Nick Crouch

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RESEARCH INTERESTS

I am interested in how species traits have changed over deep time, including both the way in which traits affect biodversity through time and, reciprocally, are affected by changing biodiversity. I generally employ phylogenetic comparative methods, utilizing a combination of life history, molecular, and paleontological data in a synergistic framework to ask questions from a variety of perspectives.

EDUCATION

2017 **Ph.D. University of Illinois at Chicago**, Ecology and Evolution
Advisor: Dr. Roberta Mason-Gamer
Thesis title: The Evolutionary Ecology of a Highly Diverse Lineage of Birds (Telluraves).

2011 **MRes, Imperial College, London**, Ecology, evolution & conservation
Advisors: Dr. Timothy Barraclough and Dr. Jarrod Hadfield
Research projects examined the phylogeography of asexual microorganisms, and the factors determining growth rate and survival of chicks of a small passerine bird (*Cyanistes caeruleus*).

2009 **BSc, Cardiff University, UK**, Zoology
Senior research projected assessed whether the red river hog (*Potamochoerus porcus*) and African bush pig (*Potamochoerus larvatus*) represent distinct species or a morphocline.

PUBLICATIONS

Number of published articles	Total number of citations	h-index	i10-index
9	66	3	3

Published papers

1. **Crouch, N**, R. Ricklefs, 2019. Speciation rate is independent of the rate of evolution of morphological size, shape, and absolute morphological specialization in a large clade of birds. *American Naturalist* 193: E78–E91

2. **Crouch, N.**, R. Mason-Gamer, 2019. Identifying ecological drivers of interspecific variation in song complexity in songbirds (Passeriformes, Passeri). *The Journal of Avian Biology* 50: doi:10.1111/jav.02020

3. **Crouch, N.**, K. Ramanauskas, B. Igić, 2019. Tip-dating and the origin of Telluraves. *Molecular Phylogenetics and Evolution* 131: 55–63

4. **Crouch, N**, J. Capurucho, S. Hackett, J. Bates, 2019. Evaluating the contribution of dispersal to community structure in Neotropical passerine birds. *Ecography* 42: 390–399

5. **Crouch, N**, R. Mason-Gamer, 2018. Structural equation modeling as a tool to investigate correlates of extra-pair paternity in birds. PLoS ONE 13: e0193365

6. Widhelm T, Huang J P, Sérusiaux E, Moncada B, Lücking R, Mercado-Díaz J A, Magain N, Goffinet B, **Crouch, N**, Mason-Gamer R, Bertoletti F R, Asztalos M R, Lumbsch T H, 2018. Oligocene origin and drivers of diversification in the genus *Sticta* (Lobariaceae, Ascomycota). *Molecular Phylogenetics and Evolution* 126: 58–73

7. Thomson C E, Bayer F, Cassinello M, **Crouch, N**, Farrell S, Heap E, Mittell E and Hadfield J D, 2017. Selection on parental performance opposes selection for larger body size in a wild population of blue tits. *Evolution* 71: 716–732

8. Hadfield J, Heap E, Bayer F, Mittell E, **Crouch N**, 2013. Disentangling genetic and prenatal sources of familiar resemblance across ontogeny in a wild passerine, *Evolution* 67: 2701–2713

9. Hadfield J, Heap E, Bayer F, Mittell E, **Crouch N**, 2013. Intra-clutch differences in egg characteristics mitigate the consequences of age-related hierarchies in a wild passerine, *Evolution* 67: 2688–2700

RESEARCH APPOINTMENTS

2017 – present **Postdoctoral Fellow**, University of Texas at Austin, with Dr. Julia Clarke
With a focus on Palaeognathae, research questions include the dating of radiations, rates of morphological evolution and lineage diversification, as well as the quantification of adaptive radiations over macroevolutionary scales.

2012 **Research Assistant**, University of Oxford, with Dr. Jarrod Hadfield
Research on whether long-term selection for increasing body size could be detected over only a few generations.

2011 **Visiting Scholar**, University of Missouri at St Louis, with Dr. Robert Ricklefs
Establishing whether clades of birds with reduced taxonomic richness have a distinct morphological signature.

2011 **Research Assistant**, University of Edinburgh, with Dr. Jarrod Hadfield
Part of a research team investigating whether female birds can actively regulate the hormones found in their eggs, or whether it is a passive reflection of their body condition.

INVITED TECHNICAL TALKS

2019 – Dept. of Integrative Biology, The University of Texas at Austin
Using path analyses to unravel complex biological systems

2018 – Dept. of Integrative Biology, The University of Texas at Austin
Using analyses of morphological evolution to infer the ecological history of birds

2018 – Field Museum of Natural History, Chicago
Using morphological analyses to infer the evolutionary history of birds

2013 – Dept. of Ecology & Evolution, University of Chicago
Ecological specialization: causes and consequences

CONFERENCE PRESENTATIONS

2018 – Society of Vertebrate Paleontology, Albuquerque, New Mexico
Global cooling and the evolution of gigantic flightless birds

2016 – Society for the Study of Evolution, Austin, Texas
Total-evidence analyses support a Cretaceous origin of Telluraves

2016 – Geological Society of America, Denver, Colorado
Total-evidence analyses support a Cretaceous origin of Telluraves

2013 – Ninth Annual University of Michigan Early Career Scientists Symposium, University of Michigan
Evolution of host specificity in avian lice: a re-analysis

TEACHING AND MENTORING EXPERIENCE

During my doctoral research I taught a variety of introductory-level courses. These included those where my responsibilities involved classroom instruction, such as in 'biology of populations & communities' and 'ecology & evolution', as well as practical activities in a wet lab setting for a genetics course. As part of my involvement in these courses I gave several undergraduate lectures. Additionally during my doctoral research I gave workshops to my peers on techniques I had learned that could be applied to a variety of questions, for example on the use of Approximate Bayesian Computation.

As a postdoctoral fellow I have been part of a research methods class, offered to both undergraduate and graduate students, which develops practical skills for students to answer their own research questions. During this class I gained extensive experience in how to provide constructive feedback, give guidance to ensure students can complete their assignments, as well as develop experience developing problem solving approaches to teaching the statistical program R.

Teaching appointments

2012 – 2017 Teaching Assistant, Dept. of Biological Sciences, University of Illinois at Chicago

GRANTS AND AWARDS

- **Elmer Hadley research award** University of Illinois at Chicago. Awarded for proposals that best demonstrate contributions to students' research goals that are likely to result in original publications
- **Student travel awards** University of Illinois at Chicago

PROFESSIONAL SERVICE

Peer review

- Oecologia
- Proceedings of the Royal Society: B

Symposia attended

- Ninth Annual University of Michigan Early Career Scientists Symposium, University of Michigan
- The Rise of Modern Biodiversity - A Workshop addressing Critical Transitions in the History of Life, Field Museum of Natural History, Chicago

Professional societies

- Society for the Study of Evolution
- American Society of Naturalists
- Society of Vertebrate Paleontology
- Systematics Association

OUTREACH

Members night, Field Museum of National History Meet museum members at special events used to describe how the collection is utilized for answering a range of questions in evolutionary biology.

Scientific adviser, Rooster Teeth Productions Provide a range of information for a YouTube science video on the morphological and physiological adaptations present in hummingbirds enabling their flight style.

Volunteer judge, Jackson School Research Symposium Evaluate poster presentations of undergraduate students on research projects they have undertaken.

Volunteer, Explore UT Open day for members of the public to visit the university and learn about a range of different skeletons.

TECHNICAL TRAINING

- **X-ray diffraction** A method for the identification of unknown crystalline compounds by quantifying the angle at which x-rays are scattered
- **R** I am proficient in the use of the statistical program R. I regularly use custom scripts for my research and use markdown to communicate the code and results
- **High performance computer clusters** I am comfortable using high performace computer clusters for the analysis of large data sets. To date, I have used two different systems via remote access for my research.
- **Digital post-processing for x-ray computed tomography** I have received instruction on the program Avizo to analyze scanned material and separate preserved material from surrounding matrix

FIELDWORK EXPERIENCE

2010 – 2012	Edinburgh, UK I performed three field seasons as part of a team carrying out research on a small European passerine (Blue tit, *Cyanistes caeruleus*), recording breeding times in combination with data on growth rates and survival rates of chicks.
2010	United Kingdom Masters research project investigating whether two sympatric species of rotifer exhibit different phylogeographic signal
2009	Kenya Undergraduate field course involving mammal and invertebrate surveys, as well as quantification of spatial variation in termite mound dimensions
2008	Llysdinam, Wales, UK Week long undergraduate field course incorporating river invertebrate and small mammal forest surveys.