Nick Crouch

Postdoctoral Fellow
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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. Biological Sciences**, Department of Biological Sciences, University of Illinois at Chicago. Advisor: Dr. Roberta Mason-Gamer

2011 **MRes, Ecology, evolution & conservation**, Imperial College, London. Advisors: Prof. Timothy Barraclough and Dr. Jarrod Hadfield

2009 **BSc, Zoology**, Cardiff University

APPOINTMENTS

2017 – present **Postdoctoral fellow**, Jackson School of Geosciences, University of Texas at Austin, under Prof. Julia Clarke

2012 – 2017 **Teaching Assistant**, Department of Biological Sciences, University of Illinois at Chicago

2012 **Research Assistant**, Department of Biology, University of Oxford, under Dr Jarrod Hadfield

2011 **Visiting scholar**, Department of Biology, University of Missouri at St Louis, under Prof. Robert Ricklefs

2011 **Research Assistant**, Department of Biological Sciences, University of Edinburgh, under Dr. Jarrod Hadfield

PUBLICATIONS

1. **Crouch, N.**, J. A. Clarke, *in review*. Body size evolution in palaeognath birds supports Neogene cooling-linked gigantism. *Paleobiology*
2. **Crouch, N.**, R. Mason-Gamer, *in review*. Identifying ecological drivers of interspecific variation in song complexity in songbirds (Passeriformes, Passeri). *The Journal of Avian Biology*
3. **Crouch, N.**, R. Mason-Gamer, *in review*. Evidence for rapid radiation in body size early in the evolutionary history of arboreal birds. *Evolution*
4. **Crouch, N.**, K. Ramanauskas, B. Igić, 2018. Tip-dating and the origin of Telluraves. *Molecular Phylogenetics and Evolution* (in press, doi.org/10.1016/j.ympev.2018.10.006)
5. **Crouch, N**, R. Ricklefs, 2018. 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* (in press)
6. **Crouch, N**, J. Capurucho, S. Hackett, J. Bates, 2018. Evaluating the contribution of dispersal to community structure in Neotropical passerine birds. *Ecography* (in press, doi.org/10.1111/ecog.03927)
7. **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

8. 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
9. 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
10. 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
11. 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

INVITED LECTURES

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

Crouch, N. 2018. Ecological specialization: causes and consequences, Department of Ecology & Evolution, University of Chicago

CONFERENCE PRESENTATIONS

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

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

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

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

RESEARCH EXPERIENCE

2017 – present **Postdoctoral Research**, Jackson School of Geosciences, University of Texas at Austin
Advisor: Prof. Julia Clarke
Research: With a focus on Palaeognathae, research questions include the dating of radiations, rates of evolution, trait evolution, as well as the quantification of adaptive radiations over macroevolutionary scales.

2012 – 2017 **Doctoral Research**, Department of Biological Sciences, Edinburgh University
Advisor: Dr. Roberta Mason-Gamer
Research: The evolutionary ecology of a highly diverse lineage of birds (Telluraves)

2011 **Visiting Scholar**, Department of Biology, University of Missouri at St. Louis
Advisor: Prof. Robert Ricklefs
Research: Establishing whether clades of birds with reduced taxonomic richness have a distinct morphological signature

2010 – 2011 **Masters Research**, Department of Biological Sciences, Edinburgh University
Advisor: Dr. Jarrod Hadfield

Research: Investigation of the effect of laying order on hatching times and survival rates in a wild passerine (Blue tit, *Cyanistes caeruleus*)

2010 – 2011 **Masters research**, Silwood Park, Imperial College London
Advisor: Prof. Tim Barraclough
Research: Comparison of phylogenetic structure of two species of rotifers that occur sympatrically on water lice

2008 – 2009 **Undergraduate Research**, Department of Biological Sciences, Cardiff University
Advisor: Prof. Mike Bruford
Research: Using phylogenetics to assess whether the red river hog (*Potamochoerus porcus*) and African bush pig (*Potamochoerus larvatus*) represent distinct species or a morphocline

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.

GRANTS AND AWARDS

- **Elmer Hadley Research Award** University of Illinois at Chicago ($577)
- **Student travel awards** University of Illinois at Chicago ($670)

PROFESSIONAL SERVICE

Peer review

- Oecologia

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

OUTREACH

Members night, Field Museum of National History Describe to museum members how the collection is utilized for answering a range of questions in evolutionary biology.

Scientific adviser, Rooster Teeth Productions Provide a range of information on the morphological and physiological adaptations present in hummingbirds to enable their flight style.

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 performace 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.
- **CT sectioning** I have received instruction on the program Avizo to analyze scanned material and separate preserved material from surrounding matrix

FIELDWORK EXPERIENCE

- Between 2010 and 2012 I carried out 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.
- As part of my first masters research project I sampled water lice from different water basins across the south of the UK
- I carried out a two week field course in Kenya performing mammal and invertebrate surveys, as well as quantification of spatial variation in termite mound dimensions
- I completed a week long undergraduate field course in Llysdinam, Wales, with activities including river invertebrate and small mammal forest surveys.