

VALERIE C. CLARK, PH.D.

Curriculum Vitae

Valerie C. Clark, Ph.D.
National Geographic Grantee
President & Executive Director of i.F.r.o.g.s.
Indigenous Forest Research Organization for Global Sustainability

Email: frogchemistry@gmail.com
WEB URLs: www.frogchemistry.com
www.frogcaller.com
www.iFrogs.net

POST –DOCTORAL EXPERIENCE

- 2012-present: Founded and developing **i.F.r.o.g.s.** with Drs. Patricia Wright and Stuart Pimm.
- 2013-2014: Biological Sciences, University of Cape Town, Western Cape, SOUTH AFRICA
- 2011-2012: Medicinal Chemistry, Pharmacy, University of Utah, Salt Lake City, UT, USA

POST GRADUATE STUDIES

- 2011: Ph.D. awarded by School of Pharmacy, Queen's University in Belfast, UK; Professor Chris Shaw advised thesis entitled 'The Chemistry of Amphibian Skin Secretions'
- 2008: M.Sc. awarded by Dept. Chem. & Chem. Biology, Cornell University, Ithaca, NY, USA
- 2004: M.A. awarded by Dept. Chemistry, Columbia University, New York, NY, USA
- 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

- Biodiversity, Herpetology, Ecology, Evolution and Conservation Biology
- Chemical Ecology: Anuran diet/toxin sources and other chemical trophic cascades
- Mass Spectrometry and Analytical Chemistry: Isolation, structure elucidation, pharmacology, and physiological functions of secondary metabolites and peptides
- Field work with a geographic focus on Madagascar, habitat focus on forests
- 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. "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, Hemiphractidae). *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.

SCHOLARSHIPS, STUDENTSHIPS, FUNDING/GRANTS

- 2015 National Geographic Society Committee for Research and Exploration (CRE) grant for (\$4,998 to Clark as PI), ‘Critically endangered nocturnal lemurs of Lokobe forest, Nosy Be, NW Madagascar.’
- 2014-15 Primate Conservation Inc. seed grant (\$3,800) for studies and conservation action of critically endangered lemurs of Lokobe, Nosy Be, Madagascar
- 2014 Amphibian ARK Seed Grant (\$4,988) for frog and arthropod breeding room construction and maintenance at Ranomafana National Park, SE Madagascar
- 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)
- 2009-2010: National Geographic Society CRE grants for fieldwork (\$8,298 to Clark as PI), ‘The ecology and evolution of chemical communication and defense in salamanders of the *Ensatina* complex of California.’
- 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 CRE grants for fieldwork (\$24,895 to Clark as PI), ‘The ecology and evolution of chemical defense in Malagasy poison frogs (*Mantella* spp.) and their dietary arthropods.’
- 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, PNAS, Nature, PLoS ONE, J. 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 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

- 2015:** “**Critically endangered nocturnal lemurs of Lokobe forest, Nosy Be, NW Madagascar**” *Invited ‘Closer Look’ talk* at National Geographic Head Quarters, Washington, DC, USA. (October 6)
- 2015:** ‘**The many colors of Lokobe National Park and surrounding secondary forests: studies on lemurs, reptiles and frogs**’ delivered in FRENCH at University of Antananrivo, Dept of Animal Biology (Hosted by UABDA Profs. Rakotondravony and Rakotondraparany on Sept 4)
- 2014:** Ten days of demonstrations to teach amphibian secretion collection techniques to Profs. Louis Du Preez, Che Weldon, and their students at North-West University, Potchefstroom, South Africa.
- 2013:** ‘**Exploring the Diversity and Ecology of Amphibian Skin Chemicals**’ invited seminars at:
- A. Ecology & Evolution, SUNY Stony Brook, New York, USA (hosted by Prof. Pat Wright, Oct. 22)
 - B. Chemistry Dept., SUNY Stony Brook, New York, USA (hosted by Prof. Iwao Ojima, October 24)
 - C. Biology seminar series, Florida Atlantic University, Boca Raton, FL, USA (April 12)
 - D. Biology seminar series, University of Central Florida, Orlando, USA (March 29)
 - E. Biomedical & Comparative Immunology Symposium, Florida International University, Miami, FL (March 6; 15-minute oral with travel scholarship, entitled ‘**A novel endogenous bile acid in bittersweet poison frog skin may explain dietary alkaloid sequestration.**’),
 - F. Division of Biological Sciences, University of Missouri, Columbia, MO (February 26),
 - G. Central Florida Zoo and Botanical Gardens, Sanford, FL (February 5).
- 2012:** ‘**Exploring the Diversity and Ecology of Amphibian Skin Chemicals**’ invited lectures:
- 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).
- 2011 July:** 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.**’
- 2011 June:** Ten day visit with field demonstrations and seminars as part of ‘**Herpethon** series’ in ITALY. ‘**Exploring the diversity and ecology of amphibian skin chemicals.**’ Museo Regionale di Scienze Naturali, Torino (hosted by Franco Andreone) & ‘**Collecting arthropod and amphibian secretions for chemical analysis**’ at *Museu de História Natural da Universidade de Pisa* (host Marco Zuffi).
- 2011 May:** Invited seminar, School of Natural Sciences, National University Ireland Galway, IRELAND. ‘**Exploring the diversity and ecology of amphibian skin chemicals.**’

- 2011 April: Wild Evolution Group Seminar, Biological Sciences, University of Edinburgh, SCOTLAND, UK. ‘**Exploring the diversity and ecology of amphibian skin chemicals.**’
- 2011 April: 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.**’
- 2011 January: Invited Seminar, Chemistry Department, Florida Institute of Technology, Melbourne, FL, USA. ‘**Exploring the diversity and ecology of amphibian skin chemicals.**’
- 2010 December: *Invited plenary lecture*, Congreso Uruguayo de Zoología, Montevideo, URUGUAY. ‘**Exploring the diversity and ecology of amphibian skin chemicals.**’
- 2010 July: *Invited plenary lecture*, Lough Boora Community Center, County Offaly, IRELAND. ‘**Exploring the biomedical potential of amphibian skin secretions.**’
- 2009 December: *Invited lecture* at National Geographic Head Quarters in Washington, DC.
- 2009 July: 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.**’
- 2008 June: 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 13-18 below
- 2007 December: *Invited lecture* and demonstrations, presented to MacArthur fellows and founder of Google, at Ranomafana National Park, MADAGASCAR.
- 2007 October: *Invited lecture* at National Geographic Head Quarters in Washington, DC.
- 2007 July: *Invited plenary lecture* at joint meeting of the Society of Colombian Entomologists (SOCOLEN)/Florida Entomological Society in Cartagena, COLOMBIA.
- 2006 July: Paper-- 22nd Annual Meeting , International Society of Chem. Ecology, Barcelona, SPAIN.
- 2006 June: Cornell Chemistry Graduate Student Summer Seminar series. NY, USA
- 2005 December : *Invited lecture*-- Cornell Herpetological Society, Ithaca, NY, USA
- 2002 August: Poster (w/ John W. Daly, PhD)—NIH Summer Student Poster Day—‘**Profiles of Biologically Active Alkaloids from Dendrobatid Poison Frogs**’ Bethesda, MD, USA.
- 2002 April: 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
- 2002 March: 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).

Blogs for National Geographic at: <http://voices.nationalgeographic.com/tag/valerie-c-clark/>

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)

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 (SEE ALSO WWW.IFROGS.NET)**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, Maryland

B. Museum related:

2002-3 Herpetology, American Museum of Natural History for research with *Mantella* frogs (supervised by Dr. Christopher Raxworthy)

2001-2 Paleontology, Florida Museum of Natural History (FLMNH), Rhinoceros dig in Newberry under Prof. Richard Hurlbert, University of Florida (UF), Gainesville

2000-2 Herpetology, Volunteer at the FLMNH (Prof. Max A. Nickerson, Curator), UF

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, UF

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

2015 June-Sept: Studies on critically endangered lemurs conducted with locals near LOKOBE National Park, Nosy Be, NW Madagascar (funded by National Geographic Society & PCI)

2014 June-August: Status review of Lokobe forest border villages, Nosy Be, NW Madagascar

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 Drs. 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 with Dr. 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 nearby; these studies focused on chemistry of arthropods and 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) surveying cryptobranchid populations on an USGS project.

LABORATORY EXPERIENCE

- 2009- present Collaborate with ThermoFisher manufacturer of Mass Spec instruments in Bremen, Germany. Co-author Martin Zeller acquires data on-site, and I interpret data remotely.
2014 Taught frog chemistry field and lab protocols at North-West University, Potchefstroom, South Africa (Profs. Louis Du Preez, Che Weldon, Chris Vorster & John Malone)
2011-12 LC-MS and prep for bio-assays (Van Wagoner Lab, Univ. of Utah)
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 Natural Products Chemistry, GC-MS, and NMR (J Meinwald Lab, Cornell Chemistry)
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.

References available upon request