NICHOLAS G. CRAWFORD

- Email: ngcrawford@gmail.com
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AREAS OF SPECIALIZATION

- Bioinformatics, evolutionary biology, computational biology, population genomics, phylogenomics, speciation, ultra conserved elements, herpetology and entomology

EDUCATION

- **2013, Postdoctoral Fellow, California Academy of Sciences**
  Advisors: Durrell Kapan and Brian Simison

- **2007/13, Ph.D. Biology, Boston University**
  Advisor: Christopher Schneider
  Thesis Title: Anolis Lizard Genomics and Phylogenetics

  Additional Projects:

  - Mammal, Reptile, and Avian Phylogenomics, with Travis Glenn
  - Butterfly Speciation Genomics, with Sean Mullen

- **2004/07, M.S. Biology, San Diego State University**
  Advisor: Tod Reeder
  Thesis: Population structure within the Plateau Striped Whiptail (*Aspidoscelis velox complex*) a parthenogenetic lizard

  Additional Project:

  - Phylogenetic relationships among Australian skinks of the genus Glaphyromorphus

- **1997/01, B.S. Biology, Union College**
  Graduated *Cum Laude* with Academic and Departmental Honors

SKILLS AND TECHNIQUES

- *Programming Languages/Frameworks:* Python (Modules: Numpy, Scipy, Matplotlib, Biopython, Pysam, Multiprocessing, iPython, MrJob, Pandas, Flask, and Django), MySQL/Sqlite3, Git/Github, Unix/Linux, LSF/SGE/AWS Clusters, Hadoop/MapReduce, also some R, Perl, Html, and CSS

- *Software:* GATK, ABySS, Trinity, Breakdancer, Samtools, VCFtools, Tophat, Cufflinks, Bowtie2, Stampy, GO Elite, Blast/NCBI, MrBayes, Sequencher, Oligo (primer design), Genemapper, GenAlEx, Arlequin

- *Laboratory:* Genomic, RAD-tag, and RNA-seq Illumina library construction, Primer Design, DNA purification, PCR, qPCR (Taqman and Kappa assays), Sanger Sequencing (both ABI3130 and ABI377 genetic analyzers), Microsatellite Genotyping, Bioanalyzer, and constructing cDNA libraries

- *Miscellaneous Skills:* Protein Purification (FPLC), Mammalian Tissue Culture, Ordering and Stocking, Maintaining Laboratory Compliance with Safety Regulations, Training Students and Techs, and Catching lizards

GRANTS AND SCHOLARSHIPS

- 2012 - Grand Challenges Award, Smithsonian Institute Consortia, Next Generation Phylogenetics, MJ Braun, K Wurdack, W Wcislo, J Maldonado, K Helgen, S Brady, M Cummings, TC Glenn, BC Faircloth, RT Brumeld, E Braun, JC McCormack, **NG Crawford**, N White. $100,000.

- 2011 - Next-generation Sequencing Small Grant. Phylogenetic utility of ultra- conserved elements for the avian tree of life. MJ Braun, ND White, TC Glenn, BC Faircloth, RT Brumeld, EL Braun, JE McCormack, **NG Crawford**. $10,000

- 2011 - Amazon Education Research Grant (aws.amazon.com), Computational Resources. BC Faircloth, **NG Crawford**, JE McCormack. $10,000.

- 2010 - Amazon Education Research Grant (aws.amazon.com), Computational Resources. **NG Crawford**, BC Faircloth, TC Glenn. $7,500.

- 2010 - Doctoral Dissertation Improvement Grant (NSF). **NG Crawford**, C Schneider. $15,000.

- 2009 - Theodore Roosevelt Memorial Fund (American Museum of Natural History) labwork/fieldwork. $1,500.

- 2005 - Theodore Roosevelt Memorial Fund (American Museum of Natural History) labwork/fieldwork. $1,960.
- 2005 - Harry E. Hamber Memorial Scholarship, tuition. $1,400.
- 2000 - IEF Grant, thesis research. $100.
- 2000 - NYSEP Grant, summer stipend. $1,700.
- 1999 - Booth - Ferris Grant, summer stipend. $1,700.

PUBLICATIONS

- Marcus R. Kronforst, Matthew E. B. Hansen, **Nicholas G. Crawford** , Jason R. Gallant, Rob J. Kulathinal, Durrell D. Kapan, Sean P. Mullen. 2013. Hybridization reveals the evolving genomic architecture of speciation. Cell Reports, 5, 1 –12.
- John E. McCormack, Michael G. Harvey, Brant C. Faircloth, **Nicholas G. Crawford**, Travis C. Glenn, Robb T. Brumfield. 2013. A phylogeny of birds based on over 1,500 loci collected by target enrichment and high-throughput sequencing. PLoS ONE. 8(1): e54848.
- Martha M. Muñoz, **Nicholas G. Crawford**, Thomas J. McGreevy, Rebecca D. Tarvin, Nicholas J. Messana, Liam J. Revell, Rosanne M. Zandvliet, Juanita M. Hopwood, Elbert Mock, André L. Schneider, and Christopher J. Schneider. 2013. *Divergence in coloration and the evolution of reproductive isolation in the Anolis marmoratus species complex.* Molecular Ecology. 22(10), 2668–2682.
- John E. McCormack, Michael G. Harvey, Brant C. Faircloth, **Nicholas G. Crawford**, Travis C. Glenn, Robb T. Brumfield. 2013. *A phylogeny of birds based on over 1,500 loci collected by target enrichment and high-throughput sequencing*. PLoS ONE. 8(1), e54848.
- John A. St. John, Edward L. Braun, Sally R. Isberg, Lee G. Miles, Amanda Y. Chong, Jamie Gongora, Pauline Dalzell, Christopher Moran, Taisen Iguchi, Bertrand Bed'Hom, Shane C. Burgess, Amanda M. Cooksey, Todd A. Castoe, Arkhat Abzhanov, Llewellyn D. Densmore, Miryam Venegas-Anya, Matthew J. Greenwold, Roger H. Sawyer, Federico G. Hoffmann, **Nicholas G. Crawford**, Jennifer C. Drew, Scott V. Edwards, Matthew K. Fujita, Jonathan M. Howard, Brant C. Faircloth, Daniel E. Janes, Shahid Yar Khan, Satomi Kohno, A.P. Jason de Koning, Stacey L. Lance, Fiona M. McCarthy, John E. McCormack, Mark E. Merchant, Daniel G. Peterson, David D. Pollock, Nader Pourmand, Brian J. Raney, Kyria A. Roessler, Jeremy R. Sanford, Carl J. Schmidt, Eric W. Triplett, Tracey D. Tuberville, Erich D. Jarvis, Louis J. Guillette Jr, Travis C. Glenn, Richard E. Green and David A. Ray. 2012. *Sequencing three crocodilian genomes to illuminate the evolution of archosaurs and amniotes*. Genome Biology. 13, 415.
- Kenro Kusumi, Rob J. Kulathinal, Arhat Abzhanov, Stephane Boissinot, **Nicholas G. Crawford**, Brant C. Faircloth, Travis C. Glenn, Daniel E. Janes, Jonathan B. Losos, Douglas B. Menke, Steven Poe, Thomas J. Sanger, Christopher J. Schneider, Jessica Stapley, Juli Wade, Jeanne Wilson-Rawls. 2012. *Developing a community-based genetic nomenclature for anole lizards*. BMC genomics, 12(1), 554.
- **Nicholas G. Crawford**, Brant C. Faircloth, John E. McCormack, Robb T. Brumfield, Kevin Winker, Travis C. Glenn. 2012. *More than 1000 ultraconserved elements provide evidence that turtles are the sister group of archosaurs*. Biology Letters. 8(5), 783-786.
- Brant C. Faircloth, John E. McCormack, **Nicholas G. Crawford**, Michael Harvey, Robb T. Brumfield, Travis C. Glenn. 2012. *Ultraconserved elements anchor thousands of genetic markers for target enrichment spanning multiple evolutionary timescales*. Systematic Biology. 61(5), 713-715.
- John E. McCormack, Brant C. Faircloth, **Nicholas G. Crawford**, Patricia Adair Gowaty, Robb T. Brumfield, Travis C. Glenn. 2011. *Ultraconserved Elements Are Novel Phylogenomic Markers that Resolve Placental Mammal Phylogeny when Combined with Species Tree Analysis*. Genome Research. 22(4), 746-54.
- **Nicholas G. Crawford**. 2010. *SMOGD: Software for the Measurement of Genetic Diversity*. Molecular Ecology Resources, 10: 556-557.
- **Nicholas G. Crawford**, Jaime Zaldvar-Rae, Cris Hagen, Amanda Schable, Erica Bree Rosenblum, Jeff A. Graves, Tod W. Reeder, Michael G. Ritchie, Travis C. Glenn. 2007. *Thirteen polymorphic microsatellite DNA loci from whiptails of the genus Aspidoscelis (Teiidae: Squamata) and related cnemidophorine lizards*. Molecular Ecology Resources. 8: 219-223
- **Nicholas G. Crawford**, Cris Hagen, Heather F. Sahli, Elizabeth A. Stacy, Travis C. Glenn. 2007. *Fifteen polymorphic microsatellite loci from Hawaiis Metrosideros polymorpha Myrtaceae: Myrtales), a model species for ecology and evolution*. Molecular Ecology Resources, 8, 308-310.
- Caleb R. Hickman, Maureen B. Peters, **Nicholas G. Crawford**, Cris Hagen, Travis C. Glenn, Christopher M. Sommers. 2008. *Development and characterization of microsatellite loci in the American white pelican (Pelecanus*

erythrorhynchos). Molecular Ecology Resources, 8, 1439-1441.

- **Nicholas G. Crawford**, Maureen B. Peters, Cris Hagen, Travis C. Glenn, Stephen K. Davis, Christopher M. Somers. 2007. *Twelve polymorphic microsatellite loci from Sprague's pipit, Anthus spragueii (Motacillidae:Passeriformes), a threatened grassland endemic songbird*. Molecular Ecology Resources, 9, 315-317.

- **Nicholas G. Crawford**. 2007. Microsatellites in cnemidophorine lizards: their utility in investigating the landscape genetics of the plateau striped whiptail (Aspidoscelis velox Complex). Masters Thesis: San Diego State University.

- Olga V. Tsyusko, Tracey D. Tuberville, Maureen B. Peters, **Nicholas G. Crawford**, Cris Hagen, Steve Weller, Ann Sakai, and Travis C. Glenn. 2007. *Microsatellite markers isolated from polyploid woodsorrell (Oxalis alpina)*. Molecular Ecology Notes, 7, 1284-1286.

PROFESSIONAL EXPERIENCE

- 2007-2011 Teaching Fellow, Boston University: Introductory Biology, Genetics, Evolution, Animal Behavior
- 2007 - South Carolina, Summer, 6 months, Research Technician, supervised by Travis Glenn
- 2006 - South Carolina, Summer, 6 weeks, Microsatellite loci preparation at the Savannah River Ecology Laboratory, supervised by Travis Glenn
- 2004/2005 - Graduate Teaching Assistant, SDSU, Introductory Biology and Introductory Zoology
- 2004 - Research Assistant, SDSU, Advisor: Tod Reeder
- 2002/03 - Research Associate, Boston Biochem
- 2001 - Research Associate, Pfizer Pharmaceuticals
- 2001 - Research Associate, Harvard Medical School

FIELD EXPERIENCE

- 2012 - Guantanamo Bay, Cuba, Summer, 1 week, collecting lizards
- 2009 - Guadeloupe, French West Indies, Summer, 5 days, collecting lizards
- 2007 - New Mexico, Summer, 1 week, collecting lizards
- 2005 - New Mexico, Summer, 1 week, collecting lizards
- 2005 - Arizona, Summer, 2 weeks, collecting lizards
- 2004 - Arizona, Summer, 2 weeks, collecting lizards
- 2001 - New York, Summer, 1 week, collecting treefrogs
- 1999 - New York, Summer, 1 week, collecting treefrogs

CONFERENCES, MEETINGS, AND TALKS

- 2013 - UMass Lowell Seminar Series: Invited Speaker
  Presentation Title: From Archosaurs to Anoles: Genomic Approaches to Studying Reptile Evolution

- 2012 - Union College Seminar Series: Invited Speaker - Union College.
  Presentation Title: Genomic approaches to understanding reptile evolution.

- 2012 - World Congress of Herpetology, Vancouver.
  Presentation Title: The Genetics of Colorful Pigmentation in Anolis Lizards.

- 2012 - Evolutionary Genomics Super Group, Broad Institute
  Presentation Title: Ultraconserved Elements as Phylogenomic Markers.

- 2012 - MCZ Lunchtime Seminar, Harvard University
  Presentation Title: Thousands of ultraconserved elements in combination with cloud computing and species-tree methods help resolve deep divergences in reptiles, mammals, and birds

- 2010 - The Genetics and Evolution of Animal Coloration, Radcliffe Workshop
  Presentation Title: Identifying coloration genes when you can't easily do QTL mapping

- 2009 - Anole Symposium Harvard University
  Presentation Title: Anolis carolinensis: Pigmentation Genetics Poster Title: Genome scan identifies two loci associated with color polymorphism in *Anolis marmoratus*

- 2009 - Gordon Conference: Evolutionary & Ecological Functional Genomics - Tilton, New Hampshire.
  Poster Title: Genetics of Colorful Pigmentation in Anolis Lizards

- 2009 - Society for Integrative and Comparative Biology Annual Meeting, Boston Massachusetts.
  Presentation Title: Evolution of Dewlap Pigmentation in Anoline lizards

- 2008 - Union College Seminar Series: Invited Speaker - Union College
  Presentation Title: Population Structure of the Plateau Striped Whiptail a Parthenogenetic Species of Lizard

- 2007 - Island Biogeography Symposium, Harvard University, Cambridge Massachusetts

- 2005 - American Society of Ichthyologists and Herpetologists 85th Annual Meeting, Tampa, Florida *Presentation Title:* Phylogenetic relationships among Australian skinks of the genus Glaphyromorphus

- 2004 - American Society of Ichthyologists and Herpetologists 84th Annual Meeting, Norman, Oklahoma

- 2004 - Evolution Conference, Fort Collins, Colorado

SOCIETY AFFILIATIONS

- American Society of Ichthyologists and Herpetologists (not presently affiliated)
- Society for Comparative and Integrative Biology (not presently affiliated)