

Paul Czechowski

COMPUTATIONAL BIOLOGIST - MOLECULAR ECOLOGIST

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Education

Adelaide University

Adelaide

PHD MOLECULAR ECOLOGY, DEAN'S COMMENDATION FOR THESIS EXCELLENCE

1.2012 - 12.2015

- Thesis: *Antarctic biodiversity surveys using high throughput sequencing: understanding landscape and communities of the Prince Charles Mountains.*
- Mentors: Dr. Mark Stevens, Dr. Laurence Clarke, Prof. Dr. Alan Cooper

University of Leipzig, British Antarctic Survey

Leipzig, Cambridge

MSc BIOLOGY

6.2005 - 12.2010

- Thesis: *Origins of Antarctic Tardigrades.*
- Mentors: Dr. Chester Sands, Dr. Mark Stevens, Prof. Dr. Peter Convey
- Majors: Zoology, Genetics, Botany, Plant Physiology

Research Experience

Helmholtz Institute for Metabolic, Obesity, and Vascular Research

Leipzig, Saxony, Germany

BIOINFORMATICS CORE SCIENTIST

since Nov. 2022

- Statistical analyses development (R: linear mixed affect modelling, general additive modelling, differential protein and gene expression analyses, functional protein and gene analyses)
- Multi-Omics data processing (Proteomics, RNAseq, Microarrays, WGS data processed with Bash, Python, and R)
- Multi-Omics pipeline development (SLURM, Nexflow, Snakemake)

Otago University - Department of Anatomy

Dunedin, Otago, New Zealand

POSTDOCTORAL RESEARCH ASSOCIATE

Jun. 2019 - Dec. 2021

- Analysis of environmental DNA from marine conservation areas.
- Genome reconstruction of extinct giant eagle *Harpagornis moorei*
- Eukaryotic environmental DNA analysis of Antarctic soils (Prince Charles Mountains)
- Colorimetric LAMP assays of *Undaria pinnatifida*

Cornell University - Ecology and Evolutionary Biology

Ithaca, New York, USA

POSTDOCTORAL RESEARCH ASSOCIATE

Jun. 2017 - Jun. 2019

- Analysis of environmental DNA from global shipping ports. NSF grant 1427157
- Prokaryotic environmental DNA analysis of Antarctic soils (Vestfold Hills)
- Colorimetric LAMP assays of *Hydrilla verticillata*

Max Plank Institute for Evolutionary Anthropology - Molecular Ecology

Leipzig, Saxony, Germany

RESEARCH ASSISTANT

Jan. 2007 - Oct. 2009

- Extraction, sequencing, and analysis of various ancient DNA samples
- Sanger, 454, Illumina sequencing
- Molecular cloning

Professional Experience

- 2022 **Data Analyst**, The Economist Intelligence Unit, Leipzig, Saxony, Germany
- 2016-2017 **Bioinformatics Consultant**, Antarctic Biological Research Initiative, Adelaide, South Australia, Australia
- 2016 **Staff Scientist**, University of Adelaide, Adelaide, South Australia, Australia
- 2011-2012 **Antarctic Expeditioner**, Australian Antarctic Division, Kingston, Tasmania, Australia
- 2009 **Research Assistant**, Alfred-Wegener-Institute for Polar and Marine Research, Bremerhaven, Bremen, Germany
- 2005-2007 **Zoo Pilot**, Leipzig Zoo, Leipzig, Saxony, Germany

Publications

IN PREPARATION

Czechowski P, Hagemann T, Ghosh A, Sun W, Dong H, Noé F, Wolfrum C, Hoffmann A, Blüher M **RNA sequencing informs on the relationship between omentin-1 expression with clinical phenotypes related to overweight, obesity, insulin resistance and bariatric surgery** In preparation for eLife

Czechowski P, Kardailsky O, Grant H, Knapp M **A draft genome of the extinct giant eagle *Harpagornis moorei*** .

IN REVIEW

Zhang E, Wong, S Y; **Czechowski P**; Terauds A et al. **Antarctic desert ecosystems are at risk due to scales being tipped in favour of increased photosynthetic potential** 2023 Mar; In Review at Global Change Biology. Preprint available from <https://doi.org/10.1101/2021.09.22.461446>

Czechowski P, de Lange M, Heldsinger M, Rayment W, Hepburn C, Ladds M, Knapp M. **An estimate of the species-level fish biodiversity of Te Wāhipounamu / Aotearoa with notes on the shortcomings local of environmental DNA reference data** 2023 June; In Review at Environmental DNA. Preprint available from <https://doi.org/10.1101/2021.10.22.465527>

PUBLISHED

Hoffmann A, Meir AY, Hagemann T, **Czechowski P**, Müller L, Engelmann B, Haange SB, Rolle-Kampczyk U, Tsaban G, Zelicha H, Rinott E, Kaplan A, Shelef I, Stumvoll M, Blüher M, Liang L, Ceglarek U, Isermann B, von Bergen M, Kovacs P, Keller M, Shai I. A polyphenol-rich green Mediterranean diet enhances epigenetic regulatory potential: the DIRECT PLUS randomized controlled trial. *Metabolism*. **2023** May 24;145:155594. Available from doi:10.1016/j.metabol.2023.155594

Varliero G, Lebre P., Stevens M, **Czechowski P**, Makhalanyane, T, Cowan D. **The use of different 16S rRNA gene variable regions in biogeographical studies**. *Environmental Microbiology Reports*. **2023** Feb;Online:1758-2229.13145. Available from <http://dx.doi.org/10.1111/1758-2229.13145>

Andres JA and **Czechowski P** and Grey E, Saebi M, Andres K, Brown C, et al. **Environment and shipping drive eDNA beta-diversity among commercial ports**. *Molecular Ecology*. **2023** Feb;Online. Available from <https://doi.org/10.1111/mec.16888>

Czechowski P, de Lange M, Knapp M, Terauds A, Stevens M. **Antarctic biodiversity predictions through substrate qualities and environmental DNA**. *Frontiers in Ecology and The Environment*. 2022 Dec;20(10):550-557. Available from <https://doi.org/10.1002/fee.2560>

Czechowski P, Stevens MI, Madden C, Weinstein P. **Steps towards a more efficient use of chironomids as bioindicators for freshwater bioassessment: Exploiting eDNA and other genetic tools**. *Ecological Indicators*. 2020 Mar;110:105868. Available from <https://doi.org/10.1016/j.ecolind.2019.105868>

Chang D, Knapp M, Enk J, Lippold S, Kircher M, Lister A, **Czechowski P**, et al. **The evolutionary and phylogeographic history of woolly mammoths: A comprehensive mitogenomic analysis**. *Scientific Reports*. 2017 Mar;7:44585. Available from <https://doi.org/10.1038/srep44585>

Czechowski P, Clarke L, Cooper A, Stevens M. **Ground-truthing Phylotype Assignments for Antarctic Invertebrates**. *DNA Barcodes*. 2017 Jan;5(1):1-13. Available from <http://dx.doi.org/10.1515/dna-2017-0001>

Czechowski P, White D, Clarke L, McKay A, Cooper A, Stevens MI. **Age-related environmental gradients influence invertebrate distribution in the Prince Charles Mountains, East Antarctica**. *Royal Society Open Science*. 2016 Dec;3(12):160296. Available from <https://doi.org/10.1098/rsos.160296>

Czechowski P, Clarke LJ, Cooper A, Stevens MI. **A primer to metabarcoding surveys of Antarctic terrestrial biodiversity**. *Antarctic Science*. 2016 Sep;29(01):3-15. Available from <https://doi.org/10.1017/S0954102016000389>

Czechowski P, Clarke LJ, Breen J, Cooper A, Stevens MI. **Antarctic eukaryotic soil diversity of the Prince Charles Mountains revealed by high-throughput sequencing**. *Soil Biology and Biochemistry*. 2016 Apr;95:112-21. Available from <https://doi.org/10.1016/j.soilbio.2015.12.013>

Alter SE, Meyer M, Post K, **Czechowski P**, Gravlund P, Gaines C, et al. **Climate impacts on transocean dispersal and habitat in gray whales from the Pleistocene to 2100**. *Molecular Ecology*. 2015 Mar;24(7):1510-22. Available from <https://doi.org/10.1111/mec.13121>

Clarke LJ, **Czechowski P**, Soubrier J, Stevens MI, Cooper A. **Modular tagging of amplicons using a single PCR for high-throughput sequencing**. *Molecular Ecology Resources*. 2013 Sep;14(1):117-21. Available from <https://doi.org/10.1111/1755-0998.12162>

Czechowski P, Sands CJ, Adams BJ, D'Haese CA, Gibson JAE, McInnes SJ, et al. **Antarctic Tardigrada: a first step in understanding molecular operational taxonomic units (MOTUs) and biogeography of cryptic meiofauna**. *Invertebrate Systematics*. 2012;26(6):526. Available from <https://doi.org/10.1071/is12034>

Asher RJ, Maree S, Bronner G, Bennett NC, Bloomer P, **Czechowski P**, et al. **A phylogenetic estimate for golden moles (Mammalia, Afrotheria, Chrysochloridae)**. *BMC Evol Biol*. 2010;10(1):69. Available from <https://doi.org/10.1186/1471-2148-10-69>

Awards, Fellowships, & Grants

2017	Support for the SCAR Biology Symposium , Scientific Committee for Antarctic Research	\$ 667
2014	Student Travel Grant , Australian Government's National Taxonomy Research Grant Program	\$ 1 650
2013	Natural History Grants Scheme , Sir Mark Mitchell Research Foundation	\$ 4 900
2012	International Post-Graduate Research Scholarship , The University of Adelaide	\$ 25 849,- <i>p.a.</i>

Presentations

CONFERENCE PRESENTATIONS

Czechowski P, Knapp M. **Environmental DNA needs reference data for taxonomy-based conservation policy – A case study from Fiordland, New Zealand** In: 1st Australian and New Zealand Environmental DNA conference 2023. <https://ednaconference.com.au/>

Czechowski P, Knapp M. **An estimate of the species-level fish biodiversity of Te Wāhipounamu / Aotearoa with notes on the shortcomings local of environmental DNA reference data** In: New Zealand Ecological Society 2022 Conference. <https://confer.eventsair.com/nzes2022/>

Czechowski P, de Lange M, Knapp M, Terauds A, Stevens M **Antarctic biodiversity predictions through substrate qualities and environmental DNA**. In: Xth SCAR Open Science Conference 2022. <https://scar2022.org/>

Czechowski P, Grey-Avis E, Lodge DM **Advancing global monitoring of ship borne invasive species through streamlined metabarcoding**. In: 10th International Conference on Marine Bioinvasions (ICMB-X) 2019. Available from https://marinebioinvasions.info/user/pages/60.archives/_icmb-x/ICMB-X.pdf

Czechowski P, Grey-Avis E, Lodge DM **Advancing global monitoring of ship borne invasive species through streamlined metabarcoding**. In: 4th World Conference on Marine Biodiversity (WCMB) 2018. Available from <http://doi.org/10.7287/peerj.preprints.26573>

Czechowski P, Stevens M **Environmental constraints to terrestrial eukaryote distribution in the Prince Charles Mountains (East Antarctica): exploring high throughput sequencing derived biodiversity capability**. In: XIth SCAR Biology Symposium 2017. <https://kuleuvencongres.be/scarbiology2017/articles/Program.html>

Stevens M, **Czechowski P**. Environmental limits to terrestrial invertebrate distribution in the Prince Charles Mountains (East Antarctica): **Exploring high throughput sequencing derived biodiversity capability**. In: XXXIV SCAR Open Science Conference 2016. Available from: <https://zenodo.org/record/162116>

Czechowski P, White D, Clarke L, Cooper A, Stevens M, **Insights into the soil biodiversity of the Southern Prince Charles Mountains in the context of the abiotic environment**. In: SCAR Open Science Conference and COMNAP Symposium 2014. Available from: <https://zenodo.org/record/53123>

SEMINARS

March 2022. *The holy grail of environmental DNA biodiversity surveys - species level identifications*. Departmental Seminar, Genetics, Max-Planck-Institute for Evolutionary Anthropology, Leipzig, SN, Germany.

November 2021. *Dr. Czechowski or: How I learned to stop worrying and love the environmental DNA*. Departmental Seminar, Anatomy, University of Otago, Dunedin, OTA, New Zealand.

Mentoring

- 2021 **Anya Kardailsky**, Summer Student, Otago University
- 2019 **Amanda Wong**, Summer Student, Cornell University
- 2018-2019 **Eden Zhang**, Graduate Student, University of New South Wales

Service & Professional Development

SERVICE AND OUTREACH

- 2021-2023 **1st Australian and New Zealand Environmental DNA conference**, Organisation Committee
- 2016 **XXIV Scar Open Science Conference**, Abstract Reviewer

PROFESSIONAL DEVELOPMENT

The Carpentries Instructor Training, 20-23 March 2023, The Carpentries, Online

Species Distribution Modelling Using R, 18-21 January 2021, Transmitting Science, Online
Fundamentals of Population Genetics Using R, 30-11 December 2020, PR Statistics, Online
Comparative Genomics, 21-25 December 2020, Physalia Courses, Online
Introduction to MIG welding, 11 August-10 September 2020, Otago Polytechnic, Dunedin, Otago
Python Machine Learning in Biology, 20-24 July 2020, Transmitting Science, Online
Software Carpentry, Python and Git, 26-27 November 2015, University of Adelaide, South Australia
Advanced Bioinformatics Workshop, 10-14 November 2014, University of Adelaide, South Australia
Advanced Bioinformatics Workshop, 11-15 November 2013, University of Adelaide, South Australia
National Bioinformatics Workshop, 5-9 November 2012, University of Adelaide, South Australia
Summer School on Genome Evolution, 5-11 September 2010, LMU Munich, Bavaria

PEER REVIEW

Antarctic Science (2), Diversity (2), Ecological Entomology (1), Ecology and Evolution (1), Freshwater Biology (1), Marine and Freshwater Research (1), Methods in Ecology and Evolution (1), Microbial Genomics (1), Molecular Ecology (1), Polar Biology (4)

PROFESSIONAL MEMBERSHIPS

Association of Polar Early Career Scientists (2015 - current)
European Society for Evolutionary Biology (2022 - current)

REFERENCE CONTACTS

Michael Knapp (Professor)

Department of Anatomy, University of Otago, PO Box 56, Dunedin OTA 9054 New Zealand.

Chris Hepburn (Professor)

Department of Marine Biology, University of Otago, PO Box 56, Dunedin OTA 9054 New Zealand.

Mark Stevens (Senior Research Scientist)

South Australian Museum, North Terrace, Adelaide SA 5000, Australia.

Aleks Terauds (Senior Research Scientist)

Australian Antarctic Division, Kingston TAS 7050, Australia.