

VALERIE C. CLARK, M. SC. CHEMISTRY
CURRICULUM VITAE

Valerie C. Clark
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POST GRADUATE STUDIES

- 2008- present: PhD student in the Laboratory of Prof. Chris Shaw, Queen's Univ. Belfast
- December 2007: M.Sc. in Chemical Biology (Department of Chemistry & Chemical Biology, Cornell University, Ithaca, NY; sponsored by Prof. Jerrold Meinwald; rotations 2005-6)
- May 2004: M.A. in 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
- 2002-3: M.A. student in Conservation Biology, Dept. Ecology, Evolution, & Environ. Biology, Columbia Univ. & Dept. of Herpetology, American Museum Natural History- C. J. Raxworthy
- 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 INTERESTS

Chemical Ecology, 'chemical biology', biosynthetic enzymes, NMR spectroscopy and Mass Spectrometry. Isolation, structure elucidation, pharmacology, and role in source organisms of alkaloids, peptides and other Natural Products. Anuran diet/toxin sources and other arthropod-amphibian interactions. Herpetology, Entomology, Ecology, Evolution and Conservation of tropical, arid, and island ecosystems. Geographic focus on Madagascar and the Guiana Shield.

PUBLICATIONS

- Means, D. B., Duellman, W. E., and V. C. Clark. **2008**. Ovipositing behavior of the egg-brooding frog *Stefania ayanganae* (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. Ramiljoana, 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

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. *Proc. Natl. Acad. Sci. 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.

PRESENTATIONS

1. June 2008: Poster—Association for Tropical Biology & Conservation 2008 annual meeting, held in Suriname—“A tribute to John W. Daly, the pioneer of frog chemistry.”
2. ‘**The ecology and evolution of chemical defense in poison frogs and their dietary arthropods.**’ *Variations of this lecture were presented to audiences described in 2.- 7.;* December 2007- Invited lecture presented to MacArthur fellows at Ranomafana National Park, Madagascar.
3. October 2007: Invited lecture at National Geographic Head Quarters in Washington, DC.
4. July 2007: Invited plenary lecture at joint meeting of the Society of Colombian Entomologists (SOCOLEN)/Florida Entomological Society (FES) in Cartagena, Colombia.
5. July 2006: Paper-- 22nd Annual Meeting of the International Society of Chemical Ecology.
6. June 2006: Cornell Chemistry Graduate Student Summer Seminar series.
7. Dec. 2005: Invited lecture--presented 2005 *PNAS* paper to the Cornell Herpetological Society
8. August 2002: Poster (w/ John W. Daly, PhD)—NIH Summer Student Poster Day—“Profiles of Biologically Active Alkaloids from Dendrobatid Poison Frogs”
9. 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”.
10. March 2002: Paper—The 25th Annual All Florida Herpetology Conference— “Ecological factors on argulid parasitism of *Rana heckscheri* tadpoles”

SCHOLARSHIPS, STUDENTSHIPS, FUNDING/GRANTS

2007-9	National Geographic Society Committee for Research and Exploration grants to PI VCC for fieldwork in Madagascar and California (\$24,895 in 2007-8 and \$8,298 in 2008-9)
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	TA appointment in the Department of Chemistry & Chem. Biology, Cornell Univ.
2003-2005	Faculty Fellowship for PhD studies, Department of Chemistry, Columbia Univ.
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

HONORS, HONORARY SOCIETIES AND ELECTED OFFICES

- 2005-6 PRESS COVERAGE of Clark et al. *PNAS* 2005, *JCE* 2006 papers: *National Geographic Magazine* and online news, *New York Times*, *Chemical & Engineering News*, *Science*, *Scientific American* (+worldwide affiliates), *Chemistry World* (Royal Society UK), *London Telegraph News*, Bloomberg News, *San Francisco Chronicle*, National Public Radio-- five appearances on three radio shows 2006-8, BBC October 4 2006 Leading Edge Radio Program, numerous websites (e.g., mongabay.com, livescience.com, yahoo), science magazines, newspapers and others in Mexico, Canada, Scandinavia, Germany, France, Korea, Vietnam, Madagascar, and many others. 2009 features in German and Chinese magazines.
- 2002 Elected Sigma Xi member (by Univ. of Florida Chapter)
- 2002, May B.S. with Highest Honors in Zoology and (Bio)chemistry at the Univ. of Florida
- 1997-2002 University of Florida Honors Program
- 2001 Elected Golden Key National Honor Society member
- 1997 State of Maryland Distinguished Scholar Certificate Award, Honorable Mention
- In High school, elected to senior board and vice-president of French club (1996-7)
- 1997 Graduated with honors at Mt. Hebron High School, Ellicott City, Maryland

MEMBERSHIP IN SCIENTIFIC ORGANIZATIONS

Sigma Xi (elected in 2002)

American Association for the Advancement of Science (AAAS)

American Chemical Society (ACS)

American Society for Mass Spectrometry (ASMS; 2006-7)

Cornell Herpetological Society (CHS)

Florida Entomological Society (FES)

International Society of Chemical Ecology (ISCE)

Society for the Study of Amphibians and Reptiles (SSAR; 2000-present)

TEACHING EXPERIENCE

1. 2006 Fall: TA for Organic Chemistry Laboratory (Cornell Univ. Chem 251)
2. 2006 Spring: TA/guest lecturer, World Of Chemistry, Prof. Roald Hoffmann (CU Chem 106)
3. 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)
4. 2005 Fall: TA for General Chemistry Laboratory (Cornell University Chem 207)
5. 2004 Fall: TA for Organic Chemistry Lecture Recitations (Columbia University)
6. 2003 Fall: TA for Organic Chemistry Laboratory (Columbia University)
7. 2000-2: Tutored extensively for Prof. Steven Benner's Biochemistry (CHM 4207, U Florida)
8. 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.

2003, 2007-8: Seven months of research expeditions in the francophone country of Madagascar.

2001, summer: Six weeks in Yucatan, Mexico with host family.

1995, summer: One month in France with host family.

OTHER CERTIFICATIONS/TALENTS

- Certified SCUBA (1997) with over 400 dives (Florida, Belize, Madagascar, Mexico, Spain).
- Photographer (Nikon D200 and Nikon Coolpix 995; published and exhibitions with openings).

WORK AND VOLUNTEER POSITIONS

A. Retail

- 1995-1996 Reptile/Amphibian Specialist at Petco pet store, Ellicott City, Maryland.
1998 Summer job at Deep Six Watersports scuba shop, Stuart, Florida.

B. Zoological Parks, Aquaria:

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

C. Museum related:

- 2002-3 Based at Herpetology Dept. as Columbia U. graduate student, American Museum of Natural History for research with *Mantella* frogs (Dr. Christopher Raxworthy)
2000-2 Occasional volunteer in Herpetology collections at the Florida Museum of Natural History (under Prof. Max A. Nickerson, Curator), Univ. of Florida

D. 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)

E. Field Experience

- 2009 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 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, especially *Mantella* spp.
1999-2002 Senior thesis project on *Rana heckscheri* tadpoles and their argulid parasites at borrow pits near I-10 in Osceola National Forest, Florida
2001-2 Independent photographic study of the alligators of Alachua Sink, Paynes Prairie State Reserve, Gainesville, Florida
2001-2 Volunteer at Rhinoceros dig in Newberry, FL for Florida Museum of Natural History/UF, headed by Prof. Richard Hurlbert
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, USGS
2001 April Three days with UF Herpetology class in Apalachicola, Florida
2000 August One week with Prof. Max Nickerson in the Great Smoky Mountains National Park (TN and NC) monitoring cryptobranchid populations on an USGS project (timed snorkeling and scooping surveys)

F. Laboratory Experience

- 2008 HPLC, MALDI, pharmacology, cloning and sequencing of peptides from amphibian skin secretions (Prof. Chris Shaw, School of Pharmacy, Queen's University in Belfast)
- 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 (Prof. Fred McLafferty, Cornell Chemistry)
- 2005 X-ray crystallographic studies of deoxycytidine kinase complexes, protein expression and purification, etc. (Prof. Steven Ealick)
- 2003-5 GC-MS of dietary sources of alkaloids in *Mantella* frogs, at the Biosphere 2 Chemistry Unit in Arizona and at Columbia University Chemistry Dept. (Prof. Koji Nakanishi)
- 2004-5 Isolation of gram quantities of ginkgolides for pharmacological studies, kinetics of A2E formation (Prof. Koji Nakanishi, Columbia Chemistry)
- 2002 May-August—Chemist/Biologist position via the NIH Summer Student Program; worked with John W. Daly, PhD, Section on Pharmacodynamics, Laboratory of Bioorganic Chemistry, National Institute of Diabetes, Digestive and Kidney Diseases (NIDDK), NIH, Bethesda, Maryland (please see publications and acknowledgements)
- 2000 Organic Synthesis in Prof. Steven Benner's Biochemistry group (UF) with Dr. Kevin Devine. Non-standard nucleotides project, uridine derivative synthesis.
- Chemistry Lab courses taken at UF:* General Chemistry 2045L, 2046L; Organic Chemistry 2211L; Analytical Chemistry 3120L; Biochemistry/Molecular Biology 4302L; Organic Spectroscopy 5235; Biophysical Chemistry 4413L

COLLABORATORS:

NATIONAL GEOGRAPHIC SPONSORED MADAGASCAR RESEARCH
Dr. Brian L. Fisher (Associate Curator and Chair of Entomology, California Academy of Sciences, San Francisco, California AND Antananarivo, Madagascar)
Valérie Prisca Rakotomalala (Research Assistant at California Academy of Sciences Ant Lab (BL Fisher) in Antananarivo, Madagascar)
Prof. Olga Ramiljoana (Head of Dept. of Animal Biology, Univ. Antananarivo, Madagascar)
Dr. Petra Sierwald (Associate Curator--Zoology, Insects, Field Museum of Natural History, Chicago; specializes on spiders and millipedes)

Numerous other collaborative studies are in progress and details are updated as appropriate at www.frogchemistry.com.