

Becky Heath

London, UK 🌐

+44 (0) 7927610681 📞

r.heath18@imperial.ac.uk 📧

Design Engineering PhD Student | Imperial College London

Ecoacoustics | Remote Sensing | Spatial Acoustics

I am a final-year PhD student working to develop an innovative, robust, autonomous recording unit (ARU). My work involves developing and assessing state-of-the-art ecoacoustics hardware and analysis techniques in study sites spanning tropical and temperate forests. **PhD Hand-in: September 2022.**

Key Skills, Knowledge Bases, and Competencies:

Data Science	(Spatial) Ecoacoustics	Remote Sensing	Field Ecology	Forest Ecology		
Acoustic Indices/ AudioSet Fingerprint	Sound Localisation	Machine Learning (including CNNs)				
Python	R	Github	Matlab	Windows/IOS/Ubuntu	Raspberry Pi	Cluster Computing
Methods Assessment	Methods Development	Science Communication				

EDUCATION

NERC (UKRI) funded PhD Student at Imperial College London (2018 – Present)

Title: Methods Assessment and Development in (Spatial) Ecoacoustics

Group/Department: Dyson School of Design Engineering / Department of Natural Sciences

CDT: Quantitative Methods in Ecology and Evolution (QMEE - 2nd Cohort)

KEY ACHIEVEMENTS:

- I have first-authored a published article [1]. + have another in progress [2]
- I have given talks about my research at 3 international conferences [3-5]
- I was an invited speaker/ panelist at 2 UKAN workshops [6-7]
- I am one of 50 invited attendees at an International Bioacoustics Workshop [8]
- I was awarded £1.3k funding [9] for participation in a doctoral exchange
- I planned and carried out a successful 2-month field trip to Malaysian Borneo.
- I built a 6-channel, autonomous, acoustic field recorder (which amassed 4,000+hrs of forest audio)
- I have been personally invited to Exhibit Research at popular public events [16-17]

PAID TEACHING AND OUTREACH POSITIONS:

- **Graduate Teaching Assistant (2021):** Computing 1, Dyson School of Design Engineering
Github, BASH command-line, and Python.
Procedural and Object-oriented Programming
Code design, unit testing and linting with VSCode
- **Imperial Outreach Leader (2020 – Present)**
Regularly give talks about my research/career progression etc., to underprivileged school kids.
My audiences range from 30 to 200+ people (larger events are online!)
I was a featured scientist and presented an outreach film for the Science in Action platform
I hosted an in-person workshop about radioactivity for kids at a programme funder visit.

Master's Degree at Exeter University (2014 –2018)

- First-class Natural Sciences Msci (with honours)
- 2 x Deans commendation [10-11]
- Master's research presented at a national conference [12]
- 2 x Funding awarded for attendance at international training programmes [13-14]

Semester Abroad at the School of Energy + Environment, CityU University Hong Kong (2016)

- Attained an A- (equivalent to the UK first)

Newstead Wood Grammar School (2011 – 2013) and Dartford Girls Grammar School (2006 – 2011)

- **A-Level:** A*, A, A | **AS-Level:** A*, B, B | **GCSE:** 5 x A* and 5 x A-C

RESEARCH ACTIVITIES (Past and Present)

Autonomous Spatial Acoustic Recorder (2020 - Present). - Dr L. Picinali and Prof. R. Ewers

I developed a fully autonomous, multi-channel acoustic recorder that detects and spatialises acoustic signals. I have had successful lab tests pre- and post- deployment. I surveyed and ran a field experiment in a 300acre temperate field site that had not previously been used for science. I assessed the site for forest structure (dominant tree species), topography, data connectivity, forest edge proximity, and hazard risks per landowner regulation. The devices I designed have amassed 4,000hrs of 6-channel audio passively. [2,3,6-7]

Impact of Data Reducing Practice in Ecoacoustics (2018-21). - Dr L. Picinali and Prof. R. Ewers

I quantified the extent that data-saving experimental practice affected acoustic indices and how well those indices could then be used to build soundscape classification models. I used standard acoustic indices (ACI, ADI etc.) and CNN-derived soundscape fingerprinting. [1,3-6,17]

Taxonomy Aligning for IUCN and UNEP (2019-2020): I worked with two other PhD students and the UNEP (WMWC) to create a string-matching algorithm to align taxonomic databases (IUCN + CITES databases).

Hot Fuzz: Thermodynamic Properties of Bumblebee Hair (2017). - Dr. J. Creswell and Dr. D Horsell:

Metamaterials project involving (SEM) Microscopy, 3D printing, microtome-ing and running custom circuits through Bumblebee carcasses (hairy and cleanly shaven) in a wind tunnel! [15]

Alcohol Addiction Mechanisms in Bumblebees (2016). - Dr J. Creswell

I built a Raspberry-Pi based photographic data logger and image analysis protocol that looked at whether bumblebees became negligent of brood responsibilities under the influence of alcohol.

AWARDS, PUBLICATIONS, CONFERENCES and EXHIBITIONS

[1] Journal Article: Heath, et al., (2021). How index selection, compression, and recording schedule impact the description of ecological soundscapes. *Ecology and Evolution*, 11(19), 13206–13217.

[2] Journal Article (in progress): Introducing a multi-channel Autonomous Recording Unit for DOA estimation.

[3] Talk: *TR@NSNET (2022): Passive Acoustic Monitoring (current practice and future solutions).* “(Spatial) Autonomous Soundscape Recording”. Madrid, Spain.

[4] Talk: *Forum Acousticum (2020):* “Autonomous Rainforest Soundscape Classification and the Impact of Lossy Compression”. Lyon, France.

[5] Talk: *International Bioacoustics Council (IBAC) (2019)* “Impact of Lossy Compression on the Usability of Audio in Soundscape Level Ecoacoustics”. Brighton, UK.

[6] Invited Speaker: *UK Acoustics Network (UKAN) workshop on Soundscapes (2022).* 1st + 2nd Session (Capturing Soundscapes, Analysing Soundscapes)

[7] Invited Panelist: *UK Acoustics Network (UKAN) Biodiversity Symposium (2022).* Acoustic Hardware Panel.

[8] Invited Attendee: *Full-Stack Bioacoustics: field kit to AI to Action (Later in 2022).* Netherlands.

[9] Funding Awarded: Imperial-Tokyo Tech Global Fellows Programme and placement: Climate Action, London. 2019. (with students studying in Tokyo)

[10] Award: Dean’s Commendation for Academic Achievement: (2015), Exeter University.

[11] Award: Dean’s Commendation for Academic Achievement: (2018), Exeter University.

[12] Conference Poster: Fisheries Society of the British Isles (FSBI), Exeter (July 2017) “The Effect of Copper on the survival of early development zebrafish (*Danio rerio*) embryos

[13] Funding Awarded: Sustainable SMART Cities, Leadership Course with Common Purpose in Nairobi, Kenya. 2017 (with Kenyan students).

[14] Funding Awarded: Experiencing China Summer School, Tsinghua University, Beijing, China. 2016. (with students from all over the globe)

[15] Funding Awarded: £4,000 EPSRC Summer Studentship. Exeter, UK.

[16] Exhibition Stand: at All the Science Ladies, Natural History Museum London, March 2020.

[17] Exhibition Stand: at Science Without Borders, Imperial Lates. London October 2019