sensing/training/cbc_workshops/species_modeling.html
4. Mentor for 4 graduate students (2 Hispanic) and 11 undergraduates (5 female; 4 Hispanic, 2 African-American, and 3 Asian-American); the undergraduates include 2 REU students (1 African-American; both female). I also mentored a female master's-level visiting scholar from Venezuela.

**COLLABORATORS AND OTHER AFFILIATIONS**

*Collaborators in past 48 months*: Marisol Aguilera (Univ. Simón Bolívar, Caracas), Miguel Araújo (Museo Nacional de Ciencias Naturales, Madrid), Santiago Burneo (Pontificia Univ. Católica del Ecuador, Quito), Stephen L. Egbert (Univ. of Kansas), Jane Elith (Univ. of Melbourne), Catherine H. Graham (SUNY–Stony Brook), Sharon A. Jansa (Univ. of Minnesota), Enrique Martínez-Meyer (Univ. Nacional Autónoma de México, Mexico City), Craig Moritz (Univ. of California, Berkeley), Miguel Nakamura (Centro de Investigación en Matemáticas, Guanajuato, México), José Ochoa-G. (Cabañas Bougainvillae, Los Taques, Venezuela), Link E. Olson (Univ. of Alaska), Richard G. Pearson (American Museum of Natural History), A. Townsend Peterson (Univ. of Kansas), Steven J. Phillips (AT&T–Research), Duke S. Rogers (Brigham Young Univ.), Robert E. Schapire (Princeton Univ.), Norman A. Slade (Univ. of Kansas), Jorge Soberón (Univ. of Kansas), Robert M. Timm (Univ. of Kansas), and Marcelo Weksler (American Museum of Natural History).

*Graduate and postdoctoral advisors*: Robert M. Timm (Univ. of Kansas) and Robert S. Voss (American Museum of Natural History).

*Thesis advisor and Postgraduate-Scholar Sponsor*: Eliécer E. Gutiérrez (Ph.D.), Mariano Soley-G. (Ph.D.); Aleksandar Radosavljevic (master's); Samuel Glickman (undergraduate honors) and Mariya Shcheglovitova (undergraduate honors).

**Aleksandar Radosavljevic**
Graduate Student

Department of Biology
Marshak Science Building, Room J-526
City College of New York
160 Convent Ave
New York, NY 10031
email: aradosa00@ccny.cuny.edu

**(a) Professional Preparation**

| | | |
|---|---|---|
| Marymount University, VA | Biology | B.S. 2005 |
| The City College of New York, NY | Biology | M.A. 2010 |
| Northwestern University, IL | Plant Biology | Ph.D. beginning August 2010 |

**(b) Appointments**

Adjunct Lecturer (laboratory instructor), Dept. of Biology, City College of New York; Dept. of Natural Science, Baruch College, 2008-present

Research Assistant, "Integrating systematics and GIS modeling: biogeography of spiny pocket mice (Heteromyidae) in South America", Dr. Robert P. Anderson, City College of New York, 2008-present

Herbarium Assistant, New York Botanical Garden, 2007-2008

Research Assistant, Biological Diversity of the Guiana Shield Program, Smithsonian Institution, Botany, 2005-2006; 2007-present

**(c) Grants and Publications**

(i) Grants

Smithsonian Internal BDG Grant, $10,000; 2009-2010

City College Graduate Award, $500; May 2009.

International Biogeography Society Student Travel Grant, $1300; January 2009

(ii) Publications

Vari, R. P., C. J. Ferraris, Jr., **A. Radosavljevic**, and V. A. Funk. 2009. Checklist of the Freshwater Fishes of the Guiana Shield. Bulletin of the Biological Society of Washington,17(1): 1-85.

(iii) Contributed talks

An emerging understanding of the diversity, distributions, and phylogeny of spiny pocket mice (Heteromyidae: Heteromys) in South America. 90th Annual Meeting, American Society of Mammalogists, 11-15 June 2010, Laramie, Wyoming. Robert P. Anderson, Tatiana Caldera-Andara, Carlos A. Delgado-V., Eliécer E. Gutiérrez, **Aleksandar Radosavljevic**, Mariya Shcheglovitova, Mariano Soley-G., Darla M. Thomas, José Ochoa-G., Marisol Aguilera, and Duke S. Rogers. (scheduled) [presented by R.P. Anderson]

The effect of ecologically marginal localities on GIS-based distributional models: a case study with the rodents Heteromys anomalus and Rhipidomys venezuelae. 90th

Annual Meeting, American Society of Mammalogists, 11-15 June 2010, Laramie, Wyoming. Soley-G., M., J. Rivera, **A. Radosavljevic**, and R. P. Anderson. (scheduled) [presented by M. Soley-G]

Modelos de la distribución potencial del ratón mochilero caribeño *Heteromys anomalus*: pruebas de sus desempeños predictivos. Contributed talk. VIII Congresso Venezolano de Ecolgoia, 2-6 November 2009, Santa Ana de Coro, Venezuela. Anderson, R. P., **A. Radosavljevic**, and D. M. Thomas. [presented by R.P. Anderson]

Using geographically structured k-fold cross-validation to assess transferability of niche-based distributional models for species with many occurrence records. Contributed talk. 2009 Ecological Society of America annual meeting, 2-7 August 2009, Albuquerque, NM. **Radosavljevic, A**., R. P. Anderson, and D. M. Thomas

Spatial transferability of niche-based distributional models in the Caribbean spiny pocket mouse *Heteromys anomalus.* Poster presentation. 2009 International Biogeography Society meeting, 8-12 January 2009, Merida, Mexico. **Radosavljevic, A**., R. P. Anderson, and D. M. Thomas

**(d) Synergistic Activities**

Teaching and training: Contributed 'Carbon Footprint' lab to Ecology and Evolution (Bio 228, City College) lab manual and assisted R.P. Anderson with editing of entire manual. Also, mentored undergraduate student researchers in R.P. Anderson's lab during the fall of 2009 and spring of 2010.

**(e) Collaborators and Other Affiliations**

(i) Collaborators and co-authors

M. Aguilera (Universidad Simón Bolívar); ( R.P. Anderson (CCNY); T. Caldera-Andara (Universidad Simón Bolívar); C.A. Delgado-V. (Colegio Fontána); Eliécer E. Gutiérrez (CCNY); C.J. Ferraris (?); V.A. Funk (Smithsonian); José Ochoa-G. (Cabañas Bougainvillea); K.M. Redden (Smithsonian); Duke S. Rogers (Brigham Young University); M. Shcheglovitova (CCNY); Mariano Soley-G (CCNY); Darla M. Thomas (CCNY); R.P. Vari (Smithsonian),

(ii) Graduate Advisors

M.A.: Robert P. Anderson (CCNY)

# Entomology

**Seán G. Brady**
**Matthew L. Buffington**
**Michael William Gates**
**Robert R. Kula**
**John S. LaPolla**
**Ted R. Schultz**
**Jeffrey Sosa-Calvo**
**Jessica Ware**

**Seán G. Brady**
SI-NMNH Assistant Curator

**(a) Professional Preparation**

| | | |
|---|---|---|
| California Polytechnic University, Pomona | History | B.A. 1990 |
| California State University, Fullerton | Linguistics | M.A. 1993 |
| University of California, Davis | Population Biology | Ph.D. 2002 |
| Cornell University | Entomology | Postdoc: 2002–2003 |
| National Museum of Natural History (NMNH) | Entomology | Postdoc: 2003–2004 |

**(b) Appointments**

Research Entomologist (Federal), Department of Entomology, NMNH, 2008–present
Research Entomologist (Trust), Department of Entomology, NMNH, 2004–2008
Postdoctoral Fellow, Department of Entomology, NMNH, 2003–2004
Postdoctoral Researcher, Department of Entomology, Cornell University, 2002–2003
Instructor, Department of Evolution and Ecology, University of California, Davis, 2002

**(c) Publications**

Five publications most closely related to proposed project:

**Brady, S. G.,** Larkin, L., and Danforth, B.N. 2009. Bees, ants, and stinging wasps (Aculeata). Pp. 264–269 in Hedges, S.B., Kumar, S. (eds.) *The Timetree of Life.* New York: Oxford University Press.

**Brady, S. G**., Sipes, S., Pearson, A., and Danforth, B.N. 2006. Recent and simultaneous origins of eusociality in halictid bees. *Proceedings of the Royal Society B* 273:1643-1649.

Danforth, B.N., Sipes, S., Fang, J., and **Brady, S.G**. 2006. The history of early bee diversification based on five genes plus morphology. *Proceedings of the National Academy of Sciences, U.S.A.* 103:15118-15123.

**Brady, S.G.** and Danforth, B.N. 2004. Recent intron gain in elongation factor-1α of colletid bees (Hymenoptera: Colletidae). *Molecular Biology and Evolution* 21:691-696.

Danforth, B.N., **Brady, S.G.,** Sipes, S.D., and Pearson, A. 2004. Single copy nuclear genes recover Cretaceous age divergences in bees. *Systematic Biology* 53:309–326.

Five other significant publications:

Ward, P.S., **Brady, S.G.,** Fisher, B.L., and Schultz, T.R. Phylogeny and biogeography of dolichoderine ants: Effects of data partitioning and relict taxa on historical inference. *Systematic Biology*, in press.

Wernegreen, J.J., Kauppinen, S.N., **Brady, S.G.,** and Ward, P.S. 2009. One nutritional symbiosis begat another: Phylogenetic evidence that the ant tribe Camponotini acquired *Blochmannia* by tending sap-feeding insects. *BMC Evolutionary Biology* 9:292.

Schultz, T.R. and **Brady, S.G.** 2008. Major evolutionary transitions in ant agriculture. *Proceedings of the National Academy of Sciences, U.S.A.* 105:5435-5440.

**Brady, S.G.,** Schultz, T.R., Fisher, B.L., and Ward, P.S. 2006. Evaluating alternative hypotheses for the early evolution and diversification of ants. *Proceedings of the National Academy of Sciences, U.S.A.* 103:18172-18177.

**Brady, S.G.** 2003. Evolution of the army ant syndrome: the unique origin and long-term evolutionary stasis of a novel complex of behavioral and reproductive adaptations. *Proceedings of the National Academy of Science, U.S.A.* 100:6575-6579.

**(d) Synergistic Activities**

1. Editorial board: *Systematic Biology* (2010–present); *Insect Systematics and Evolution* (2009–present).
2. Other positions: Council, Society of Systematic Biologists (2009–2011); President, Entomological Society of Washington (2010); Treasurer, Biological Society of Washington (2009–present); Scientific Committee, 7th International Congress of Hymenopterists (2010).
3. Instructor for the Hymenoptera Course (www.hymcourse.org), a one-week field-based workshop on the identification and biology of this group.
4. Participant in PollinatorLIVE: The Insect Zoo in Your Schoolyard, an interactive webcast broadcast to schools across the US educating students about bees and other pollinators (2010).
5. Co-leader of the Global Genome Initiative, a project lead by NMNH to collaborate with other museums worldwide to collect, curate, and analyze the next generation of genomic-grade biodiversity material.

**(e) Collaborators & Other Affiliations**

*(i) Collaborators within last 48 months*

Eduardo Almeida (Universidade Federal do ABC, Brazil), Timothy Bradley (UC Irvine); Matt Buffington (USDA); Chris Burwell (Queensland Museum, Australia); Bryan Danforth (Cornell); Sam Droege (USGS); Brian Fisher (Cal Academy of Sciences); Leah Larkin (University of the Pacific); John LaPolla (Towson University); Doug Miller (USDA); Molly Rightmyer (USDA); Steve Shattuck (CSIRO, Australia); Ted Schultz (NMNH); Jeff Scott (Cornell); Jeff Sossa (University of Maryland); Philip Ward (UC Davis); Jennifer Wernegreen (Woods Hole)

*(ii) Graduate and Postdoctoral Advisors*

Graduate advisor: Philip Ward (University of California, Davis)

Postdoctoral advisor: Bryan Danforth (Cornell University)

Postdoctoral advisor: Ted Schultz (NMNH)

*(iii) Thesis Advisor and Postgraduate-Scholar Sponsor*

Molly Rightmyer (Molecular Evolution Fellow), Postdoctoral Sponsor, Jun 2007–Mar 2009

Natasha Mehdiadabi (Evolutionary and Systematic Biology Fellow), Postdoctoral Sponsor, Sep 2007–Aug 2009

Rachelle Adams (Molecular Evolution Fellow), Postdoctoral Sponsor, Jan 2009–Mar 2010

Dietrich Gotzek (Evolutionary and Systematic Biology Fellow), Postdoctoral Sponsor, Aug 2009–present

**Matthew L. Buffington**
USDA Research Entomologist

Systematic Entomology Lab, USDA/ARS
c/o National Museum of Natural History, Smithsonian Institution
10th & Constitution Avenue NW, Washington DC 20013
email: matt.buffington@ars.usda.gov; voice: 202-382-1784 fax: 202-786-9422

**(a) Professional Preparation**

| | | |
|---|---|---|
| Doctor of Philosophy | University of California, Riverside, 2005 | Entomology |
| Master of Science | Texas A&M University: January, 2000 | Entomology |
| Bachelor of Science | University of California, Riverside, 1997 | Biology |

**(b) Appointments**

Postdoctoral Scientist California Department of Food and Agriculture, PlantPest Diagnostics/Florida State University, School of Computational Science and Information

**(c) Publications**

Buffington, M.L. 2009. Description, circumscription and phylogenetics of the Zaeucoilini, new tribe (Hymenoptera: Figitidae: Eucoilinae) including a description of a new genus. *Systematic Entomology*, 34, 162-187.

Buffington, M.L., S. I. Morita. 2009. Not all oak gall wasps gall oaks: the description of *Dryocosmus rileypokei*, a new, apostate species of Cynipini from California. *Proceedings of the Entomological Society of Washington*, 111, 244-253.

Notton, D.G, M.L. Buffington, S.van Noort. 2009. The status of the type material of *Pycnostigmus rostratus* Cameron (Hymenoptera, Figitidae, Pycnostigminae). *Journal of Natural History*, 43, 181-184.

Kerr, P.H., E.M. Fisher, M.L. Buffington. 2009. Dome lighting for insect imaging under a microscope. *American Entomologist*, 54, 198-200.

Buffington, M.L. M. Gates. 2009. Advanced imaging techniques II: using a compound microscope for photographing point-mount specimens. *American Entomologist*, 54, 222-224.

Nylander, J.A.A., M.L. Buffington, Z. Liu, J. Nieves-Aldrdey, J. Liljeblad and F. Ronquist. in prep. Molecular phylogeny and evolution of gall wasps.

Buffington, M.L., S.J. Scheffer. 2008. North American species of *Agrostocynips* Diaz (Hymenoptera: Figitidae), parasitoids of Agromyzidae (Diptera): bionomics and taxonomy. *Zootaxa*, 1817, 39-48.

Buffington, M.L. 2008. A revision of Australian Thrasorinae (Hymenoptera: Figitidae) with a description of a new genus and six new species. *Australian Journal of Entomology* 47, 203-212.

Buffington, M.L., J. Liljeblad. 2008. The description of Euceroptrinae, a new subfamily of Figitidae (Hymenoptera), including a revision of the *Euceroptres* Ashmead, 1896, and the description of a new species. *Journal of Hymenoptera Research*, 17, 44-56.

Buffington M.L., Nylander J.A.A., Heraty J. 2007. The phylogeny and evolution of Figitidae (Hymenoptera: Cynipoidea). *Cladistics*, 23, 1-29.

Buffington, M.L. 2007. The occurrence and phylogenetic implications of the ovipositor clip within the Figitidae (Insecta: Hymenoptera: Cynipoidea). *Journal of Natural History*, 41, 2267-2282.

Buffington, M.L. & S. van Noort. 2007. A world revision of the Pycnostigminae (Cynipoidea: Figitidae) with descriptions of seven new species. *Zootaxa*, 1392, 1-30.

Ronquist, F., P. Hanson, M.L. Buffington, F. Fontal-Cazalla & P. Ros-Farre. 2006. *Familia Figitidae* In: Hanson & Gauld, eds. Neotropical Hymenoptera. *Memoirs of the American Entomolgical Institute*, 77, 280-293.

Buffington M.L. & Ronquist F. 2006. Capitulo 97: Familia Figitidae. In: Fernández & Sharkey, eds. *Introducción a los Hymenoptera de la Región Neotropical*. Sociedad Colombiana de Entomología y Universidad Nacional de Colombia, Bogotá D.C., 829-838.

Buffington, M.L., Z. Liu and F. Ronquist. 2006. Capitulo 94: Cynipoidea In: Fernández & Sharkey, eds. *Introducción a los Hymenoptera de la Región Neotropical*. Sociedad Colombiana de Entomología y Universidad Nacional de Colombia, Bogotá D.C., 811-823.

Buffington, M.L. 2006. The description of *Moritiella* Buffington, new genus (Hymenoptera: Figitidae: Eucoilinae). *Zootaxa*, 1237, 61-68.

Buffington, M.L. and R. Burks. 2005. Parasitic Hymenoptera. In: Hauser et al., eds. *Digital Imaging of Biological Type Specimens: A manual of best practice. Results from a study of the European network for biodiversity information*. Stuttgart. 297-299.

Buffington, M.L. (2005) Phylogenetics and evolution of the Figitidae (Hymenoptera: Cynipoidea) [Doctoral Dissertation, UC Riverside]

Buffington, M.L., R. Burks and L. McNeil. (2005) Advanced techniques for imaging microhymenoptera. *American Entomologist*, 51, 50-54.

Buffington, M.L. (2004) The description of *Preseucoela* Buffington, new genus, with notes on the status of Nearctic species of *Agrostocynips* Diaz (Hymenoptera: Figitidae: Eucoilinae). *Zootaxa*, 408, 1-11.

Seltman, K. and M.L. Buffington. (2004) IntKey to Cynipoidea. Available online at http://www.uky.edu/~mjshar0/ (Intkey required to read key).

Buffington, M.L. (2004) The description of *Nordlandiella semirufa* (Kieffer), new combination, with notes on the status of *Ganaspidium* Weld (Hymenoptera: Figitidae: Eucoilinae). *Proceedings of the Entomological Society of Washington* 106, 192-198.

Buffington, M.L. (2002) A description of *Aegeseucoela* Buffington, new name, with taxonomic notes on the status of *Gronotoma* Förster. *Proceedings of the Entomological Society of Washington*, **104**: 589-601.

Fontal-Cazalla, F.M., Buffington, M.L., Nordlander, G., Liljeblad, J., Ros-Farré, P., Nieves-Aldrey, J. L., Pujade-Villar, J. & Ronquist, F. (2002) Phylogeny of the Eucoilinae (Hymenoptera: Cynipoidea: Figitidae**)**. *Cladistics* **18**: 154-199.

Buffington, M.L.(2000). The phylogeny and classification of the *Gronotoma* group (s.l.) of genera (Hymenoptera: Figitidae: Eucoilinae). Texas A&M University. [MS Thesis].

Buffington, M.L. & Redak, R.A. (1998). A comparison of vacuum sampling versus sweep-netting for arthropod biodiversity measurements in California coastal sage scrub. *Journal of Insect Conservation* **2,** 99-106.

**(d) Synergistic activities**

Research Associate, American Museum of Natural History.
Program Chair, Entomological Society of Washington.
Subject Editor, Zootaxa.
Recording Secretary, Senate of Scientists, Smithsonian Institution.
Past Program Chair, Entomology Collections Network.

**(e) Collaborators**

Dr. John LaSalle, CSIRO, Canberra, Australia; Dr. James Carpenter, AMNH, NY, NY; Dr. Sonja Scheffer, USDA, Beltsville, MD; Dr. Owen Lewis, Silwood Park, UK; Dr. Zhiwei Liu, Desert Museum, Tucson, AZ; Dr. Robert Wharton, TAMU, College Station, TX; Dr. James Woolley, NSF, Washington, D.C.; Dr. Fredrik Ronquist, Florida State University, Tallahassee, FL.; Dr. Göran Nordlander, Swedish Agricultural Univ., Uppsala, Sweden; Dr. Adriana Salvo, Universidad Nacional de Cordoba, Argentina; Dr. Michael Sharkey, University of Kentucky, KY; Dr. Robert Zuparko, CAS, San Francisco, CA; Dr. Johan Nylander, University of Uppsala, Sweden; Dr. Simon van Noorta, IZIKO, Cape Town, RSA; Dr. Robert Copeland, ICIPE, Nairobi, Kenya.

**Michael William Gates**
USDA Research Entomologist

Systematic Entomology Laboratory, PSI, USDA - Agricultural Research Service
c/o National Museum of Natural History, NHB 168
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**Academic History:**
Dec., 2000 Ph.D. University of California, Riverside, CA. Systematic Entomology.
July, 1995 M.S. Oklahoma State University, Stillwater, OK. Stored Product Entomology.
June, 1992 B.A. Hendrix College, Conway, AR. Biology.

**Professional Experience:**
2000-03, Postdoctoral Researcher, Systematic Entomology Laboratory, USDA, Washington, DC.
2003-04, GS-11, Support Scientist, Systematic Entomology Laboratory, USDA, Washington, DC.
2004-present, GS-12-13, Research Entomologist, Systematic Entomology Laboratory, USDA, Washington, DC.

**Grants:**
Smithsonian Women's Committee to rescue and remediate the collection of George Vogt (in collaboration with M. Schauff), $5,700, 2003.
U. S. Forest Service (USDA) interagency agreement to document Nearctic parasitoids of *Agrilus planipennis* Fairmaire (Coleoptera: Buprestidae) (in collaboration with M. Schauff), $14,000, 2004.
Informatics Office and the Primary Type Data Clean-up and Imaging Committee for imaging and label data capture of primary types of parasitic Hymenoptera (in collaboration with M. Buffington, R. Kula, and T. Schultz), $16,000 (of $91,000 total granted), 2007.
National Park Service, Valles Caldera National Preserve, interagency agreement to document insect biodiversity in Preserve (in collaboration with M. Buffington, A. Norrbom, M. Pogue, G. Miller, J. Brown, S. Scheffer, A. Solis [SEL]), $50,000, 2007.
Smithsonian Institution short-term visitor grant for Dr. Badrul Bhuiya (University of Chattagong, Bangladesh), $4,000, 2007.
Smithsonian Institution short-term visitor grant for Dr. Paul Hanson (University of Costa Rica, San Pedro, Costa Rica), $1,200, 2008.
Washington Biologist's Field Club research grant, Host determination of *Isosomodes parkeri* and *I. landoni*, $1,500, 2009.
Smithsonian Institution short-term visitor grant for Dr. Gerárd Delvare (CSIRO of Montpelier, France), $2,900, 2010.

**Professional Memberships:**
Friends of the University of California, Entomology Research Museum, 1998 to present.
Entomological Society of Washington, 1997 to present.
International Society of Hymenopterists, 1996 to present.
Entomological Society of America, 1993 to present.
Maryland Entomological Society, 2006 to present.

**Related Publications:**
**Gates, M.**, J. Heraty, M. Schauff, D. Wagner, J. Whitfield, and D. Wahl. Survey of the parasitic Hymenoptera on leafminers in California. Journal of Hymenoptera Research 11: 213-270. 2002.

**Gates, M.** and A. Cascante-Marin. A new phytophagous species of *Eurytoma* (Hymenoptera: Eurytomidae) attacking *Werauhia gladioliflora* (Bromeliales: Bromeliaceae). Zootaxa 512: 1-10. 2004.

**Gates, M.** and M. Schauff. *Oncastichus goughi* (Hymenoptera: Eulophidae), an introduced pest of waxflower (Myrtaceae; *Chamelaucium uncinatum*) newly reported from Peru. Entomological News 116(2): 115-116. 2005.

**Gates, M.**, M. Metz, and M. Schauff. The circumscription of the generic concept of *Aximopsis* Ashmead (Hymenoptera: Chalcidoidea: Eurytomidae) with the description of seven new species. Zootaxa 1273: 9-54. 2006.

Rowley, D., J. Coddington, **M. Gates**, A. Norrbom, R. Ochoa, N. Vandenberg, and M. Greenstone. Vouchering DNA-barcoded specimens: Test of a non-destructive extraction protocol for arthropods. Molecular Ecology Notes OnLine Early, doi:10.1111/j.1471-8286.2007.01905.x. 2007.

Heraty, J. and **M. Gates.** 2003. Chapter 14, Diversity of Chalcidoidea (Hymenoptera) at El Edén Reserve, Mexico, pp. 277-292. *In* Pompa, A., Allen, M., Fedick, S. & J. Jimenez-Osornio [eds]. Lowland Maya Area: Three Millennia at the Human-Wildland Interface. Food Products Press.

**Gates, M.** and E. Grissell. A new species of *Eurytoma* (Hymenoptera: Eurytomidae) attacking the Mango fruit fly, *Anastrepha obliqua* (Macquart) (Diptera: Tephritidae), pp. 147-159. *In* K. Rajmohana, K. Sudheer, P. Girish Kumar, S. Santhosh, [eds.]. Perspectives on Biosystematics and Biodiversity, Harvest Media Services, Calicut. 2004.

**Gates, M.** Revision and Generic Systematics of World Rileyinae (Hymenoptera: Eurytomidae). University of California Publications in Entomology, 125: 332 pp. 2008.

**Gates, M.** and P. Hanson. Familia Eurytomidae, pp. 380-387. *In* Hanson & Gauld [eds]. Hymenoptera de la Región Neotropical. American Entomological Institute, Gainesville, Florida, 994 pp. 2006.

Schauff, M., **M. Gates**, and J. LaSalle. Familia Eulophidae, pp. 755-760. *In* Fernández & Sharkey [eds]. Introducción a la Hymenoptera de la Región Neotropical. Sociedad Colombiana de Entomología y Universidad Nacional de Colombia, Bogotá D.C., xxx+894 pp. 2007.

**Gates, M.** Familia Eurytomidae, pp. 667--672. *In* Fernández & Sharkey [eds]. Introducción a la Hymenoptera de la Región Neotropical. Sociedad Colombiana de Entomología y Universidad Nacional de Colombia, Bogotá D.C., xxx+894 pp. 2007.

**Gates, M.** Description of *Khamul*, gen. nov. (Hymenoptera: Chalcidoidea: Eurytomidae), with hypothesis of its phylogenetic placement. Zootaxa 1898: 1-33. 2008.

**Gates, M.** and Hanson, P. A revision of *Bephrata* and *Isosomodes* (Hymenoptera: Eurytomidae). Journal of Hymenoptera Research 18 (1): 25-73. 2009.

**Gates, M.** A new species of *Aximopsis sensu lato* Ashmead (Hymenoptera, Chalcidoidea, Eurytomidae) parasitic on *Euglossa* spp. (Hymenoptera, Apidae). Zookeys 20: 165-174. 2009.

Mena-Correa, J., Sivinski, J., Ramírez-Romero, R., Córdova-García, G., Aluja, M., and **Gates, M.**. Consideration of *Eurytoma sivinskii* Gates and Grissell, a eurytomid (Hymenoptera) with unusual foraging behaviors, as a biological control agent of tephritid (Diptera) fruit flies. Biological Control 2009.

**Robert R. Kula**
Research Entomologist, USDA

Systematic Entomology Laboratory
Agricultural Research Service, U.S. Department of Agriculture
Smithsonian Institution, National Museum of Natural History
Washington, DC 20560-0168
telephone: (202) 382-1781, email: Robert.Kula@ars.usda.gov

## Education

**Kansas State University** *Manhattan, Kansas*. May 2006. Ph.D. Entomology.
**Texas A&M University** *College Station, Texas*. May 2001. M.S. Entomology.
**Peru State College** *Peru, Nebraska*. May 1998. B.S. Biology.

## Research Experience

**Systematic Entomology Laboratory** *Research Entomologist*. June 2006 – present.
Systematics of Hymenoptera, particularly parasitoid wasp classification, evolution, and biodiversity. Taxonomic revisions, cladistic analyses, and biodiversity studies for Braconidae. Systematics support for biological control programs using braconids and ichneumonids. Develop and refine techniques and equipment for collecting parasitoid wasps. Develop and disseminate databases to facilitate research on parasitoid wasps. Curator of Ichneumonoidea at Smithsonian Institution National Museum of Natural History (NMNH).

**Kansas State University** *Graduate Research Assistant*. January 2001 – May 2006.
Advisor: Gregory Zolnerowich. Funding: Kansas State University. Dissertation title: Systematics of Dacnusini (Hymenoptera: Braconidae), parasitoids of cyclorrhaphous Diptera. Additional activities: Develop and maintain long-term insect biodiversity survey at Konza Prairie Biological Station.

**Texas A&M University** *Graduate Research Assistant*. August 1998 – December 2000.
Advisor: Robert A. Wharton. Funding: National Science Foundation Partnerships for Enhancing Expertise in Taxonomy (PEET). Thesis title: Revision of Nearctic species in *Opius* (*Gastrosema*) (Hymenoptera: Braconidae: Opiinae). Additional activities: Develop species-level Internet database cataloging World Opiinae.

**Peru State College** *Undergraduate Research Assistant*. May 1997 – August 1998.
Advisor: Richard E. Clopton. Funding: National Science Foundation Research in Undergraduate Institutions (RUI). Participated in biodiversity survey focused on eugregarine protozoans in insects. Fieldwork included collection of insects. Laboratory work included identification, curation, dissection, and histology of insect and protozoan specimens.

## Publications

**Kula, R. R.**, K. S. Knight, J. Rebbeck, D. L. Cappaert, L. S. Bauer, and K. J. K. Gandhi. In press. *Leluthia astigma* (Ashmead) (Hymenoptera: Braconidae: Doryctinae) as a parasitoid of *Agrilus planipennis* Fairmaire (Coleoptera: Buprestidae: Agrilinae), with an assessment of host associations for Nearctic species of *Leluthia* Cameron. *Proceedings of the Entomological Society of Washington*.

**Kula, R. R.**, J. T. Lill, S. M. Murphy, and T. Stoepler. In press. The first host records for the Nearctic species *Triraphis discoideus* (Hymenoptera: Braconidae: Rogadinae). *Entomological News*.

**Kula, R. R.**, A. J. Boughton, and R. W. Pemberton. 2010. *Stantonia pallida* (Ashmead) (Hymenoptera: Braconidae) reared from *Neomusotima conspurcatalis* Warren (Lepidoptera: Crambidae), a classical biological control agent of *Lygodium microphyllum* (Cav.) R. Br. (Polypodiales: Lygodiaceae). *Proceedings of the Entomological Society of Washington* 112: 61 – 68

**Kula, R. R.** 2009. A new species of *Chaenusa* (Hymenoptera: Braconidae) reared from *Hydrellia pakistanae* and *Hydrellia sarahae laticapsula* (Diptera: Ephydridae) infesting *Hydrilla verticillata* (Alismatales: Hydrocharitaceae) in India and Pakistan. *The Florida Entomologist* 92: 139 – 146.

**Kula, R. R.** 2009. Review of the New World species of *Coiba* Marsh (Hymenoptera: Braconidae: Doryctinae), including descriptions of two new species, new distribution records, and a key to species. *Proceedings of the Entomological Society of Washington* 111: 183 – 198.

**Kula, R. R.**, J. J. Martinez, and G. Cabrera Walsh. 2009. Supplement to revision of New World *Chaenusa* Haliday *sensu lato* (Hymenoptera: Braconidae: Alysiinae). *Proceedings of the Entomological Society of Washington* 111: 641 – 655.

**Kula, R. R.** 2008. Taxonomic status and location of type specimens for species of *Coelinidea* Viereck and *Sarops* Nixon (Hymenoptera: Braconidae: Alysiinae) described by Garland T. Riegel. *Journal of Hymenoptera Research* 17: 138 – 156.

**Kula, R. R.** and G. Zolnerowich. 2008. Revision of New World *Chaenusa* Haliday *sensu lato* (Hymenoptera: Braconidae: Alysiinae), with new species, synonymies, hosts, and distribution records. *Proceedings of the Entomological Society of Washington* 110: 1 – 60.

Wyckhuys, K. A. G., R. L. Koch, **R. R. Kula**, and G. E. Heimpel. 2008 (2009). Potential exposure of a classical biological control agent of the soybean aphid, *Aphis glycines*, on non-target aphids in North America. Biological Invasions (published Online First™ in 2008).

**Kula, R. R.**, G. Zolnerowich, and C. J. Ferguson. 2006. Phylogenetic analysis of *Chaenusa sensu lato* (Hymenoptera: Braconidae) using mitochondrial NADH 1 dehydrogenase gene sequences. *Journal of Hymenoptera Research* 15: 251 – 265.

**Kula, R. R.** and G. Zolnerowich. 2005. A new species of *Epimicta* Förster (Hymenoptera: Braconidae) from North America and new distribution records for *Epimicta griffithsi* Wharton. *Proceedings of the Entomological Society of Washington* 107: 78 – 83.

**Kula, R. R.** 2003. Morphological variation in *Opius* Wesmael (Hymenoptera: Braconidae) with an emphasis on Nearctic species in the subgenus *Gastrosema* Fischer. *Journal of Hymenoptera Research* 12: 278 – 302.

**Kula, R. R.** and R. E. Clopton. 1999. *Amoebogregarina nigra* n. gen., n. comb. (Apicomplexa: Gregarinidae) from adult *Melanoplus differentialis* (Orthoptera: Acrididae) in southeastern Nebraska. *Journal of Parasitology* 85: 321 – 325.

**John S. LaPolla**
Assistant Professor, Towson University

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Towson University, 8000 York Road, Towson, MD 21252
phone: (410) 704-3121; e-mail: jlapolla@towson.edu

**(a) Professional Preparation**

| | | |
|---|---|---|
| Stockton College, Pomona, NJ | Biology | B.S., 1997 |
| Rutgers University, New Brunswick, NJ | Entomology | Ph.D., 2004 |
| Nat. Museum of Natural History, Washington, DC | Entomology | Post-doc, 2004-2006 |

**(b) Appointments**

2006-present Assistant Professor, Dept. of Biological Sciences, Towson University, Towson, Maryland.
2006-present Research Collaborator (Entomology), National Museum of Natural History, Washington, DC.
2004-2006 Research Associate (Entomology), Academy of Natural Sciences, Philadelphia.
2003-2004 Headlee Fellow, Department of Entomology, Rutgers University.
2002-2003 Bevier and University Fellow, Rutgers University
2001-2002 Teaching Assistantship, Rutgers University.
2000-2001 Graduate Assistantship, Rutgers University.
1998-2001 Teaching Assistantship, Rutgers University.

**(c) Publications**

**LaPolla, J.S**., S.G. Brady, and S.O. Shattuck. 2010. Phylogeny and taxonomy of the *Prenolepis* genus-group of ants (Hymenoptera: Formicidae). *Systematic Entomology* 35 (1): 118-131.

J. Sosa-Calvo, T.R. Schultz and **J.S. LaPolla**. 2010. A Review of the Dacetine Ants of Guyana (Formicidae: Myrmicinae). *Journal of Hymenoptera Research* 19(1): 12-43.

**LaPolla**, J.S., T. Suman, J. Sosa-Calvo, and T.R. Schultz. 2007. Leaf Litter Ant Diversity in Guyana. *Biodiversity and Conservation*: 16(2): 491-510.

**LaPolla, J.S.** and J. Sosa-Calvo. 2006. Review of the Ant Genus *Rogeria* (Hymenoptera: Formicidae) in Guyana. *Zootaxa*: 1330: 59-68.

**LaPolla, J.S.,** K.M. Kjer, T.R. Schultz and J.F. Bischoff. 2006. Phylogenetic Position of the Ant Genus *Acropyga* Roger (Hymenoptera: Formicidae) and the Evolution of Trophophoresy. *Insect Systematics and Evolution* 37(3): 197-212.

**LaPolla, J.S.** 2004. *Acropyga* (Hymenoptera: Formicidae) of the World. *Contributions of the American Entomological Institute* 33(3): 1-130.

Other significant publications:

**LaPolla, J.S.,** C.H. Cheng and B.L. Fisher. 2010. Taxonomic revision of the ant genus *Paraparatrechina* in the Afrotropical and Malagasy regions. *Zootaxa* 2387: 1-27.

**LaPolla, J.S.** 2009. Taxonomic revision of the southeast Asian ant genus *Euprenolepis*. *Zootaxa* 2046: 1-25.

**LaPolla, J.S.,** C. Burwell, S.G. Brady and D.R. Miller. 2008. A new genus and species of scale (Hemiptera: Ortheziidae) associated with *Acropyga myops* (Hymenoptera: Formicidae). *Zootaxa* 1946: 55-68.

Kjer, K.M., Z. Swigonova, **J.S. LaPolla**, and R.E. Broughton. 2007. Why Weight? *Molecular Phylogenetics and Evolution* 43: 999-1004.

**LaPolla, J.S.** and J.T. Longino. 2006. An Unusual *Brachymyrmex* from Costa Rica with implications for the phylogeny of the lasiine tribe group. *Proceedings of the Entomological Society of Washington* 108(2): 297-305.

**LaPolla, J.S.** and S.P. Cover. 2005. New species of *Pheidole* (Hymenoptera: Formicidae) from Guyana, with a list of species known from the country. *Transactions of the American Entomological Society* 131 (3): 1-11.

**(d) Synergistic Activities**

1. *The Ants of Guyana*. Collaboration with T.R. Schultz and V.A. Funk to conduct leaf-litter ant survey of Guyana. Leaf litter ants have become a model invertebrate used by conservationists of survey work and this work has resulted in modifications of standardized leaf litter ant collecting protocols.

2. *The Ants of Costa Rica*. Collaborated with J.T. Longino to create the *Acropyga* taxonomy page (http://www.evergreen.edu/ants/genera/acropyga). This includes species, illustrations, descriptions, specimen data, natural history data, and keys to all 3 castes.

**(e) Grants and Awards**

| | |
|---|---|
| $273,214 | 2009-2012. Roberts, R. and J.S. LaPolla. Improvements to the Botanical and Entomological Collections at the Towson University Biodiversity Center. National Science Foundation. |
| $500,000 | 2008- 2012. LaPolla, J.S., S.G. Brady and S.O. Shattuck. Global Monographic Revision of the Ant Genus *Paratrechina*. National Science Foundation (REVSYS). |
| $5,000 | LaPolla, J.S. 2007. *Revision of the ant genus* Paratrechina *in the Malagasy and Afrotropical Regions*. Towson University Faculty Development Grant. |
| $19,723 | LaPolla, J.S. 2006. *The ants of the Acarari Mountains: A Biodiversity Frontier*. National Geographic Society. |
| $40,000 | LaPolla, J.S. 2004-2006. Grant from Conservation International to conduct research for their Tropical Ecology, Assessment & Monitoring Initiative (TEAM) in Suriname. |
| $25,000 | LaPolla, J.S. 2003-2004. Headlee Fellowship for one year to include stipend and tuition remission |
| $23,000 | LaPolla, J.S. 2002-2003. Bevier and University Fellowship for one year to include stipend and tuition remission |
| $20,130 | LaPolla, J.S. and T.R. Schultz. 2002. *The Ants of Guyana*. Biological Diversity of the Guianas Program Grant (Smithsonian Institute, National Museum of Natural History, Washington, DC) |
| $2,500 | LaPolla, J.S. 2001. *Ernst Mayr Grant* (Harvard University-Museum of Comparative Zoology). Funding for trips to the Museum of Comparative Zoology and The Natural History Museum (London) |

**Ted R. Schultz**

SI Entomogist & Curator

## (a) Professional Preparation

| | | |
|---|---|---|
| University of California, Berkeley | Biology (Evolution and Systematics) | B.A., 1988 |
| Cornell University | Entomology | Ph.D., 1995 |

## (b) Appointments

Research Entomologist, Smithsonian Institution, 1995 to present
Chair, Department of Entomology, Smithsonian Institution, 01April 2004 to 30 Sept 2007
Adjunct Professor, Department of Entomology, University of Maryland, 2003 to present
Adjunct Professor, Department of Biology, Towson University, 2009 to present
Visiting Scholar, Department of Entomology, Rutgers University, 2002 to 2005

## (c) Grants and Publications

### (i) Selected grants:

National Science Foundation DEB Systematic Biology and Biodiversity 0949689. Submitted 9 July 2009. Feb 2010 to Jan 2013. "Phylogenetic research on the origin and evolution of agriculture in ants." PI; co-PIs: U.G. Mueller, N.J. Mehdiabadi, A. Mikheyev, C.W. Mitter. Requested: $491,781.00; awarded: $445,000

National Geographic Society Committee for Research and Exploration. 2006. "The ants of the Acarai Mountains: A biodiversity frontier" (J.S. LaPolla and T.R. Schultz, co-PIs). $19,723.

National Science Foundation Assembling the Tree of Life DEB 0431330. 2004-2009. "AToL: Collaborative research on ant phylogeny: a comprehensive evolutionary tree for the world's premiere social organisms." Co-P.I. with P.S. Ward (PI), B.L. Fisher, and S.G. Brady. $1,491,319 total ($733,178 to Smithsonian Institution).

National Science Foundation Integrated Research Challenges in Environmental Biology DEB 0110073. 2001-2007. "Evolutionary ecology of the attine ant-microbe mutualism: Experimental and molecular approaches to understanding symbiosis and coevolution." Co-P.I. with U.G. Mueller (PI) and C.R. Currie. $2,670,000 total ($744,927 to Smithsonian Institution). (One-year no-cost extension in 2007.)

### (ii) Selected publications:

**Schultz, T. R**., Meier, R. 1995. A phylogenetic analysis of the fungus-growing ants (Hymenoptera: Formicidae: Attini) based on morphological characters of the larvae. *Syst. Entomol.* 20:337-370.

**Schultz, T.R.,** R.B. Cocroft, and G.A. Churchill. 1996. The reconstruction of ancestral character character states. *Evolution* 50: 504-511.

Mueller, U.G., S.A. Rehner, and **T.R. Schultz**. 1998. The evolution of agriculture in ants. *Science* 281: 2034-2038.

**Schultz, T.R.** and G.A. Churchill. 1999. The role of subjectivity in reconstructing ancestral character states: A Bayesian approach to unknown rates, states, and transformation asymmetries. *Systematic Biology* 48: 651-664.

Agosti, D., J. Majer, L. Alonso, and **T.R. Schultz** (Editors). 2000. *Sampling Ground-dwelling Ants: Case Studies from the Worlds' Rain Forests.* Perth, Australia: Curtin School of Environmental Biology Bulletin No. 18. 75 pp.

Agosti, D., J. Majer, L. Alonso, and **T.R. Schultz** (Editors). 2000. *Ants: Standard Methods for Measuring and Monitoring Biodiversity.* Washington, D.C.: Smithsonian Institution Press. 280 pp.

Currie, C.R., B. Wong, A.E. Stuart, **T.R. Schultz**, S.A. Rehner, U.G. Mueller, G.H. Sung, J.W. Spatafora, and N.A. Straus. 2003. Ancient tripartite coevolution in the attine ant-microbe symbiosis. *Science* 299: 386-388.

**Schultz, T.R.,** U.G. Mueller, C.R. Currie, and S.A. Rehner. 2005. Reciprocal illumination: A comparison of agriculture in humans and ants. Pp. 149-190 in: *Ecological and Evolutionary Advances in Insect-Fungal Associations* (Fernando Vega and Meredith Blackwell, editors). Oxford University Press, New York.

Mueller, U.G, N.M. Gerardo, D.K. Aanen, D.L. Six, and **T.R. Schultz**. 2005. The evolution of agriculture in insects. *Annual Review of Ecology, Evolution, and Systematics* 36: 563-595.

Brady, S.G., **T.R. Schultz**, B.L. Fisher, and P.S. Ward. 2006. Evaluating alternative hypotheses for the early evolution and diversification of ants. *Proceedings of the National Academy of Sciences* 103: 18172-18177.

LaPolla, J.S., T. Suman, J. Sosa-Calvo, and **T.R. Schultz**. 2007. Leaf litter ants of Guyana. *Biodiversity and Conservation* 16: 491-510.

**Schultz, T.R.** 2007. The fungus-growing ant genus *Apterostigma* in Dominican amber. In: *Advances in Ant Systematics (Hymenoptera: Formicidae): Homage to E.O. Wilson – 50 Years of Contributions* (R.R. Snelling, B.L. Fisher, and P.S. Ward, Eds.). *Memoirs of the American Entomological Institute* 80: 425-436.

**Schultz, T.R.** and S.G. Brady. 2008. Major evolutionary transitions in ant agriculture. *Proceedings of the National Academy of Sciences* 105: 5435-5440.

Sosa-Calvo, J., **T.R. Schultz**, and J.S. LaPolla. In press. Review of Dacetini ants (Hymenoptera: Formicidae) of Guyana. *Journal of Hymenoptera Research* (in press).

**(d) Synergistic Activities**

- Editorships: Editorial Board, *Annual Review of Entomology* (2006-present); Editorial Board for *Systematics and Biodiversity* (London) (2002-present); Associate Editor, *Systematic Biology* (2001-2004).
- Web sites: Raised funds for and created: William L. Brown, Jr., Digital Library: An online database of ant taxonomic literature. http://ripley.si.edu/ent/nmnhtypedb/wlb/ and USNM Formicid Type Database. http://ripley.si.edu/ent/nmnhtypedb/public/
- Popular writing: Hoyt, Erich and T.R. Schultz (Editors). 1999. *Insect Lives: Stories of Mystery and Romance From a Hidden World.* (New York: John Wiley and Sons. Trade Edition. 2002. Harvard University Press.) "Ants, Plants, and Antibiotics." ("News and Views," 1999, *Nature* 398: 747-748.) 2000. "In search of ant ancestors." ("Commentary." *Proceedings of the National Academy of Sciences,* 2000, 26:14028-14029.) "Hyperdiversity up close." (Book review: *Pheidole in the New World* by E.O. Wilson. *Science,* 2003, 300: 57-58.)
- Museum exhibit: Core Design Team member, "Partners in Evolution: Butterflies and Plants," a new hall of coevolution at the National Museum of Natural History that opened in February 2008. (Includes fungus-growing ant exhibit.)
- Film documentaries: *Evolution: A Journey Into Where We're From and Where We're Going* (8-part televison series). Part 4. "The Evolutionary Arms Race." 2001. Written and directed by G. Willumsen. Gemini Productions Film for WGBH/NOVA Science Unit and Clear Blue Sky Productions. Broadcast on PBS, Fall 2001. *Stories From the Vaults.* Episode 4: *Beauty.*

Smithsonian Networks. Television series. Interview and lab profile (with Faridah Dahlan). Filmed on Feb. 21, 28, and March 2, 2007.

**(e) Students and Affiliations**

**(i) Graduate and Postdoctoral Advisors**

William Brown (Cornell University, deceased)

**(ii) Thesis Advisor (career) and Postgraduate-Scholar Sponsor (past five years)**

**Ph.D. students:**

Adams, R.M.M. (in progress, UT Austin), committee member
Artiss, T. (grad. 2000, Clark U.; current Lakeside School, Seattle, WA), project advisor
Johnson, S.J. (in progress, U Maryland), co-advisor
LaPolla, J.S. (grad. 2004, Rutgers U.; current Towson U.), committee member
Rabeling, CR (in progress, UT Austin), committee member
Sosa-Calvo, J. (in progress, U Maryland), major advisor
Vick, K. (grad. 2005, U. Maryland; current Shawnee State U.), committee member

**M.Sc. students:**

Sosa-Calvo, J. (2007, U. Maryland), major advisor

**Postdocs (past 5 years):**

Brady, S.G. (NSF postdoc 2003 to present, Smithsonian)
Marshall, C. (Smithsonian postdoc fellow 2001-2002, current Oregon State U.)
Mehdiabadi, N.J. (Smithsonian postdoc fellow, 2007-2008)
Miller, J.A. (Smithsonian postdoc fellow 2004-2005, current Cal Academy)
LaPolla, J.S. (Smithsonian postdoc fellow 2004-2006, current Towson U.)
Rightmyer, M. (Smithsonian postdoc fellow 2007-2009)
Solomon, S.E. (NSF postdoc 2007-2009)

**Total number advised/sponsored**: Ph.D. students, 7; M.Sc. students, 1; postdoctoral scholars, 7.

**Jeffrey Sosa-Calvo**
Graduate Student

## (a) Professional Preparation

| | | |
|---|---|---|
| Universidad del Quindio, Colombia | Biology and Environmental Education | B.S., 2002 |
| University of Maryland, Maryland | Entomology | M.Sc., 2007 |
| University of Maryland, Maryland | Entomology | PhD. Present |

## (b) Appointments

Research student, Smithsonian Institution, 2002 to present

## (c) Grants and Relevant Publications

### (i) Grants

International Union for the Study of Social Insects- North American Section Travel Grant, 2010.
Max and Vera Britton Environmental Science Award, Cosmos Club Foundation, 2010.
Smithsonian Institution-National Museum of Natural History, Small Grants Program. Co-PI. 2010.
Ernst Mayr Travel Grant, Museum of Comparative Zoology, Harvard University 2007.
Jacob K. Goldhaber Travel Award, University of Maryland 2007.
Smithsonian Institution-National Museum of Natural History, Collection Care Grant. Co-PI. 2006.
Amazon Conservation Association, Graduate Research Grant. Los Amigos Research Center and Conservation, Madre de Dios, Peru 2005.
Conservation International Rapid Assessment Program (RAP). Fellowship 2005.
Smithsonian Institution- Trust Endowment Award (Wolcott Fund). Co-PI. 2004.
Andrew W. Mellon Research Exploration Awards in Tropical Biology. STRI-OTS August 2003.
Andrew W. Mellon Foundation Award. STRI. Jul-Aug 2002.
Barro Colorado Island (BCI) Latino Scholarship. STRI. Oct 2001-Jan 2002.

### (ii) Peer-Reviewed Publications:

Sosa-Calvo, J, TR Schultz. 2010. Three remarkable new fungus-growing ant species of the genus *Myrmicocrypta*, with a reassessment of the characters that define the genus and its position within Attini. Ann. Entomol. Soc. Am., 103(2): 181-195.
Solomon, SE, UG Mueller, CT Lopes, A Rodrigues, J. Sosa-Calvo, TR Schultz (Submitted). Nesting biology and fungiculture of *Mycetagroicus cerradensis* shed light on the origins of higher attine agriculture. J. Insect Res.
Sosa-Calvo, J, TR Schultz, and JS LaPolla. 2010. Review of Dacetini (Hymenoptera: Formicidae) in Guyana. J. Hym. Res., 19(1): 12-43.
Sosa-Calvo, J, SG Brady, and TR Schultz. 2009. The gyne of the enigmatic fungus-farming ant species Mycetosoritis explicata. J. Hym. Res., 18(1): 113-120.
Azorsa, F and J Sosa-Calvo. 2008. Description of a remarkable new species of ant in the genus Daceton Perty (Formicidae: Dacetini) from South America. Zootaxa, 1749: 27-38.
Bolton, B, J Sosa-Calvo, F Fernandez, and JE Lattke. 2008. New synonyms in neotropical Myrmicine ants (Hymenoptera: Formicidae). Zootaxa, 1732: 61-64.
LaPolla, JS, T Suman, J Sosa-Calvo, and TR Schultz. 2007. Leaf litter ant diversity in Guyana. Biodivers. Conserv., 16: 491-510.

LaPolla, JS, and J Sosa-Calvo. 2006. Review of the ant genus Rogeria (Hymenoptera: Formicidae) in Guyana. Zootaxa, 1330: 59-68.

Sosa-Calvo, J, SO Shattuck, and TR Schultz. 2006. Dacetine ants of Panama: New records and description of a new species (Formicidae: Myrmicinae: Dacetini). PESW, 108(4): 814-821.

Sosa-Calvo, J and DF Campos. 2005. First record of the family Heloridae (Hymenoptera: Proctotrupoidea) for Colombia. SOCOLEN 31: 233- 234 (In Spanish).

**(iii) Book Chapters:**

Schultz, TR and Sosa-Calvo, J. 2008. Chapter 2. Ants of Southern Guyana- a preliminary report. 31-32. In: Alonso, LE et al. (Eds.) RAP Bull. Biol. Asses. 51. Conservation International.
Sosa-Calvo, J and JT Longino. 2008. Chapter 7. Subfamily Proceratiinae. In: Jimenez, E., et al. (Eds.). 219-238 p. (In Spanish)

Sosa-Calvo, J. 2007. Chapter 5. Ants of the leaf-litter of two plateaus in Eastern Suriname. 92-98. In: Alonso, L.E. and Mol, J.H. (Eds.) RAP Bull. Biol. Asses. 43. Conservation International.

**(d) Synergistic Activities**

Web sites: Collaborator for William L. Brown, Jr., Digital Library: An online database of ant taxonomic literature. http://ripley.si.edu/ent/nmnhtypedb/wlb/ and USNM Formicid Type Database. http://ripley.si.edu/ent/nmnhtypedb/public/

**(e) Collaborators & Other Affiliations, past 48 months**

**(i) Collaborators: Co-authors (past 48 months) co-editors (past 24 months)**

F. Azorsa (Universidad Mayor de San Marcos); D.F. Campos (Universidad Nacional de Colombia); B. Bolton (British Museum of Natural History, retired); S.G. Brady (Smithsonian); F. Fernandez (Universidad Nacional de Colombia); A.Y. Kawahara (University of Maryland); J.S. LaPolla (Towson U.); J.E. Lattke (MIZA-Universidad Central de Venezuela); J.T. Longino (Evergreen State University); S.O. Shattuck (CSIRO, Canberra, Australia); S.E. Solomon (Smithsonian); T.R. Schultz (Smithsonian); T. Suman (Smithsonian); W. Wcislo (Smithsonian Tropical Research Institute)

**(ii) Graduate and Postdoctoral Advisors**

Ted R. Schultz (Smithsonian) Major PhD advisor
Charles Mitter (University of Maryland) PhD Co-advisor; John LaPolla (Towson University) PhD Co-advisor; Charles Delwiche (University of Maryland) PhD Co-advisor; Daniel Gruner (University of Maryland) PhD Co-advisor; Mailee Neel (University of Maryland) MSc Co-advisor

**Jessica Ware**
Assistant Professor

**(a) Professional Preparation**
University of British Columbia: Invertebrate Zoology, Bachelor of Science, 2001
Rutgers University: Entomology, PhD, 2008
American Museum of Natural History: Insect Systematics (2008-2010)

**(b) Appointments:** Assistant Professor, Rutgers University, Newark, commencing September 1, 2010.

**(c) Publications**
1. **Ware, J. L**., Simaika, J. P., Samways, M. 2009. Biogeography and divergence estimation of the relic Cape dragonfly genus *Syncordulia*: global significance and implications for conservation. *Zootaxa*. **2216**: 22-36
2. Baskinger, G., **J. Ware**, Cornell, D., M. May, K. Kjer. 2008. A phylogenetic exploration of *Celithemis* (Odonata: Libellulidae): the pennants of North America. *Odonatologica* **37(2):** 101-109 □
3. **Ware, J. L**., Litman, J., Klass, K-D, Spearman, L. 2008. Relationships among the major lineages of Dictyoptera: the effect of outgroup selection on dictyopteran tree topology Systematic Entomology, 33:429-450
4. Ware, J. L., **Ho, S., Kjer, K. 2008. Divergence dates of libelluloid dragonflies (Odonata: Anisoptera) estimated from rRNA using paired-site substitution models. *Molecular Phylogenetics and Evolution*.** 47(1):**426-32**
5. **Ware, J. L.,** M. L. May, K.M. Kjer. 2007. Phylogeny of the higher Libelluloidea (Anisoptera: Odonata): an exploration of the most speciose superfamily of dragonflies. *Molecular Phylogenetics and Evolution* **45(1):** 289-310

*(ii) up to 5 other significant publications, whether or not related to the proposed project:*
1. **Ware, J.,** Grimaldi, D., Engel M. The Effects of Fossil Placement and Calibration on Divergence Times and Rates: An example from the Termites (Insecta: Isoptera). *Arthropod Structure and Development. Accepted November 2009; published online January 2010, doi:10.1016/j.asd.2009.11.003*
2. Nielsen, A., **Ware, J. L.,** Mahar, J., Hamilton, G. 2009. *Entomological Society of America Student Biosecurity Debate, PRO Position*. American Entomologist. September issue.
3. Janmaat, Alida F., **Ware, Jessica**, Myers, Judy. 2007. Effects of crop type on *Bacillus thuringiensis* toxicity and residual activity against *Trichoplusia ni* in greenhouses. *Journal of Applied Entomology* **131(5)**: 333-337
4. Karl M. Kjer, Frank L. Carle, Jesse Litman and **Jessica Ware**. 2006. A molecular phylogeny of Insecta. *Arthropod Systematics and Phylogeny* 64(1):35-44
5. Myers, J. H. and **Ware, J**. 2002. Setting priorities for the biological control of weeds: What to do and how to do it. In: *Proceedings, Hawaii Biological Control Workshop. Technical Report # 129*. Denslow, J. E., Hight, S.D. and Smith, C. W. (eds.) Honolulu: Pacific cooperative Studies Unit, University of Hawaii. Pp. 62-74

**(d) Synergistic Activities**

*1. Symposia organized*

a) Jessica Thomas, **Jessica Ware.** January 8, 2010. Northeastern Symposium on Evolutionary Divergence Time. Rutgers University, NJ, USA. Attendance: 17 invited speakers, 70 attendees; http://nsedt.rutgers.edu

b) Jessica Ware, Jessica Thomas and Akito Kawahara, December 12-15, 2010. When Entomologists Date, Section Symposium at the National Entomological Society of America Meeting, San Diego, California, 2010.

*2. Student mentoring:*

High School students: Wlodtek Lapkiewicz (2005-2008); Jonathan Payne (Summer 2009)
Undergraduate students:
1. George Baskinger 2004-2007 (REU student and Undergrad Honors student mentor);
2. Mary McLaughlin 2004-2007 (REU student mentor);
3. Phillip Barden 2009 (Summer REU student mentor)

**(e) Collaborators & Other Affiliations**

David Grimaldi, American Museum of Natural History
Michael Engel, University of Kansas
Sanjana Lal, Silviculture Research Division, Forestry Department, Fiji
Jerry Louton, Smithsonian Institution
Jesse Litman, Cornell University
Simon Ho, University of Sydney
Klaus Klass, State Natural History Collections Dresden, Museum of Zoology, Germany
Lauren Spearman, Towson University
Jessica Thomas, University of Canberra
Göran Sahlen, Halmstad University, Sweden
Maria Karlsson, Lund University, Sweden
Kamilla Koch, Johannes Gutenberg-University Mainz, Germany
Anne Nielsen, University of California, Davis
Joseph Mahar, Rutgers University
Michael Samways, University of Stellenbosch, South Africa
John Simaika, University of Stellenbosch, South Africa
Danielle Cornell; no longer in academia
George Baskinger; no longer in academia
Karl Kjer, Rutgers University

**Graduate Advisors and Postdoctoral Sponsors.**

Graduate Advisors: Michael May Rutgers University; Karl Kjer, Rutgers University; George Hamilton, Rutgers University; Mark McPeek, Dartmouth University

Postdoctoral Advisor: David Grimaldi, American Museum of Natural History

# FISHES - ICHTHYOLOGY

**Jonathan W. Armbruster**
**Richard P. Vari**

**Jonathan W. Armbruster**
Associate Professor and Curator of Fishes

Department of Biological Sciences, 331 Funchess
Auburn University, AL 36849
Telephone: Office: (334) 844-9261; e-mail: armbrjw@auburn.edu

**Professional Preparation**

| | | |
|---|---|---|
| University of Illinois, Ecology | Ethology, and Evolution | B.S. 1991 |
| University of Illinois, Ecology | Ethology, and Evolution | Ph.D. 1997 |
| Smithsonian Institution | Zoology | Postdoc 1997–1998 |

**Appointments**

2003-Present: Associate Professor and Curator of Fishes, Department of Biological Sciences, Auburn University, AL.

1998-2003: Assistant Professor and Curator of Fishes, Department of Biological Sciences, Auburn University, AL.

**Ten Publications Relevant to the Proposal**

Lujan, N.K. and J.W. Armbruster. 2010. Geological and hydrological history of the Guyana Shield and historical biogeography of its fishes. In Albert, J.A. and R. E. Reis, eds. Historical Biogeography of Neotropical Freshwater Fishes. Verlag Freidrich Pfeil.

Betancur-R, R. and J.W. Armbruster. 2009. Molecular clocks provide new insights into the evolutionary history of galeichthyine sea catfishes. Evolution 63:1232–1243.

Armbruster, J.W. 2008. The Genus *Peckoltia* with the Description of Two New Species and a Reanalysis of the Phylogeny of the Genera of the Hypostominae (Siluriformes: Loricariidae). Zootaxa 1822:1–76.

Armbruster J.W. and D.C. Taphorn. 2008. A new species of *Pseudancistrus* from the Río Caroni, Venezuela (Siluriformes: Loricariidae). Zootaxa 1731:33–41.

Armbruster, J.W., N.K. Lujan, and D.C. Taphorn. 2007. Four new species of *Hypancistrus* from southern Venezuela (Siluriformes: Loricariidae). Copeia 2007:62–79.

Pera, T.P. and J.W. Armbruster. 2006. Notropis amplamala, a new species of silverjaw minnow (Cypriniformes: Cyprinidae). Copeia 2006:423–430.

Reis R. E., E. H. L. Pereira, and J. W. Armbruster. 2006. Delturinae, a new loricariid catfish subfamily (Teleostei, Siluriformes), with a revision of *Delturus* and *Hemipsilichthys*. Zoological Journal of the Linnean Society 147:277-299.

Armbruster, J.W. 2005. The loricariid catfish genus *Lasiancistrus* (Siluriformes) with description of two new species. Neotropical Ichthyology 3: 549–569.

Armbruster, J. W. 2004. Phylogenetic relationships of the suckermouth armored catfishes (Loricariidae) with emphasis on the Hypostominae and the Ancistrinae. Zoological Journal of the Linnean Society 141:1-80.

Armbruster, J. W. 2003. The species of the *Hypostomus cochliodon* group (Siluriformes: Loricariidae). Zootaxa 249:1-60.

**Synergistic Activities**

1999. Loricariidae Home Page. A set of pages detailing my work on the suckermouth armored catfishes. The pages provide a key to the genera and detailed

descriptions and photographs of all genera. Some species are also described and keys are provided. The pages are accessed by scientists and aquarists the world over.
http://www.auburn.edu/academic/science_math/res_area/loricariid/fish_key/lorhome/index.html

2000. Teacher of the Year, Beta Beta Beta Honors Society, Auburn, 2000-2001.
2003. All Catfish Species Inventory Web Page. Pages that keep track of the progress of the NSF-funded All Catfish Species Inventory. http://silurus.acnatsci.org/
Associate Editor, Copeia, 2003-2006
2007. Alumni Professorship, Auburn University, 2007–2012.
2009. Board of Governors, American Society of Ichthyologists and Herpetologists, 2009-2013

**Recent Collaborators**

Arce, Mariangeles – Museum of Zoology, São Paulo; Bernard, Calvin – University of Georgetown; Betancur, Ricardo – Auburn University; Chamon, Carine – Museum of Zoology, São Paulo; De Souza, Lesley – Auburn University; Ferraris, Carl – California Academy of Science; Lopez, Hernán – Royal Ontario Museum; Lundberg, John – Academy of Natural Sciences of Philadelphia; Melo, Marcelo – Auburn University; Page, Lawrence – University of Florida; Pera, Thomas – University of Memphis; Pereira, Edson – Laboratório de Ictiologia, PUCRS, Porto Alegre, Brazil; Reis, Roberto – Laboratório de Ictiologia, PUCRS, Porto Alegre, Brazil; Sabaj, Mark – Academy of Natural Sciences of Philadelphia; Taphorn, Donald – retired; Werneke, David – Auburn University.

**Graduate Advisors And Postdoctoral Sponsors**

Burr, Brooks – Southern Illinois University, Ph.D. committee; Frazzetta, Thomas – University of Illinois, Ph.D. committee; La Berge, Wallace, – retired Illinois Natural History Survey, Ph.D. committee; Page, Lawrence – University of Florida, Ph.D. advisor; Vari, Richard – Smithsonian Institution, Posdoctoral fellow advisor.

**Graduate Students**

**Last five years – 5 Ph.D., 3 MS.**

Betancur, R., Ph.D., completed 5/2009, postdoc U. of Georgetown.; de Souza, L., Ph.D., current. ; Ferdous, S. Ph.D. current.; Lujan, N., Ph.D., completed 5/2009, postdoc Texas A. and M.; Melo, M., Ph.D., completed 7/2009; Pera, T., MS, completed 12/2004, Lawyer; Ray, C. Keith, M.S., current; Tan, Milton, Ph.D., current; Werneke, D. MS, completed 12/2004, Collection Manager, Auburn University.

**Undergraduate Students**

An average of 7 undergraduate students work for course credit in the fish collection and in lab collecting data per semester. Two, Brandon Chcockley and Leigh Tansey, have published papers based on their results.

**RICHARD P. VARI**
SI-NMNH Curator of Fishes

Department of Vertebrate Zoology, National Museum of Natural History
Smithsonian Institution; varir@si.edu; 202-633-1207

**Major Professional Interests/Areas of Expertise**
Systematics, Phylogeny and Zoogeography of freshwater tropical fishes with focus on South America and Africa; comparative osteology of Ostariophysan fishes.

**Current Position**
Research Zoologist and Curator of Fishes, September 1991-present;

**Educational history**
**Ph.D.** 1976. City University of New York-American Museum of Natural History joint program.
**BA.** 1971. New York University, University College

**Previous Professional Positions**
Chairman, Department of Vertebrate Zoology, December 2004-October 2008.
Research Zoologist and Curator, GS-14, December 1987-September 1991.
Research Zoologist and Associate Curator, GS-13, February 1984-December 1987.
Research Zoologist and Assistant Curator, GS-12, August 1982-February 1984.
Research Zoologist and Assistant Curator, GS 11, February 1980-August 1982.
Consultant. World Bank and Government of Suriname, September 1979-February 1980
Smithsonian Postdoctoral Fellow, June 1978-May 1979, Division of Fishes, National Museum of Natural History.
NATO- NSF Postdoctoral Fellow, January 1977-February 1978, Department of Zoology, British Museum (Natural History), London.
Lecturer, part-time, City University of New York, Queens and City Colleges, September 1972-July 1976
Technician, part-time, Department of Ichthyology, AMNH, September 1971-August 1972

**Publications** (for last five years involving fishes of Guiana Shield region)
Castro, R.M.C. and R.P. Vari. 2004. The South American Characiform Family Prochilodontidae (Ostariophysi: Characiformes): A Phylogenetic and Revisionary Study. *Smithsonian Contributions to Zoology.* 622: v + 1-189.
Benine, R.C., C.Z.P. Dardis, and R.P. Vari. 2004. *Tetragonopterus lemniscatus* (Characiformes: Characidae), a new species from the Corantijn River basin in Suriname. *Proceedings of the Biological Society of Washington,* 117(3):339-345
Ferraris, C.J., Jr., R.P. Vari, and S.J. Raredon. 2005. Catfishes of the Genus *Auchenipterichthys* (Osteichthyes, Siluriformes. Auchenipteridae): A Revisionary Study. *Neotropical Ichthyology*, 3(1):89-106.
Vari, R.P., Ferraris, C.J., Jr., and M.C.C. de Pinna. 2005. Neotropical Catfishes of the Subfamily Cetopsinae (Ostariophysi: Siluriformes: Cetopsidae); A Revisionary Study. *Neotropical Ichthyology*, 3(2):127-238.

Zanata, A.M. and R.P. Vari. 2005. The family Alestidae (Ostariophysi, Characiformes); A Phylogenetic Analysis of a Trans-Atlantic Clade. *Zoological Journal of the Linnean Society,* 145(1):1-144.

Vari, R.P., and C.J. Ferraris, Jr. 2006. The catfish genus *Tetranematichthys* (Siluriformes: Auchenipteridae). *Copeia* 2006(2):168-180.

Vari, R.P. and N.A. Menezes. 2007. Família Curimatidae. Pages 19-23, in *Catálogo de Peixes de Água doce do Brasil*, Buckup P. A., N. A. Menezes and M. S. Ghazzi (eds). Museu Nacional, Rio de Janiero.

Castro, R.M.C. and R.P. Vari. 2007. Família Prochilodontidae. Page 23, in *Catálogo de Peixes de Água doce do Brasil*, Buckup P. A., N. A. Menezes and M. S. Ghazzi (eds). Museu Nacional, Rio de Janiero.

de Pinna, M.C.C, C.J. Ferraris, Jr. and R.P. Vari. 2007. A phylogenetic study of the Neotropical Catfish family Cetopsidae (Osteichthyes, Ostariophysi, Siluriformes), with a New Classification. *Zoological Journal of the Linnean Society*, 150: 755-813.

Sidlauskas, B. and R.P. Vari. 2008. Phylogenetic Relationships within the South American Characiform Fish Family Anostomidae (Teleostei, Ostariophysi). *Zoological Journal of the Linnean Society.* 154:70-210.

Maldonado-Ocampo, J.A., R.P. Vari, and J. S. Usma. 2009. Checklist of the freshwater fishes of Colombia. *Biota Colombiana,* 9(2): 143-237.

de Santana, C. D. and R. P. Vari. 2009. The South American Electric Fish Genus *Platyurosternarchus* (Gymnotiformes: Apteronotidae). *Copeia*, 2009 (2): 233-244.

Vari, R.P, and C.J. Ferraris, Jr. 2009. Fishes of the Guiana Shield, pages 5-18 in Checklist of the Freshwater Fishes of the Guiana Shield (Vari, R.P., C. J. Ferraris, Jr., A. Radosavljevic, and V. A. Funk). *Bulletin of the Biological Society of Washington.* 17: i-viii + 95 pages

Vari, R.P. 2009. Families Curimatidae, Prochilodontidae, Anostomidae, Chilodontidae, Ctenoluciidae, Cetopsidae, pages 26-28, 36, in Checklist of the freshwater fishes of the Guiana Shield (Vari, R. P., C. J. Ferraris, Jr., A. Radosavljevic, and V. A. Funk). *Bulletin of the Biological Society of Washington,* 17: i-viii + 95 pages

Vari, R. P. and C. J. Ferraris, Jr. 2009. New species of *Cetopsidium* (Siluriformes, Cetopsidae, Cetopsinae) from the Rupununi region of Guyana. Neotropical Ichthyology, 7(3): 289-293.

de Santana, C. D. and R. P. Vari. In press. Electric Fishes of the Genus *Sternarchorhynchus* (Teleostei, Ostariophysi, Gymnotiformes); phylogenetic and revisionary studies. *Zoological Journal of the Linnean Society*. 481 ms pages

Sidlauskas, B.L., J. Mol, and R. P. Vari. In press. Traditional morphometric, geometric and meristic approaches to species discrimination and allometry in the *Leporinus cylindriformis* group (Characiformes: Anostomidae), with a description of a new species from Suriname. *Zoological Journal of the Linnean Society* 72 ms pages

Vari, R. P., B. Sidlauskas, and P. Y. Le Bail. In press. New species of *Cyphocharax* (Ostariophysi: Characiformes: Curimatidae) from Suriname and French Guiana and an analysis of curimatid diversity in the region. *Cybium* 30 ms pages

**Synergistic Activities** (last five years)

Editorial boards for Copeia, Brazilian Journal of Zoology, and publication series Museum de Zoologia da Universidade de Sao Paulo

Graduate Committees: George Washington University; University of Chicago; Universidad de Quindío; Universidade de Antióquia; Pontificia Universidade Católica da Rio Grande do Sul Universidade Federal do Rio Grande do Sul

Graduate student advising (limited to those engaged in studies of Neotropical fishes)

Smithsonian Postdoctoral fellows: Angela Zanata, Cristiano Moreira

Smithsonian Predoctoral fellows: David de Santana

Predoctoral students funded by FAPESP and CNPq (Brazil): Fernando Jerep, Fernando Carvalho, Aléssio Datovo

Interns: Gustavo Ballen (SI funding), Dahiana Arcila (Deep-fin funding), Patricia Pelayo (iPez funding)

Students hosted in my lab: 15-20 supported by various funding sources internal and external to SI.

# HERPETOLOGY

**Ross D. MacCulloch**
**Brice P. Noonan**

**ROSS D. MACCULLOCH**
Assistant Curator ROM

**(a) Professional Preparation**
McGill University, B.Sc., 1973
University of Regina, M.Sc., 1981

**(b) Appointments**
Assistant Curator, Royal Ontario Museum, 1982 – present.

**(c) Publications**
*(i) up to 5 publications most closely related to the proposed project:*

1. **MacCulloch, R.D.** and A. Lathrop. 2009. Herpetofauna of Mount Ayanganna, Guyana. Results of the Royal Ontario Museum Ayanganna Expedition 2000. Royal Ontario Museum Science Contributions 4: 36 pp
2. **MacCulloch, R.D.** in press. Status of Amphibian Conservation in Guyana. Chapter 8 *In* Heatwole, H., J.W. Wilkinson and C.L. Barrio-Amorós (eds.) Amphibian Biology, Volume 8B. Surrey Beatty, Australia.
3. **MacCulloch, R.D.**., A. Lathrop, R.P. Reynolds, J.C. Señaris and G.R. Schneider. 2007. Herpetofauna of Mount Roraima, Guiana shield region, northeastern South America. Herpetological Review 38: 24–30.
4. Señaris, J.C. and **R.D. MacCulloch**. 2005. Amphibians. pp. 8–23 in Hollowell, T. and R.P. Reynolds (eds.). Checklist of the Terrestrial Vertebrates of the Guiana Shield. Bulletin of the Biological Society of Washington 13.
5. **MacCulloch, R.D.** and A. Lathrop. 2005. Hylid frogs from Mount Ayanganna, Guyana: new species, redescriptions and distributional records. Phyllomedusa 4: 17–37.

*(ii) up to 5 other significant publications, whether or not related to the proposed project:*

1. **MacCulloch, R.D.**, A. Lathrop, P.J.R. Kok, R. Ernst and M. Kalamandeen. 2009. The genus *Oxyrhopus* (Serpentes: Dipsadidae: Xenodontinae) in Guyana: morphology, distributions and comments on taxonomy. Papéis Avulsos de Zoologia 49 (36): 487–495.
2. **MacCulloch, R.D.**, A. Lathrop, P.J.R. Kok, L.R. Minter, S.Z. Khan and C.L. Barrio-Amorós. 2008. A new species of *Adelophryne* (Anura: Eleutherodactylidae) from Guyana, with additional data on *Adelophryne gutturosa.* Zootaxa 1884: 36–50.
3. **MacCulloch, R.D.**, A. Lathrop, L.R. Minter and S.Z. Khan. 2008. *Otophryne* (Microhylidae) from the highlands of Guyana: redescriptions, vocalisations, tadpoles and new distributions. Papéis Avulsos de Zoologia 48: 247-261.
4. **MacCulloch, R.D.**, A. Lathrop and S.Z. Khan. 2006. Exceptional diversity of *Stefania* (Anura: Cryptobatrachidae) II: six species from Mount Wokomung, Guyana. Phyllomedusa 5: 31–41.
5. **MacCulloch, R.D.** and A. Lathrop. 2002. Exceptional diversity of the genus *Stefania* (Anura: Hylidae) on Mount Ayanganna, Guyana; three new species and new distributional records. Herpetologica 58: 327–346.

**(d) Synergistic Activities**

*Symposium participation*

a) 2007 International Conference on the Status of Biological Sciences in Caribbean and Latin American Societies, University of Guyana (Keynote Speaker).
b) 2003 IUCN South American Amphibian Status Workshop, Belo Horizonte, Brazil
c) 2002 IUCN Guiana Shield Priority Workshop, Paramaribo, Suriname.

**(e) Collaborators & Other Affiliations**

Biodiversity of the Guiana Shield Program, Smithsonian Institution
Centre for the Study of Biological Diversity, University of Guyana
Robert Reynolds, Smithsonian Institution
C.J. Cole, American Museum of Natural History, New York
Philippe Kok, Institut Royal des Sciences Naturelles, Belgium

**Academic Advisors**

J. Roger Bider, McGill University
Diane M. Secoy, University of Regina

**Interest in the Herpetofauna of the Guiana Shield:**

I have been conducting specimen-based research on the amphibians and reptiles of the Guiana Shield since 1990. During this time I have conducted 7 trips to Guyana, concentrating on the highlands of the Pakaraima Mountains in western Guyana. This region is an area of high endemism, and is considered a biodiversity "hotspot".

So far, efforts have been focused on determining the faunal composition of the diverse habitats of the area, including the highest mountains in the region. High endemism, restricted distributions and the presence of cryptic species are the problems that are faced by biodiversity researchers in the Guiana Shield.

The next step in the study of this biodiversity is to coordinate locality and distribution data for several important faunal groups, to identify those locations needing further investigation, and locations worthy of increased conservation efforts.

The Biodiversity of the Guiana Shield Program acts as coordinating body to facilitate collaboration among researchers and fieldworkers who study the biodiversity of the region. The Program has already accomplished much, and is uniquely positioned to further the research into the biodiversity of this important part of the earth.

**BRICE P. NOONAN**
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**(a) Professional Preparation**

| | | |
|---|---|---|
| University of Florida | Zoology | B.S., 1996 |
| University of Texas at Arlington | Biology | M.S., 1998 |
| University of Texas at Arlington | Quantitative Biology | Ph.D., 2004 |
| Brigham Young University | Biology (Post-doc) | 2004–2006 |
| Duke University | Biology (Post-doc) | 2006–2007 |

**(b) Appointments**

2008 Present **Assistant Professor**, Department of Biology, University of Mississippi.

2006 – 2007 **Postdoctoral Fellow**, Department of Biology, Duke University, Durham, North Carolina (Lab of Anne Yoder. Project: Testing the role of historical geology and rivers for shaping the distribution of land vertebrate biodiversity in western Madagascar).

2004 – 2006 **Postdoctoral Fellow**, Department of Integrative Biology, Brigham Young University, Provo, Utah (Lab of Jack Sites. Project: Deep Scaly, Tree of Life).

2002 – 2004 **Research Assistant**, Department of Biology, University of Texas at Arlington, Arlington, Texas (Lab of Jeremy Marshall. Project: Population genetics of *Allonemobius*).

1996 – 2002 **Teaching Assistant**, Department of Biology, University of Texas at Arlington, Arlington, Texas.

**(c) Publications:** Five publications most closely related to proposed project:

**Noonan, B.P.** and Comeault, A.A. 2009. The role of predator selection on polymorphic aposematic poison-frogs. *Biology Letters* 5(1): 51-54.

**Noonan, B.P**. & A.D. Yoder. 2009. Anonymous nuclear markers for Malagasy plated lizards (*Zonosaurus*). *Molecular Ecology Resources* 9(1): 402-404.

**Noonan, B. P.** and P. Gaucher. 2006. Genetic diversity, population structure and the origin of variation in the Dyeing Poison Frog: *Dendrobates tinctorius* (Anura: Dendrobatidae). *Molecular Ecology*, 15(14): 4425–4435.

**Noonan, B. P.** and K. P. Wray. 2006. Neotropical diversification: The effects of a complex history on diversity within the poison frog genus *Dendrobates*. *Journal of Biogeography* 33: 1007–1020.

**Noonan, B.P.** and P. Gaucher. 2005. Phylogeography and demography of Guianan harlequin toads (*Atelopus*): Diversification within a refuge. *Molecular Ecology* 14(10): 3017–3031.

Five other significant publications:

**Noonan, B. P.** and Sites, J. W. Jr. 2010. Tracing the origins of iguanid lizards and boine snakes of the Pacific. *American Naturalist* 175: 61-72.

Fouquet, A., V. Dubut, R.A. Hataway, A. Gilles, C. Scotti-Aaintagne, I. Scotti, & **B.P. Noonan**. 2009. Isolation and characterization of 19 microsatellite loci from the Amazonian *Adenomera andreae* (Amphibia: Anura: Leptodactylidae). *Conservation Genetics Resources* 1: 217-220.

Raselimanana, A.P., **B.P. Noonan**, K.P., Karanth, J. Gauthier, & A.D. Yoder. 2009. Phylogeny and evolution of Malagasy plated lizards. *Molecular Phylogenetics and Evolution* 50: 336-344.

**Noonan, B. P.** and P. T. Chippindale. 2006. Vicariant origin of Malagasy reptiles supports Late Cretaceous Antarctic landbridge. *American Naturalist* 168: 730–741.

**Noonan, B.P.** and P.T. Chippindale. 2006. Dispersal and vicariance: The complex evolutionary history of boid snakes. *Molecular Phylogenetics and Evolution*, 40: 347–358.

**(d) Synergistic Activities**

1. *Creation of BioGuiana network facilitating biological research in the Guiana Shield*. BPN has established an online resource for biologists working in northeastern South America (http://www.bbioguiana.org). This network provides resources to the scientific community with the aim of facilitating multinational research and greater involvement of local scientists. Additionally, BPN has created a Google Group for this network with which researchers may share information (e.g. logistics, permits) and make requests to the community (e.g. samples or other information).
2. *Facilitation of Graduate Student Research in the Guianas.* BPN has directly supported and facilitated the travel and research of three graduate students working on reptiles and amphibians (K. Wray, FSU), birds (B. O'Shea, LSU), and parasites (D. Zamparo, U. Toronto) in the Guianas. The products of this fieldwork have served as the foundation for both Wray's and O'Shea's Ph.D. project proposals, and have added a new biogeographic region to the study of Zamparo.
3. *Incorporation of undergraduates and minorities in the study of Guianan biodiversity*. From Aug. 2004 to present, BPN has mentored six undergraduate students (three of which are members of underrepresented groups) who undertook research projects focusing on questions of Guianan and Malagasy biodiversity and biogeography. These students traveled to the meetings (e.g. SSE/SSB) and presented the results of their research. One (a Native Alaskan) also traveled to Venezuela and presented his work to the 1st International Congress on the Biodiversity of the Guianas
4. *Integration of local students and governmental officials*. BPN has worked extensively with representatives of Mission pour la creation du Parc de la Guyane in order to incorporate biogeographic information into conservation strategies for French Guiana. BPN has also supported undergraduates from the University of Guyana who have accompanied him into the field and been trained in the methodology of collecting and preserving herpetological specimens and their associated parasites. Additionally, BPN has worked extensively in the laboratory with Malagasy students, including them in the more technical aspects of their individual research projects on biodiversity in Madagascar.

**(e) Collaborators & Other Affiliations**

**(a) Collaborators/Co-authors (last four years)**

Todd, Castoe, University of Central Florida; Brian Fisher, California Academy of Sciences; Philippe Gaucher, Centre National de la Recherche Scientifique; Philippe Kok, Royal Belgian Institute of Natural Sciences; Stefan Lötters, University of Mainx; Jennifer Pramuk, Bronx Zoo; Kenny Wray, Florida State University; Jack W. Sites Jr., Brigham Young University; Anne Yoder, Duke University; David Weisrock, University of Kentucky; Stephen Goodman, Field Museum; Christopher Raxworthy, American Museum of Natural History; Miguel Vences, Technical University of Braunschweig; David Reed, University of Mississippi; Antoine Fouquet, Canterbury University; Achille Raseliminana, Université d'Antananarivo; Hery Rakotondravony, Université d'Antananarivo.

**(b) Graduate and Postdoctoral Advisors**

Anne D. Yoder, Duke University
Jack W. Sites, Brigham Young University
Paul T. Chippindale, University of Texas at Arlington
Jonathan A. Campbell, University of Texas at Arlington

# MAMMALS

Mark Engstrom
Burton Lim

**Burton Lim**
Assistant Curator, ROM

**(a) Professional Preparation**

University of Toronto: Zoology, Bachelor of Science, 1984
York University: Biology, Master of Science, 1996
University of Toronto: Ecology and Evolutionary Biology, PhD, 2007

**(b) Appointments**

Research Assistant, Royal Ontario Museum, Toronto, 1984-1986
Assistant Curator, Royal Ontario Museum, Toronto, 1986 to present

**(c) Publications**

*(i) up to 5 publications most closely related to the proposed project:*

1. **Lim, B.K.** 2011 (accepted). Biogeography of mammals from the Guianas of South America. In *Bones, clones, and biomes: an 80-million year history of modern Neotropical mammals* (Patterson, B.D., and L.P. Costa, eds.). The University of Chicago Press.
2. **Lim, B.K.** 2008. Historical biogeography of New World emballonurid bats (Tribe Diclidurini): taxon pulse diversification. *Journal of Biogeography*, **35**:1385-1401.
3. **Lim, B.K.,** M.D. Engstrom, J.C. Patton, and J.W. Bickham. 2008. Systematic review of small fruit-eating bats (*Artibeus*) from the Guianas, and a re-evaluation of *A. glaucus bogotensis*. *Acta Chiropterologica*, **10**:243–256.
4. Clare, E.L., **B.K. Lim**, M.D. Engstrom, J.L. Eger, and P.D.N. Hebert. 2007. DNA barcoding of Neotropical bats: species identification and discovery within Guyana. *Molecular Ecology Notes*, **7**:184–190.
5. **Lim, B.K.,** A.T. Peterson, and M.D. Engstrom. 2002. Robustness of ecological niche modeling algorithms for mammals in Guyana. *Biodiversity and Conservation*, **11**: 1237-1246.

*(ii) up to 5 other significant publications, whether or not related to the proposed project:*

1. **Lim, B.K.,** M.D. Engstrom, J.C. Patton, and J.W. Bickham. 2010. Molecular phylogenetics of Reig's short-tailed opossum (Monodelphis reigi) and its distributional range extension into Guyana. *Mammalian Biology*, **75** (in press).
2. **Lim, B.K.** 2009. Review of the origins and biogeography of bats in South America. *Chiroptera Neotropical*, **15 (1)**: 391-410.
3. **Lim, B.K.** 2009. Environmental assessment at the Bakhuis bauxite concession: small-sized mammal diversity and abundance in the lowland humid forests of Suriname. *The Open Biology Journal*, **2**:42–53.
4. **Lim, B.K.,** M.D. Engstrom, J.W. Bickham, and J.C. Patton. 2008. Molecular phylogeny of New World emballonurid bats (Tribe Diclidurini) based on loci from the four genetic transmission systems in mammals. *Biological Journal of the Linnean Society*, **93**:189-209.
5. **Lim, B.K.** 2007. Divergence times and origin of neotropical sheath-tailed bats (Tribe Diclidurini) in South America. *Molecular Phylogenetics and Evolution*, **45**:777-791.

**(d) Synergistic Activities**

1. Guest Editor for a special issue on "DNA Barcoding of Mammals" in The Open Zoology Journal with expected publication in 2010. Based on a symposium at the 10th International Mammalogical Congress in Mendoza, Argentina during August 2009.
2. Exhibit Curator for the Bat Cave renovation project at the Royal Ontario Museum, which opened to the public on 27 February 2010.
3. Developed curricula and taught courses on "Small Mammal Survey Methods" for a ranger training program at Iwokrama Forest, Guyana and for a Conservation International Rapid Assessment Program (RAP) survey of the Kanuku Mountains, Guyana.
4. Wrote and developed a mammal fieldguide for educational purposes in conjunction with an Amerindian organization, the North Rupununi District Development Board in Guyana. It is available on the Internet (www.iwokrama.org/mammals/index.html) as an interactive guide, downloadable for free, and also can be purchased as a printed fieldguide.

**(e) Collaborators & Other Affiliations**

Mark Engstrom and Judith Eger, Royal Ontario Museum
John Bickham and John Patton, Purdue University
Paul Hebert and Alex Borisenko, University of Guelph
Renato Gregorin, Universidade Federal de Lavras, Minas Gerais, Brazil
Town Peterson, University of Kansas
Brock Fenton, University of Western Ontario
Nancy Simmons and Rob Voss, American Museum of Natural History
Hugh Genoways, University of Nebraska
Francois Catzeflis, Université de Montpellier, France

**Graduate Advisors and Postdoctoral Sponsors.**

Graduate Advisors:
Mark Engstrom, Royal Ontario Museum
Brock Fenton, University of Western Ontario