

Valerie C. Clark, Ph.D.
National Geographic Grantee
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POST –DOCTORAL EXPERIENCE

- 2011-2012: Laboratory of Prof. Ryan Van Wagoner and Chris Ireland, Department of Medicinal Chemistry, University of Utah, Salt Lake City, UT 84112

POST GRADUATE STUDIES

- 2008- 2011: Ph.D. dissertation completed in the Laboratory of Prof. Chris Shaw, School of Pharmacy, Queen's University in Belfast, Northern Ireland, UK (graduated July 7, 2011)
- January 2008: M.Sc. awarded in Chemical Biology (Department of Chemistry & Chemical Biology, Cornell University, Ithaca, NY; sponsored by Prof. Jerrold Meinwald)
- May 2004: M.A. awarded in Organic Chemistry (Department of Chemistry, Columbia University; sponsored by Prof. Koji Nakanishi)
- Summer 2003: Visiting scientist at Columbia University's Biosphere 2 Center's Chemistry Unit, sponsored by Professors Koji Nakanishi and Jerrold Meinwald
- Summer 2002: Internship with John W. Daly, PhD, at the National Institutes of Health (NIH)

UNDERGRADUATE STUDIES

1997- May 2002 University of Florida (UF), Gainesville; graduated with Highest Honors B.S. degree in Zoology & B.S. degree in Chemistry with Biochemistry option

RESEARCH AND OTHER PROFESSIONAL INTERESTS

- Chemical Ecology, 'chemical biology', biosynthetic enzymes.
- NMR spectroscopy and Mass Spectrometry. Isolation, structure elucidation, pharmacology, and physiological functions of secondary metabolites and peptides.
- Anuran diet/toxin sources and other arthropod-amphibian interactions.
- Herpetology, Entomology, Ecology, Evolution and Conservation Biology.
- Field work with a geographic focus on Madagascar and the Guiana Shield.
- Photography (published and in exhibitions). Popular writing (blogs, freelance).

PUBLICATIONS

- König, E., V. C. Clark, C. Shaw and O. R. P. Bininda-Emonds. **2012**. Molecular cloning of skin peptide precursor-encoding cDNAs from tibial gland secretion of the Giant Monkey Frog, *Phyllomedusa bicolor* (Hylidae, Anura). *Peptides*, 38: 371-376.
- Clark, V. C., L. Harinantenaina, M. Zeller, W. Ronto, J. Rocca, A. T. Dossey, D. Rakotondravony, D. G. I. Kingston and C. Shaw. (Publication Date Web: January 30, 2012, Article). "An Endogenous Bile Acid and Diet-Sequestered Sucrose from Skin Secretions of Alkaloid-Sequestering Poison Frogs." *J. Nat. Prod.*, **75**(3): 473-478.
- Clark, V. C. **2010**. Collecting arthropod and amphibian secretions for chemical analyses. Behavioral and Chemical Ecology W. Zhang and H. Liu. New York, Nova Science Publishers, Inc.: 1-46.
- Means, D. B., Duellman, W. E., and V. C. Clark. **2008**. Ovipositing behavior of the egg-brooding frog *Stefania ayangannae* (Anura, Hemiphraetidae). *Phyllomedusa*. 7(2): 143-8.
- Soriano, E. V., V. C. Clark and S. E. Ealick. **2007**. Structures of human deoxycytidine kinase product complexes. *Acta Crystallographica* **D63**: 1201-1207.

- Clark, V. C.*, V. Rakotmalala, O. Ramilijoana, L. Abrell and B. L. Fisher. **2006**. Individual variation in alkaloid content of poison frogs of Madagascar (*Mantella*; Mantellidae). *Journal of Chemical Ecology*. **32**: 2219-2233.
- Clark, V. C.*, C. J. Raxworthy, V. Rakotomalala, P. Sierwald, and B. L. Fisher. **2005**. Convergent evolution of chemical defense in poison frogs and arthropod prey between Madagascar and the Neotropics. *Proc. Natl. Acad. Sci. USA* **102**:11617-11622.
- Daly, J. W.*, H. M. Garraffo, T. F. Spande, V. C. Clark, J. Ma, H. Ziffer and J. F. Cover Jr. **2003**. Evidence for an enantioselective pumiliotoxin 7-hydroxylase in dendrobatid poison frogs of the genus *Dendrobates*. *Proc. Natl. Acad. Sci. USA* **100**: 11092-11097.
- Clark, V. C. **2001**. “*Rana heckscheri*—Ectoparasites.” Natural History Notes. *Herpetological Review* **32**(1): 36.
- Clark, V. C. **1998**. Frog Skin Secretions. *Reptile Hobbyist*. **3**(5): 78-82.
- Thesis: Undergraduate---Clark, V. C. **2002**. The effects of submerged vegetation density, water depth, and substrate on argulid parasite abundance on *Rana heckscheri* tadpoles. University of Florida, Gainesville on microfiche.

Acknowledgements in Papers (partial list)

- Daly, J. W., T. F. Spande and H. M. Garraffo. **2005**. Alkaloids from amphibian skin: a tabulation of over eight-hundred compounds. *J. Nat. Prod.* **68**(10): 1556-1575.
- Daly, J. W., T. Kaneko, et al. **2002**. Bioactive alkaloids of frog skin: Combinatorial bioprospecting reveals that pumiliotoxins have an arthropod source. *PNAS USA* **99**(22): 13996-14001.
- Hutchinson, D. A., A. Mori, A. H. Savitzky, G. M. Burghardt, et al. **2007**. The dietary sequestration of defensive steroids in nuchal glands of the Asian snake *Rhabdophis tigrinus*. *Proc. Natl. Acad. Sci. USA* **104**(7): 2265-2270.

SCHOLARSHIPS, STUDENTSHIPS, FUNDING/GRANTS

- | | |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2011 | American Society of Pharmacognosy, Student Research Award consisting of engraved plaque and travel funds to attend annual meeting (San Diego, CA, USA) |
| 2010 | Queen’s University in Belfast Emily Sarah Montgomery Travel Scholarship to present plenary lecture at Zoology Congress in Montevideo, Uruguay (£650) |
| 2009 | International Society of Chemical Ecology Student travel award (\$400 to defray costs to present at annual meeting in Neuchatel, Switzerland + award of 2010 membership fees) |
| 2009-2010: | National Geographic Society Committee for Research and Exploration grant for salamander fieldwork in California, USA (\$8,298 to Clark as PI) |
| 2008-2011 | Post graduate student fellowship including all fees and student stipend, School of Pharmacy, Queen’s University in Belfast, Northern Ireland, UK |
| 2007-2008 | National Geographic Society Committee for Research and Exploration grants for fieldwork in Madagascar (\$24,895 to Clark as PI) |
| 2006 | Cornell Univ. Graduate School Conference Grant (\$650 to defray costs to present at International Society of Chemical Ecology meeting in Barcelona, Spain) |
| 2005-6 | Teaching Assistant, Department of Chemistry & Chem. Biology, Cornell Univ. |
| 2003-2005 | Teaching Assistant, Department of Chemistry, Columbia University, NYC |
| 2003 | Biosphere 2 Chemistry Unit Summer Stipend from Columbia University (\$4,900) |
| 2003 | Allocation of CJ Raxworthy’s NSF BSI funds for Madagascar fieldwork (\$9,000) |
| 2002 | International House (NYC) Resident Scholarship (\$1,000/semester) |
| 2002 | NIH Summer Student Program (\$10,000) |

- 2001 International Center Tropical Ecology Scholarship, Summer Study Abroad (\$1K)
 1997-2001 John Hopkins Univ. Applied Physics Laboratory Scholarship (½ tuition & fees)
 1997-2001 Honors UF Out of State student scholarship, four year value \$10,000

SERVICE FOR PEER REVIEW

National Geographic Society grants, PLoS ONE, Journal of Natural Products, and SpringerPlus

HONORS, HONORARY SOCIETIES AND ELECTED OFFICES

- Papers and expeditions led by Clark *et al.* (see publications list above) sparked global press and media coverage, including articles in *Chemical & Engineering News*, *Science NOW*, *National Geographic Society* outlets (magazine, radio, TV, online news, KIDS), *New York Times*, *Science Times*, *Scientific American*, *Chemistry World* (Royal Society UK), *London Telegraph*, *San Francisco Chronicle*, Bloomberg News, National Public Radio, PBS, BBC Leading Edge Radio Program, The Today Show, and science magazines and newspapers worldwide.
- 2011 2011 Student Research Award from the American Society of Pharmacognosy
- 2002 Elected Sigma Xi member (by University of Florida Chapter)
- 2002 B.S. with Highest Honors in Zoology and (Bio)chemistry at the Univ. of Florida
- 2001 Elected Golden Key National Honor Society member
- 1997-2002 University of Florida Honors Program
- 1997 State of Maryland Distinguished Scholar Certificate Award, Honorable Mention

PRESENTATIONS

1. 2012: ‘**Exploring the Diversity and Ecology of Amphibian Skin Chemicals**’ invited lectures delivered at:
 - A. Chemistry Seminar series, Florida Atlantic University, Boca Raton, FL, USA (November)
 - B. Central Florida Herpetological Society monthly meeting in Orlando, FL, USA (August),
 - C. A.Watson Armour III Seminar Series at the Field Museum of Natural History, Chicago, Illinois, USA (June 13, 2012),
 - D. Iowa State University, at El Zota Biological Station, COSTA RICA (May field course),
 - E. Plenary lecture at Herpetos Venenosos Meeting, Valencia, SPAIN (March 24, 2012),
 - F. Integrative Biology, University of Texas at Austin, TX, USA (February 27, 2012),
 - G. New Mexico Herpetological Society, Albuquerque, NM, USA (February 25, 2012),
 - H. Biology, Brigham Young University, Provo, Utah, USA (February 10, 2012).
2. July 2011: Invited oral for ‘Student Research Award’ at annual meeting of the American Society of Pharmacognosy in San Diego, California, USA. ‘**A novel endogenous bile acid in bittersweet poison frog skin may explain dietary alkaloid sequestration.**’
2. May 2011: Invited seminar, School of Natural Sciences, National University Ireland Galway, IRELAND. ‘**Exploring the diversity and ecology of amphibian skin chemicals.**’
3. April 2011: Wild Evolution Group Seminar, Biological Sciences, University of Edinburgh, SCOTLAND, UK. ‘**Exploring the diversity and ecology of amphibian skin chemicals.**’
4. April 2011: Student oral at British Ecology Society Tropical Ecology Group annual meeting in Newcastle, ENGLAND, UK. ‘**Tropical poison frogs in degraded Madagascar rainforests have fewer defensive skin chemicals than those from intact habitats.**’
5. January 2011: Invited Seminar, Chemistry Department, Florida Institute of Technology, Melbourne, FL, USA. ‘**Exploring the diversity and ecology of amphibian skin chemicals.**’
6. December 2010: *Invited plenary lecture*, Congreso Uruguayo de Zoología, Montevideo, URUGUAY. ‘**Exploring the diversity and ecology of amphibian skin chemicals.**’

7. July 2010: *Invited plenary lecture*, Lough Boora Community Center, County Offaly, IRELAND. ‘**Exploring the biomedical potential of amphibian skin secretions.**’
8. December 2009: *Invited lecture* at National Geographic Head Quarters in Washington, DC.
9. July 2009: Paper—25th Annual Meeting of the International Society of Chemical Ecology, Neuchatel, SWITZERLAND. ‘**New approach to study poison frog secretions reveals novel frog skin chemistry.**’
10. June 2008: Poster—Association for Tropical Biology & Conservation 2008 annual meeting, SURINAME—“A tribute to John W. Daly, the pioneer of frog chemistry.”
‘**The ecology and evolution of chemical defense in poison frogs and their dietary arthropods.**’
Variations of this lecture were presented to audiences detailed in 11-16 below
11. December 2007: *Invited lecture* and demonstrations, presented to MacArthur fellows and founder of Google, at Ranomafana National Park, MADAGASCAR.
12. October 2007: *Invited lecture* at National Geographic Head Quarters in Washington, DC.
13. July 2007: *Invited plenary lecture* at joint meeting of the Society of Colombian Entomologists (SOCOLEN)/Florida Entomological Society in Cartagena, COLOMBIA.
14. July 2006: Paper-- 22nd Annual Meeting of the International Society of Chemical Ecology, Barcelona, SPAIN.
15. June 2006: Cornell Chemistry Graduate Student Summer Seminar series. NY, USA
16. Dec. 2005: *Invited lecture*-- Cornell Herpetological Society, Ithaca, NY, USA
17. August 2002: Poster (w/ John W. Daly, PhD)—NIH Summer Student Poster Day—‘**Profiles of Biologically Active Alkaloids from Dendrobatid Poison Frogs**’ Bethesda, MD, USA.
18. April 2002: Paper--Zoology Undergraduate Research Symposium—‘**The effects of submerged vegetation density, water depth, and substrate on argulid parasite abundance on *Rana heckscheri* tadpoles.**’ Gainesville, FL, USA
19. March 2002: Paper—The 25th Annual All Florida Herpetology Conference— ‘**Ecological factors on argulid parasitism of *Rana heckscheri* tadpoles.**’ Gainesville, FL, USA.

TEACHING EXPERIENCE

1. 2012 Spring: Tropical Field Biology Course in Costa Rica (Prof. Jill Pruetz, Iowa State Univ)
2. 2008 Fall: TA for Statistics, Queen’s University in Belfast
3. 2006 Fall: TA for Organic Chemistry Laboratory (Cornell Univ. Chem 251)
4. 2006 Spring: TA/guest lecturer, World Of Chemistry, Prof. Roald Hoffmann (CU Chem 106)
5. 2005 Fall: Gave invited lectures and other voluntary assistance to Chem 105, the Language of Chemistry (Chemical Ecology oriented), for Prof. Jerrold Meinwald (Cornell University)
6. 2005 Fall: TA for General Chemistry Laboratory (Cornell University Chem 207)
7. 2004 Fall: TA for Organic Chemistry Lecture Recitations (Columbia University)
8. 2003 Fall: TA for Organic Chemistry Laboratory (Columbia University)
9. 2000-2: Tutored extensively for Prof. Steven Benner’s Biochemistry (CHM 4207, U Florida)
10. 2002 Spring: TA for Prof. Ron Wolff’s Biophotography PGY 5246 (Univ. of Florida)

FOREIGN LANGUAGES

Reading, writing, and basic speaking competence in Spanish; fluent French; kely Malagasy.

OTHER CERTIFICATIONS/TALENTS

SCUBA certified (1997) with over 400 dives (Florida, Belize, Madagascar, Mexico, Spain).

MEMBERSHIP IN SCIENTIFIC ORGANIZATIONS

Sigma Xi (elected in 2002)
 American Association for the Advancement of Science (AAAS)
 American Chemical Society (ACS)
 American Society of Pharmacognosy (ASP, beginning June 2011)
 Association for Tropical Biology and Conservation (ATBC)
 Florida Entomological Society (FES)
 International Society of Chemical Ecology (ISCE)
 Society for the Study of Amphibians and Reptiles (SSAR)

VOLUNTEER EXPERIENCE**A. Zoological Parks, Aquaria:**

2002 Weekend internship at the National Aquarium in Baltimore (Jack Cover, Jr.)
 1996 Worked primarily with anurans at the Baltimore Zoo Reptile House (Anthony Wisnieski), Maryland

B. Museum related:

2002-3 Herpetology Department, American Museum of Natural History for research with *Mantella* frogs (supervised by Dr. Christopher Raxworthy)
 2001-2 Rhinoceros dig in Newberry, FL for Florida Museum of Natural History, headed by Prof. Richard Hurlbert, University of Florida, Gainesville, FL
 2000-2 Occasional volunteer in Herpetology collections at the Florida Museum of Natural History (under Prof. Max A. Nickerson, Curator), Univ. of Florida

C. Editorial related:

2000 Edited, created chapter summaries, and added figures and paragraphs of text to Dr. Steven A. Benner's "Post-Genomic Biochemistry" textbook, used in CHM 4207 at UF and other institutions (acknowledged within)

D. Mentoring related:

2007-12 Mentored undergraduate William Ronto during fieldwork in Madagascar and throughout the publication process to result in a co-authored publication
 2006-7 Mentored High School student Amanda Epstein, Science Research Program, North Shore High School, NY, USA (now at Juniata College)
 2006 Raised funds selling photographs to send student Valérie Rakotomalala to English courses in Madagascar—the following year she began research in CA, USA
 2004-5 Founding member and webmaster of Women In Science at Columbia (WISC)
 2003 Achieved permanent job placement for Malagasy student Valérie Rakotomalala

FIELD EXPERIENCE

2012 May: focus on frogs and arthropods with Collection and Research Permits to work in El Zota Biological Station, Tortuguero Province, NE COSTA RICA
 2011 July: 10 days in Italy with Franco Andreone and Marcos Zuffi

- 2010 December: Uruguay expedition studying amphibians and arthropod prey with Prof. Raúl Manyero of the Universidad de la Republica URUGUAY
- 2010 July-August: studies of common frog in midland IRELAND (Brandon Ballengée)
- 2009 January: NGS-sponsored expedition throughout California, USA to study the chemical ecology of the *Ensatina* species complex of salamanders
- 2007-8 Led 4-month expedition sponsored by the National Geographic Society to NW and SE MADAGASCAR to study diet and chemistry of leaf litter frogs.
- 2007 July: One month expedition to Wokomung Massif, GUYANA, South America with D. Bruce Means to find new species of toxic frogs on a remote tepui summit
- 2003 Led 3-month expedition to SE rainforests of MADAGASCAR, including Ranomafana National Park and areas south to Tolongoina; these studies focused on the ecology and chemistry of arthropods and Mantellinae frogs
- 1999-2002 Senior thesis project on *Rana heckscheri* tadpoles and their argulid parasites at borrow pits near I-10 in Osceola National Forest, Florida, USA
- 2001-2 Independent photographic study of the alligators of Alachua Sink, Paynes Prairie State Reserve, Gainesville, Florida, USA
- 2001 August: one week at BFREE (Belize Foundation for Research and Environmental Education) research station of Jacob Marlin, on Bladen River, BELIZE
- 2001 June-August: Yucatan, Mexico Ecology class—Six 3 day field trips
- 2001 May-June: Salamander sampling protocol survey, Great Smoky Mountains, TN
- 2001 April: Three days with UF Herpetology class in Apalachicola, Florida, USA
- 2000 August: One week with Prof. Max Nickerson in the Great Smoky Mountains National Park (TN and NC, USA) monitoring cryptobranchid populations on an USGS project (timed snorkeling and scooping surveys)

LABORATORY EXPERIENCE

- 2009-10 Thermo Orbitrap Mass Spectrometers, *de novo* sequencing of tryptic peptide fragments (Volunteer, J. Busby Laboratory, Scripps, Florida, USA)
- 2008-11 HPLC, FPLC, MALDI-TOF, pharmacology, cloning and sequencing of peptides from amphibian skin secretions (Prof. Chris Shaw, School of Pharmacy, QUB)
- 2006-7 Chemical Ecology, Natural Products Chemistry, GC-MS, and NMR (Prof. Jerrold Meinwald, Cornell Univ. Dept. of Chemistry & Chemical Biology)
- 2005-6 Fourier Transform Mass Spectrometry (F. McLafferty Lab, Cornell Chemistry)
- 2005 X-ray crystallographic studies of deoxycytidine kinase complexes, protein expression, purification, and crystallization (S. Ealick Lab, Cornell Chemistry)
- 2004-5 Isolation of gram quantities of ginkgolides for pharmacological studies, kinetics of A2E formation (Prof. Koji Nakanishi, Columbia Chemistry)
- 2003-5 GC-MS of alkaloids in *Mantella* frogs and arthropod prey, Nakanishi Laboratory, Biosphere 2 Chemistry Unit in Arizona and Columbia University Chemistry Dept.
- 2002 May-August—Chemist/Biologist internship, NIH Summer Student Program under John W. Daly, PhD, Section on Pharmacodynamics, Laboratory of Bioorganic Chemistry, NIH, Bethesda, Maryland
- 2000 Organic Synthesis in Prof. Steven Benner's Biochemistry group (UF) with Dr. Kevin Devine. Non-standard nucleotides project, uridine derivative synthesis.

Professional References available upon request