Andrew Orkney
Curriculum Vitæ

Postdoctoral researcher

Department of Biomedical Sciences

Cornell Univeristy

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https://github.com/aorkney

Google Scholar

Direction:

I am a comparative evolutionary biologist with a broad training in the biological sciences. My principal love is animal skeletal morphology– I have published research in dinosaur histology, bird evolution, and I currently research ecomorphology, evolvability and anatomical organisation in diverse vertebrate groups, including bats. My multidisciplinary background also includes expertise in remote-sensing and marine ecology, and I have taken advantage of my capacity to bridge different fields of research, gaining a diverse suite of skills. I am especially interested in the significance of biomechanical and ancestral anatomical constraints that might be expected to restrict evolvability, and the evolutionary solutions that are employed in adaptive radiations. New datasets I am collecting will expand my research to explore fundamental aspects of vertebrate biology such as sex, developmental mode and organismal asymmetry. My range of research ambitions will engage a diverse body of students in vibrant projects, teaching them coding and phylogenetic comparative methods, and providing them with opportunities for conference presentation and publication.

Education:

- **University of Oxford, DPhil Earth Sciences**
  'Discernment of phytoplankton groups from optical properties,' **2017-2021**
- **University of Oxford, Master of Earth Sciences**
  'A flight of fancy; geometric morphometric analysis of Avian wing skeletons,' **2017**

Appointments:

- **Postdoctoral research associate**
  Department of Biomedical Sciences, Cornell University
  'Princes of Darkness; limb integration and evolutionary dynamics in bats,' **2022-2024**

Publications:

Within 4 years of publishing: **184** citations, h-index **6**, i10-index **6**, lead author publications in **top 5%** of Altmetric attention scores, engagement from multiple news outlets

- **Orkney**, A., & Hedrick, B.P., **2024**. *Small body size is associated with increased evolutionary lability of wing skeleton proportions in birds,*
  Nature Communications Nature community Cornell Chronicle
- Luan, Q., Mitchell, E., Henley, S.F., **Orkney**, A., Bouman, H.A., Braun, J.S., Poulton, A.J., & Davidson, K., **2024**.*Water mass influence on spatial and seasonal distributions of diatoms, dinoflagellates and coccolithophores in the western Barents Sea.*
  Polar Biology
- **Orkney**, A., Sathyendranath, S., Jackson, T., Porter, M. & Bouman, H.A., **2022**. *Atlantic inflow is the primary driver of remotely sensed autumn blooms in the Barents Sea.*
  Marine Ecology Progress Series
- Fabbri, M., Navalón, G., Benson, RBJ., Pol, D., O'Connor, J., Bhullar, B-AS., Erickson, GM., Norell, MA., **Orkney**, A., Lamanna MC., Zouhri S., Becker, J., Dal Sasso, C., Bindellini, G., Maganuco, S., Auditore, A. & Ibrahim, N., **2022**. *Subaqueous foraging among carnivorous dinosaurs.*
  Nature Smithsonian Popular Science BBC Spektrum National Geographic
- Castellani, G., Veyssieére, G., Karcher, M., Stroeve, J., Banas, N.S., Bouman, H.A., Brierley,

A.S., Connan, S., Cottier, F., Große, F., Hobbs, L., Katlein, C., Light, B., McKee, D., **Orkney**, A., Proud, R. & Schourup-Kristensen, V., **2022**. *Shine a light: Under-ice light and its ecological implications in a changing Arctic Ocean.*
Ambio

- **Orkney**, A., Davidson, K., Mitchell, E., Henley, S.F. & Bouman, H.A., **2022**. *Different Observational Methods and the Detection of Seasonal and Atlantic Influence Upon Phytoplankton Communities in the Western Barents Sea.*
Frontiers in Marine Science
- **Orkney**, A., Bjarnason, B., Tronrud, B. & Benson, R., **2021**. *Patterns of skeletal integration in birds reveal that adaptation of element shapes enables coordinated evolution between anatomical modules.*
Nature Nature Community Raptormaniacs
- **Orkney**, A., Platt, T., Narayanaswamy, B.E., Kostakis, I. & Bouman, H.A., **2020**. *Bio-optical evidence for increasing Phaeocystis dominance in the Barents Sea.*
PTransA NASA-EO Spektrum
- Kostakis, I., Röttgers, R., **Orkney**, A., Bouman, H.A., Porter, M., Cottier, F., Berge, J. & McKee, D., **2020**. *Development of a bio-optical model for the Barents Sea to quantitatively link glider and satellite observations.*
PTransA
- Porter, M., Henley, S.F., **Orkney**, A., Bouman, H.A., Hwang, B., Dumont, E., Venables, E.J. & Cottier, F., **2020**. *A Polar Surface Eddy Obscured by Thermal Stratification.*
Geophysical Research Letters The Guardian Herald Scotland

Pre-print:

- Fabbri, F., Navalon, G., Benson, R., Pol, D., O'Connor, J., Bhullar, A., Erickson, G., Norell, M., **Orkney**, A., Lamanna, M., Zouhri, S., Becker, J., Dal Sasso, C., Bindellini, G., Maganuco, S., Auditore, M. & Ibrahim, N., **2022**. *Sinking a giant: quantitative macroevolutionary comparative methods debunk qualitative assumptions.*
bioRxiv

In-revision:

- **Orkney**, A., Boerma, D.B., & Hedrick, B.P., **2024**. *'A binding destiny: The membrane wing enforces evolutionary integration between wing and leg proportions, inhibiting ecological adaptation in bats'*
Nature Ecology & Evolution

In-prep:

- **Orkney**, A., Rothier, P., & Hedrick, B.P. **2024**. *'Differences in developmental mode across birds determine skeletal organisation and critically define avian evolvability,'*
- **Orkney**, A., Davis, C.C., & Hedrick, B.P., **2024**. *'Parsed and Future: best practices for parsing error in large aggregated museum record databases,'*

Contribution to public-facing science in media:

- 'Melding Art and Science' Exhibition entry on bird and bat evolution **2023**.
(EVENTS.CORNELL.EDU)

- 'Beauty in the Barents' **2021**.
(NASA Earth observatory)

Public datasets: Field-work derived oceanographic datasets. I also contributed to cell-count and invertebrate collection.

- **Orkney**, A. & Bouman, H.A., **2019**. *Phytoplankton absorption spectra, JR16006*
British Oceanographic Data Centre
- **Orkney**, A. & Bouman, H.A., **2019**. *Phytoplankton absorption spectra, HH180423*
British Oceanographic Data Centre
- **Orkney**, A. & Bouman, H.A., **2019**. *Phytoplankton absorption spectra, JR17006*
British Oceanographic Data Centre

- **Orkney**, A. & Bouman, H.A., **2019**. *Fluorometric Chlorophyll-a, JR16006* British Oceanographic Data Centre
- **Orkney**, A. & Bouman, H.A., **2019**. *Fluorometric Chlorophyll-a, HH180423* British Oceanographic Data Centre
- **Orkney**, A. & Bouman, H.A., **2019**. *Fluorometric Chlorophyll-a, JR17006* British Oceanographic Data Centre

Awards:

- **Cornell Department of Biomedical Sciences:**
  Chair's Trainee award for outstanding departmental citizenship ($1000) **2024**
- **Palæontological Association** Prize for best 4th year performance in Palæontology
  (Free Palæontological Association membership) (£40) **2017-2018**
- **Tony Doyle Science Bursary**
  (≈ £600) **2016**
- **International Seismological Centre**
  Prize for best 1st year performance in Mathematics and Geophysics (£200) **2015**

Funding:

- **Oxford University Block Grant funding**
  (article processing charge under institutional membership model) $2950 **2022**
- **Tied studentship Arctic PRoductivity in the seasonal Ice ZonE** (Arctic PrIZE)
  Principal Investigator Associate Prof. Heather A. Bouman (£151,726) **2017-2021**
  1940183 NE/P006507/1
- **Moritz-Heymann Scholarship**
  (valued at half undergraduate tuition fees ≈ £5000 per annum) **2013-2016**
- **Shorefast foundation** (Newfoundland, Canada)
  Free housing provided for undergraduate field geology project (value ≈ £700) **2015**
- **Oxford Geology Group**
  Travel grant towards undergraduate geological mapping (£250) **2015**

Conferences, Talks and Presentations: * denotes presenting author

- **North American Society for Bat Research** – Talk; *'Bat wing membranes enforce evolutionary integration of fore- and hindlimbs, inhibiting ecological adaptation compared to birds,'* **Orkney**, Boerma*, & Hedrick **Coming Fall 2024**
- **EvoGroup, Cornell EEB** – Talk; *'Birds of the Tinyverse: how body mass structures the evolutionary organisation of the wing skeleton,'* **Orkney*** **2024**
- **SICB, Seattle WA** – Talk; *'Princes of Darkness: limb integration and evolutionary dynamics in bats,'* **Orkney***, Boerma, & Hedrick **Session chair 2024**
- **SICB, Seattle WA** – Poster; *'Bad to the bone: sternal morphology and ecological radiation in bats,'* Augustin*, **Orkney** & Hedrick **2024**
- **SICB, Seattle WA** – Poster; *'Reshaping the past: geological deformation in Diictodon using 3D geometric morphometrics,'* Hooker*, **Orkney** & Hedrick **2024**
- **SICB, Seattle WA** – Poster; *'Astragalar and calcaneal shape predict locomotor mode in caniforms,'* Essner*, Munteanu, **Orkney** & Hedrick **2024**
- **Assistant Prof. Dara Orbach: Texas A & M Corpus Christi** – Guest lecture; *'What is Geometric morphometrics?'* **Orkney*** **2023**
- **SICB, Austin TX** – Talk; *'Divergent trends in integration with increasing mass in the avian wing and trunk,'* **Orkney***, Hedrick **2023**
- **Oxford Earth Observation Conference** – Poster & Talk **Orkney***, Bouman **2020**
- **Arctic PRIZE project meeting**, Edinburgh – Talk **Orkney***, Bouman **2019**
- **Arctic PRIZE project meeting**, Glasgow – Talk **Orkney***, Bouman **2018**
- **IPC5, Paris** *'Fish-eating habits in Spinosaurs are shaped by heterochrony and bone microstructure'* Fabbri*, Benson, Pol, **Orkney**, Dal Sasso, Maganuco, Zouhri & Ibrahim **2018**

- **NERC advanced training course**, Ocean-Colour data Poster **Orkney***, Bouman **2017**

Teaching:

Demonstration & Lecture

- **VTMED xxxx Comparative Physiology: Bird respiratory form and function** **Coming Fall 2024**
- **VTMED 6103 Comparative Anatomy: Pattern and Function** **2024**
- **MRC 1626 Spring elective dog dissection course** **2024**
- **VTMED 6565 3rd-year Veterinary medicine**
  Musculo-skeletal anatomy and function in birds **2024**
- **BIOEE 3780 µCT-scanning** Lecture on geometric morphometric methods and the quantification of biological shape, including worked examples in the **R** scripting language for student participation and active learning. **2023**
- **VTMED 6122 1st-year Veterinary medicine** Comparative dissection **2023**
  Groundhog, squirrel, rabbit, llama, duck, raptor, pigeon, owl, turtle, lizard, snake, carp, flatfish, beltfish, dolphin
  Emphasis placed on encouraging students to formulate evolutionary hypotheses explaining anatomical difference, consider living organisms within a greater tree of life and apply this navigational aid to clinical scenarios.
- **Online Bermuda field course demonstrator** (University of Oxford) **2021**
  During COVID-19, the Bermuda ocean-sampling field course was substituted with an online course. I helped students visualise oceanographic datasets, identify secular change and develop their own hypotheses to explain periodicity and long term trends in oceanographic conditions and recorded biomass in the Bermuda Atlantic Time-series.

Mentoring

- **Isha Chauhan: Graduate Veterinary** Lab rotation:
  R-coding, animal spatial capture-recapture analysis, methods + fieldwork **2024**
- **Jamison Thompson:** NewVisions
  R-coding, Avizo 2022.1, and literature review of saltatorial rodents **2023-2024**
- **Caroline Goldstein: Senior** Lab participation: Bat pevlic morphology **2023-2024**
  Avizo 2022.1, supplemental canine dissection
- **Rita Liu: Freshman** Lab participation: Special project
  3-D anatomical model production (canine cranium) **2023-2024**
  Avizo 2022.1
- **Kay Williams: Sophomore** Lab participation: Skeletal organisation across hummingbirds **2023-2024**
  Avizo 2022.1
- **Lauren Essner: NewVisions**
  (Ithaca High-school; since progressed to Cornell undergraduate)
  Carnivoran ankle bones **2022-2024**
  R-coding, Geometric morphometrics, Poster design, culminating in student-led research symposium.
- **Will Hooker: undegraduate + DPhil** Lab participation:
  Skull asymmetry in *Diictodon* **2022-2024**
  Geometric morphometric approaches, using *Didelphis* as a model system.
  R-coding, Geometric morphometrics, Poster design
  + Honours thesis supervisor + Bat sternum shape **2023-2024**
- **Tram Huynh: Junior** Lab participation: Bat skeleton 3-D imaging **2022-2023**
  Avizo 2022.1
- **Elizabeth Augstin: undergraduate** Lab participation: Bat sternum shape **2022-2024**
  Avizo 2022.1, R-coding, Geometric morphometrics
- **Sacchi Pillai: Master's** project: Southern Ocean phytoplankton bio-optics **2021**
  R-coding

- **Chang Liu: 2nd year** project: Dataset from Arctic-deployed robotic submersible **2020**
  R-coding

Tuition

- **3rd-year undergraduate** Biological Oceanography **2018-2021**
  exam-style questions, essays, free-form discussion
  Emphasis placed on developing skills of scientific inquiry beyond an undergraduate course remit, improving written language and communication; and forming an integrative view of the physical and life sciences.

Service:

Committees

- **Veterinary Research Tower refurbishment design committee** **2023-2024**

This committee identifies potential obstacles and plans solutions for faculty, staff and student office and lab space relocation during planned building refurbishment at the College of Veterinary Medicine.

Reviewing

- I have reviewed manuscripts for diverse topics such as marine phytoplankton **community structure** in Arctic Seas, the state of the literature in basal dino-bird **ecology**, olfactory **genomics**, avian **developmental modularity**, and ecological partitioning in South American bats; for journals including Frontiers in Ecology and Evolution, the Journal of Mammology, the Journal of Evolutionary Biology and Journal of Morphology.

Outreach and volunteering

- **Cornell Herpetological Society:** Snake outreach at Varna nursery **2023**
- **Ithaca High-school: NewVisions** **2023 + 2024**
- **Cornell Guild of Visual Arts**, Spring exhibition volunteer **2023 + 2024**
- **Workshop leader; Fossil illustration**
  at the Oxford University Museum of Natural History **2015**
- **Free tutition** provided to disadvantaged school children; 'SchoolPlus' programme **2014**
- **EarthScience Outreach day** assistant, University of Oxford **2014**
- **Learning difficulties Teaching assistant:** 'The Ridgeway' school, Surrey UK **2014**
  classroom assistant for students with learning difficulties.

Technical skills:

- **Comparative dissection** of vertebrate gross anatomy: **2023-2024**
- 3-D image processing: **µCT-scans; Avizo 9.3–2022.1** **2016-2023**
- Experienced user of **R** statistical programming language **2016-2023**
- Routine user of **LaTeX** coding environment **2017-2023**
- **µCT-scanner** operation **2023-2024**
- Scientific illustration- **published** **2021-2024**
- **MATLAB**, **HydroLite** coding languages **2017-2021**
- **Field collection** of biological samples + cryogenics **2017-2021**
- **Chemotaxonomic and bio-optical laboratory methods** **2017-2021**

Fieldwork:

- Salamander capture-recapture analysis – upstate New York, (**SPARCnet**) **2023-2024**
- RRS James Clark Ross – 4 weeks – Barents Sea – June-July, **Link 2018**
- FF Helmer Hanssen – 2 weeks – Barents Sea – April-May, **Link 2018**
- FF Helmer Hanssen – 2 weeks – Barents Sea – January, **Link 2018**
- RRS James Clark Ross – 6 weeks – Barents Sea – July-August, **Link 2017**

Professional development: I am attending seminars on **Grant writing** and **teaching style**. I am taking active steps to become a better mentor, sensitive to the mental health needs of students. I view this as an essential step towards improving graduation rates and career progression in under-represented demographics in science.

- Remote attendance of 'Diversity, Equity, and Inclusion (DEI) in STEM and Ecology. Mountain Lake Biological Station, VA, USA [DEI, teaching]' **2024**
- Participation in open discussion group 'A DEIA Tax? The hidden cost of 'diversity' in Academia and who pays it,' **Dr Gwendolyn Pough** **2024**
- Participation in open discussion group 'Notice & Respond: Assisting Students in Distress,' **Emily Dunuwila, Health Initiatives Coordinator** **2024**
- Attendance of '2023 A conversion on Two-Spirit identity' **River Webb** **2023**
- Attendance of '2023 Building Allyship Keynote– Supporting Trans and Nonbinary People During Turbulent Times' **Leo Taylor** **2023**
- Attendance of 'Teaching & Learning Science in the 21st Century' **Carl Wieman** (ADW Professor-at-Large) **2023**
- Attendance of 'From Postdoc to Principal Investigator': An NSF Division of Integrative Organismal Systems **(IOS) Virtual Colloquium** **2023**
- Attendance of **Campusgroup** Leadership Workshop: Welcoming Neurodivergent Members in Your Organization **2023**
- Attendance of **FarmNet** seminar series; identifying symptoms of stress, suicide prevention **2023**
- Attendance of **MindWell** mental health seminar series **2023-2024**

Languages:

Ich kann einfaches Deutsch verstehen. In Zukunft würder Ich gerne mehr Sprachen (zum Beispiel Spanisch oder Norwegenisch) lernen. Als ich in der Arktis gearbeitet gab es viele Forscher wer viele verschiedene Nationen represäntierten, und deshalb mag Ich im kulturell-vielfältigere Universitätabteilungen arbeiten.

References:

- Assistant Professor **Brandon P. Hedrick** bph54@cornell.edu
  Postdoctoral Supervisor +1 (607) 253-2169
  Department of Biomedical Sciences, Cornell University
- Associate Professor **Heather A. Bouman** heather.bouman@earth.ox.ac.uk
  PhD Supervisor +44 (0)1865 272019
  Department of Earth Sciences, University of Oxford
- Professor **Roger B.J. Benson** rbenson@amnh.org
  Master's Supervisor +1 (212) 769-5811
  Curator of Dinosaurs, Division of Palaeontology, American Museum of Natural History
- Doctor **Shubha Sathyendranath** MBE ssat@pml.ac.uk
  Collaborator, supervisor and advisor +44 (0)1752 633100 / +44 7500 8643 96
  Remote Sensing Group, Plymouth Marine Laboratory