KATARINA STUART
Curriculum vitae

School of Applied BioSciences
Macquarie University, Sydney, Australia
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Google Scholar | Website | GitHub

Research Interests

My interests are in evolutionary genomics and exploring the proximate mechanisms that facilitate local adaptation. Most of my research is conducted on introduced species, as successful invasives provide an important opportunity to observe rapid evolution within a species as it responds to a new ecosystem. Understanding rapid adaptation within invasive populations has applications in many scientific fields, including but not limited to pest control, conservation, organism response to climate change, and evolutionary mechanisms. Some of my research focuses on commonly understudied elements of the genome, including structural variation and transposable elements, in order to examine holistic patterns of genomic variation and adaptive potential.

My projects and interests cover a range of fields, including genomics, bioinformatics, ecological statistics, and field ecology.

Education

DOCTOR OF PHILOSOPHY (BIOLOGY) 2018-2022
University of New South Wales
Thesis Title: A genetic perspective on rapid adaptation in the globally invasive European starling (*Sturnus vulgaris*)
Supervisors: Lee A Rollins, Richard J Edwards, & William B Sherwin

BACHELOR OF SCIENCE (ADVANCED) (HONOURS) 2013-2017
University of Sydney
Thesis Title: Mechanisms generating geographic divergence in phenotypic traits within the invasive cane toad in Australia
Supervisors: Richard Shine & Gregory Brown

Professional Appointments

Postdoctoral Research Fellow Sept 2024 - present
Macquarie University

Research Fellow May 2022 – Sept 2024
University of Auckland

Research Assistant 2020-2022
University of New South Wales

Research Assistant August 2017
Deakin University

Grants, Scholarships, & Awards

SCHOLARSHIPS & RESEARCH GRANTS

2024	Genomics Aotearoa ECR Grant	8,000 NZD
2024	UoA FoS Research Fellow Society Publishing Grant	1,000 NZD
2022	GSA Workshop Support Program	1,000 AUD
2022	AES ECR Networking Grant	2,000 AUD
2022	UNSW Science PhD Writing Grant	7,500 AUD

2019;2020	Holsworth Wildlife Research Endowment	6,375;7,500 AUD
2018-2022	Australian Government Research Training Program Scholarship	≈27,000 AUD p.a.

AWARDS

2023	Bioprotection Aotearoa/Genomics Aotearoa ECR Talk Prize	250 NZD
2022	Dean's Award for Outstanding PhD Theses	-
2022	SMBE Invasomics Conference Oral Presentation Award	250 NZD
2021	GSA 2021 Mayo Prize for best student presentation	-
2021	Outstanding E&ERC Postgraduate Researcher	-
2020	Australasian Evolution society student talk award (2nd Place)	200 AUD
2019	The Outstanding Evolution and Ecology Presentation EERC talk	200 AUD
2018	COMBINE 2018 Symposium 3rd place best oral presentation	50 AUD
2018	The Outstanding Evolution and Ecology Presentation EERC (2nd place)	-

TRAVEL GRANTS

2024	UoA FoS Research Fellow Society Travel Fund	1000 NZD
2023	Genomics Aotearoa – He taonga tuku iho scholarship	600 NZD
2023	Queenstown Research Week's Genomics satellite scholarship	1180 NZD
2022	School of Biological Science support scheme	1,500 NZD
2022	SMBE Invasomics Conference	400 NZD
2022	University of Auckland FoS Research Fellow Society	500 NZD
2021	Postgraduate Research Student Support (PRSS) Scheme	1,000 AUD
2020	Genetic Society of Australia Smith-White Travel award	-
2018	ABACBS National Conference CSL travel award	200 AUD

PUBLICATIONS

FIRST/LAST AUTHOR IN-PREP

21. Stuart KC, Atsawawaranunt K, Johnson R, Major R, Ewart KM, Rollins LA, Whibley A, Santure AW (**2024**) Structural variants and transposable elements as hidden components of whole genome variation, *in-prep*

20. Stuart KC (**2024**) A beginners guide to incorporating structural variants into eco-evolutionary and population genomics, *Molecular Ecology, invited review.*

PREPRINT & UNDER REVIEW/REVISION

19. Zhou J, Nelson TM, Lopez CR, Zhou SJ, Ward-Fear G, Stuart KC, Rollins LA (**2021**) Microbial function is related to behavior of an invasive anuran. *BioRXIV*, https://doi.org/10.1101/2020.11.16.385690

PEER REVIEWED ARTICLES

18. Atsawawaranunt K, Stuart KC, Whibley A, Ewart KM, Major RE, Johnson JN, Santure AW (**2024**) Parallel signatures of diet adaptation in the invasive common myna genome, *Molecular Ecology*, Accepted.

17. Stuart KC, Tan HZ, Whibley A, Brekke P, Ewen JG, Santure AW, (**2024**) Lifetime fitness is correlated more strongly with structural variant than SNP mutational load in a threatened bird species, *Molecular Ecology*, Accepted.

16. Thompson B, Atsawawaranunt K, Nehmens M, Pearman W, Perkins E, Tan HZ, Whibley A, Santure AW, Stuart KC (**2024**) Population genetics of the invasive European Starling across Aotearoa, New Zealand, *Molecular Ecology*, Accepted.

15. Tan HZ, Scherer P, Stuart KC, Bailey S, Lee KD, Brekke P, Ewen JG, Whibley A, Santure AW (**2024**) A high-density linkage map allows investigation of fine-scale heterochiasmy in an avian system, *Heredity*, 1-14, https://doi.org/10.1038/s41437-024-00711-3

14. Stuart KC, Atsawawaranunt K, Johnson R, Major R, Ewart KM, Rollins LA, Santure AW, Whibley A (**2024**) The genome of a globally invasive passerine, the common myna (*Acridotheres tristis*), *DNA Research*, 31 (2), dsae005, https://doi.org/10.1093/dnares/dsae005

13. McGaughran A, Dhami MK, Parvizi E, Vaughan AL… Stuart KC,… (**2024**) Genomic tools in biological invasions: current state and future frontiers, *Genome Biology and Evolution*, 16: evad230 https://doi.org/10.1093/gbe/evad230

12. Miller SM, Stuart KC, Burke NW, Rollins LA, Bonduriansky R (**2024**) Genetic and phenotypic consequences of local transitions between sexual and parthenogenetic reproduction in the wild. *American Naturalist*, 203, https://doi.org/10.1086/727511

11. Hofmeister NR, Stuart KC, Warren WC, Werner SJ, Bateson M, Ball GF, Buchanan KL, Burt DW, Cardilini APA, Cassey P, De Meyer T, George J, Meddle SL, Rowland HM, Sherman CDH, Sherwin WB, Berghe WV, Rollins LA, Clayton DF (**2023**). Concurrent invasions by European starlings (Sturnus vulgaris) suggest selection on shared genomic regions even after genetic bottlenecks. *Molecular Ecology*, https://doi.org/10.1111/mec.17195

10. Li-Williams S[†], Stuart KC[†], Comte S, Forsyth DM, Dawson M, Sherwin WB, Rollins LA. (**2023**) Genetic analysis reveals spatial structure in an expanding introduced rusa deer population, *Wildlife Research*, WR22128. https://www.publish.csiro.au/WR/WR22128 ([†] indicates joint first authorship)

9. Stuart KC, Edwards, RJ, Sherwin WB, Rollins, LA. (**2023**) Contrasting patterns of single nucleotide polymorphisms and structural variations across multiple invasions. *Molecular Biology and Evolution*, 40(3): msad046. https://doi.org/10.1093/molbev/msad046

8. Stuart KC[†], Hofmeister NR[†], Zichello JM, Rollins LA. (**2023**) Global invasion history and native decline of the common starling: insights through genetics, *Biological Invasions*. https://doi.org/10.1007/s10530-022-02982-5 ([†] joint first author)

7. Stuart KC, Sherwin WB, Edwards RJ*, Rollins LA* (**2023**) Evolutionary genomics: Insights from the invasive European starlings, *Frontiers in Genetics* ([*] indicates joint last authorship). https://doi.org/10.3389/fgene.2022.1010456

6. Stuart KC[†], Edwards RJ[†], Cheng Y, Warren WC, Burt DW, Sherwin WB, Hofmeister NR, Werner SJ, Ball GF, Bateson M, Brandley MC, Buchanan KL, Cassey P, Clayton DF, De Meyer T, Meddle SL, Rollins LA (**2022**). Transcript- and annotation-guided genome assembly of the European starling. *Molecular Ecology Resources*, https://doi.org/10.1101/2021.04.07.438753 [†] joint first author

5. Stuart KC, Sherwin WB, Cardilini APA, Rollins LA (**2022**). Genetics and plasticity are responsible for climate induced ecogeographical patterns in a recent invasion. *Frontiers in Genetics* DOI: https://doi.org/10.3389/fgene.2022.824424.

4. Stuart KC, Sherwin WB, Austin JJ, Bateson M, Eens M, Brandley MC, Rollins LA (**2022**). Historical museum samples enable the examination of divergent and parallel evolution during invasion. *Molecular Ecology*, 31(6):1836-1852, https://doi.org/10.1111/mec.16353.

3. Stuart KC[†], Cardilini APA[†], Cassey P, Richardson MF, Sherwin W, Rollins LA[*], Sherman CDH[*]. (**2021**) Signatures of selection in a recent invasion reveal adaptive divergence in a highly vagile invasive species. *Molecular Ecology*, 30(6):1419-1434, https://doi.org/10.1111/mec.15601 ([†] indicates joint first authorship, [*] indicates joint last authorship)
Featured in *Molecular Ecology* News and Views: https://doi.org/10.1111/mec.15794

2. Stuart KC, Brown GP, Shine R. (**2019**) Proximate mechanisms underlying the rapid modification of phenotypic traits in cane toads (*Rhinella marina*) across their invasive range within Australia. *Biol J Linnean Soc*. 126(1):68-79, https://doi.org/10.1093/biolinnean/bly150

1. Hudson CM, Brown GP, Stuart KC, Shine R. (**2018**) Sexual and geographical divergence in head widths of invasive cane toads, *Rhinella marina* (Anura: Bufonidae), is driven by both rapid evolution and plasticity. *Biol J Linnean Soc.* 124(2):188-99, https://doi.org/10.1093/biolinnean/bly040

PEER REVIEWED BOOK CHATPERS

2. Stuart KC, Santure AW, Rollins LA. (**2025**) Structural variants and transposable elements as facilitators of rapid evolutionary change in invasive populations. in Rius, M. and Bock, D. Invasion Genomics. *In Review*.

1. Stuart KC, Woolnough AP, Rollins LA. (**2023**) Invasive species detection and management using genomic methods. in Holleley, C.E., Berry, O. and Jarman, S. Applied Ecological Genetics. CSIRO Publishing, Canberra

Teaching Experience

UNDERGRADUATE COURSES - LECTURES

2024 **BIOSCI210: Evolution and the Origin of Life** *UoA, New Zealand*
Guest lecturer

UNDERGRADUATE COURSES - TUTOR

2023 **BIOSCI322: Evolution of Genes, Populations and Species** *UoA, New Zealand*
Lead for the populations genetics and simulating evolution lab for a third year undergraduate course.

2018-2022 **BABS3291: Genes, Genomes and Evolution** *UNSW Sydney, AUS*
Laboratory demonstrator for a third-year biotechnology and biomolecular sciences subject, teaching students with a range of biological and coding knowledge. Key topics include introduction to evolutionary bioinformatics, fundamental genomic principles, and investigation into recent advancements in the field.

2021 **BIOC2201: Principles of molecular biology** *UNSW Sydney, AUS*
Laboratory demonstrator and tutor for a second-year biochemistry subject, with key topics including an introduction to modern molecular biology, molecular mechanisms of gene expression, and fundamental aspects of recombinant DNA technology

2019-2021 **BABS2204: Genetics** *UNSW Sydney, AUS*
Laboratory demonstrator for a second-year biotechnology and biomolecular sciences subject. Duties include supervising classes to ensure safely protocols are adhered to, marking assignments, and supervising assessable tasks. I was responsible for motivating constructive discussion among students, as well as explaining biological processed to students, and assisting with experimental procedures.

2021 **BIOC2101: Principles of Biochemistry** *UNSW Sydney, AUS*
Laboratory demonstrator for a second-year biochemistry subject, with key topics including and introduction to modern biochemistry, and covers fundamental aspects of the structure-function relationships of proteins and an overall coverage of intermediary metabolism.

POSTGRADUATE & OTHER

2022-2024 **Workshop - Genetic Outlier Analysis** *New Zealand & Australia*
Developed materials for a two-day workshop, and successfully hosted six workshops to-date, with over 150 attendees over this time. This workshop covers the basics of PCAdapt, Fst, BayeScan, and BayPass, as well as key discussion around selection analysis on genomic data. Some workshops were hosted in-person and allowed for attendees to bring and analyse their own data. Press release from Australian BioCommons.

2022- **Genomics Aotearoa Workshop Helper** *New Zealand*

2023 Assisted with coding workshops as a facilitator/helper. Courses included 'Introduction to Shell & Unix', and 'Introduction to RNA-seq' workshops.

2020 **Science and Engineering Indigenous Preparatory Program** *UNSW Sydney, AUS*
Project Developer and Instructor for the Science and Engineering Indigenous Preparatory Program. Prepared and delivered 3 hours (lectures and tutorials) of first year university level biology teaching content for incoming and prospective first year university students.

2019 **Workshop - Data Intensive Biology Summer Institute ANGUS 2019** *UC Davis, USA*
Teaching assistant at the ANGUS summer course held through the Data Intensive Biology Summer Institute and the Lab for Data Intensive Biology at UC Davis. Taught learners from varied backgrounds (undergraduate to professorial) genomic practices for analysing big shotgun sequencing data sets over the intensive two-week course, as well as working one on one with learners on their own data sets.

Supervision Experience

2024- **PhD co-supervisor (external) - Neve Kelly**
I am an external co-supervisor to a Ph D student at the University of New South Wales, commencing in mid-2024. Neve will be continuing research from my Ph D into the genomic basis of starling evolution and success.

2023-2024 **Summer student primary supervisor - Bryan Thompson**
Supervised a 3rd year undergraduate student of a 10 week summer period. Introduced the student to genomics using R and the UNIX command line. Student completed SNP variant calling and population genomics exploration of a reduced representation SNP dataset. Bryan's project has been published in the University of Auckland Scientific.

2021-2022 **Masters student unofficial supervisor - Scarlett Li-Williams**
Project involved reduced representation sequencing of invasive deer in conjunction with the NSW Department of Primary Industries.

2019 **NSW Year 12 (high school) Extension Science Project Supervisor**
Primary supervisor for final high school year student on an extension science project. Work covered developing coding, analytical, writing, and general scientific skills to help them produce a report in fulfillment of their course outcomes. Assisted student in preparing a conference presentation, which they gave at the 2019 Australasian Evolution Conference.

Scientific Presentations

INVITED SEMINARS

2024 **University of Rennes, Ecobio department seminar** | Rapid evolution & adaptive potential: perspectives from genomes, invasive species, & history. *Rennes, France*

2024 **The University of Sheffield, Ecology and Evolutionary Biology department seminar** | Rapid evolution & adaptive potential: perspectives from genomes, invasive species, & history. *Sheffield, England*

2023 **Zoology Seminar - Otago University** | Invasive species, and the secrets they can teach us about the genetics of local adaptation. *Virtual*

2023 **Sydney Bioinformatics Seminar Series - University of Sydney** | A genetic perspective on rapid adaptation in the globally invasive European starling (Sturnus vulgaris) *Virtual*

2021 **Queensland Technologies and Innovations group seminar talk – University of Queensland |** The draft genome assembly of the globally invasive common starling, Sturnus vulgaris — *Virtual*

INVITED CONFERENCE TALKS

2023 **Genomics Aotearoa Annual Meeting |** A whole genome perspective on genetic variation and rapid adaptation. — *Dunedin, NZ*

2023 **Queenstown Research Week: He taonga tuku iho – Bioprotection Aotearoa |** A whole genome perspective on genetic variation and rapid adaptation. — *Queenstown, NZ*

2020 **Genetics Society of AustralAsia Award Symposium |** Whole transcripts in genome assembly, annotation, and assessment: the draft genome assembly of the globally invasive common starling, Sturnus vulgaris — *Virtual*

SELECT TALKS

2024 **3rd Joint Congress on Evolutionary Biology |** Structural variants and transposable elements as hidden components of whole genome variation — *Montreal, Canada*

2024 **Genetics society of Australasia |** Structural variants and transposable elements as hidden components of whole genome variation — *Sydney, Australia*

2023 **International Congress of Genetics |** A whole genome perspective on genetic variation and rapid adaptation. — *Melbourne, Australia*

2022 **Australasian Evolution Society National Conference |** Genetics and plasticity are responsible for ecogeographical patterns in a recent invasion. — *ANU, Australia*

2022 **NZ Molecular Ecology Conference |** Contrasting patterns of single nucleotide polymorphisms and structural variations across multiple invasions. — *Auckland, NZ*

2022 **SMBE Invasomics Conference |** Contrasting patterns of single nucleotide polymorphisms and structural variations across multiple invasions. — *UoW, NZ*

2022 **ComBio/Genetics Society of Australasia |** Genetics and plasticity are responsible for ecogeographical patterns in a recent invasion. — *UoM, Australia*

2021 **Australasian Evolution Society Conference |** A genetic perspective on rapid adaptation in the globally invasive European starling (Sturnus vulgaris). — *Virtual*

2021 **Genetics Society of AustralAsia Conference |** A genetic perspective on rapid adaptation in the globally invasive European starling (Sturnus vulgaris). — *Virtual*

2020 **Australasian Evolution Society Conference |** Rapid Adaptation in invasive species: Using historical museum samples to examine evolution in an invasive passerine. — *Virtual*

2020 **Postgraduate Research Forum |** Investigating evolution using invasive species and historical museum samples. — *Virtual*

2020 **ABACBS Virtual Conference |** Whole transcripts in genome assembly, annotation, and assessment: the draft genome assembly of the globally invasive common starling, Sturnus vulgaris. — *Virtual*

2019 **Postgraduate Research Form |** Evolution in invasive species: exploring adaptive divergence and selection across the Australian landscape. — *UNSW, Australia*

2019 **Australasian Evolution Society National Conference |** Local signatures of founding populations confound identification of adaptive divergence in invasive populations. *UNSW, Australia*

2018 **COMBINE Symposium |** Evolution in invasive populations: using genomics to reveal drivers of invasion success in the Australian European starling (Sturnus vulgaris) introduction across Australia. *UMelb, Australia*

2018 **Postgraduate Research Form, University of New South Wales |** Evolution in invasive populations: using genomics to reveal drivers of invasion success in the Australian European starling (Sturnus vulgaris) introduction across space and time. *UNSW, Australia*

POSTERS

2022 **Lorne Genome Conference |** A genetic perspective on rapid adaptation in the globally invasive European starling (Sturnus vulgaris). *Lorne, AUS*

2019 **GIW/ABACBS International Conference |** Using genomics to reveal drivers of invasion success. *USYD, AUS*

2019 **COMBINE/AYRCOB Symposium |** Using genomics to reveal drivers of invasion success. *USYD, AUS*

2018 **ABACBS National Conference |** Evolution in invasive populations: using genomics to reveal drivers of invasion success in the Australian European starling (Sturnus vulgaris) introduction across Australia. *UM, AUS*

SERVICE, OUTREACH & MEDIA

SERVICE

2024- **Genetics Society of Australaisa** – *ECR representative*

2023- **Landscape Genomics Journal Club** - *Lead*
2024 Organising a fortnightly discussion group which discusses key papers within the field of landscape genomics.

2023- **Centre for Computational Evolution – S***eminar Series Organiser*
2024 Co-running the CCE seminar series at the University of Auckland and a hybrid in-person and online seminar series.

2023 **International Congress of Genetics conference 2023** - *Symposia Organiser and Chair*
Organised and chaired the 'Invasion Genomics' session, which included appointing a co-chair, inviting international speakers, and appraising abstracts for inclusion into the scientific program.

2021 **GSA 2021 Virtual Conference Committee** – *Committee Member*
Assisted with the organisation of the 2021 Genetics Society of AustralAsia Virtual Conference.

2018- **Sydney Society for Conservation Biology** – *President, Communications*
2020 Responsible for managing the society board committee, overseeing finances and event organisation and execution. Additionally, responsible for maintaining the social media pages (Facebook and Twitter), and organised and wrote a monthly newsletter for society members.

2019 **COMBINE General Committee -** *Symposium Coordinator*
I was responsible for assembling the 2019 COMBINE symposium committee, supervising the organisation of all aspects of the event. Key roles include meeting outcome deadlines, ensuring budget restraints were met and invoiced, and assisting to organise the assembly of a guest careers panels.

2019- **E&ERC Postgraduate Committee** – *Committee Member*

2020 My job was to provide a lively, inclusive, fun and academically enriching experience for all postgraduates in the E&ERC. I organise formal and informal centre gatherings, two seminar speakers, encourage student participation in centre activities and help integrate new students.

2019 **GIW/ABACBS 2019 Conference Committee** – *COMBINE Representative*
Liaised between the ABACBS conference committee and COMBINE symposium committee to ensure budget and time restraints were met.

2019 **AES 2019 Conference Committee**– *Committee Member*
Assisted with the organisation of the 2019 Australasian Evolution Society Conference.

OUTREACH & MEDIA

2020, 2022 **Boiling Point Science Podcast** – *Guest*
Guest on EastSide 89.7 FM science podcast Boiling Point (August 2020, May 2022)

2014-2019 **Australian National Museum -** *Volunteer*
Assisting with running events and demonstration, chaperoning school groups, and general communications and operational duties during Australian Science Week.

2016 **Friends of Fogg Dam -** *Invited Speaker*
Gave a talk to a community ecology and restoration group on the developing aspects of my honours research.

Professional Development & Training

2022 **Carpentries Instructor Training and Certification** *University of Auckland, NZ*

2020 **UNSW Women in Maths and Science Champions Program** *UNSW Sydney, AUS*

2020 **Sessional Staff Development Program** *UNSW Sydney, AUS*

2018 **Bioconductor Hands-on Training Day** *University of Melbourne, AUS*
4th Bioconductor Asia meeting

2018 **Sample Size and Power Calculations** *UNSW Sydney, AUS*
Stats Central

2018 **ANGUS - Analysing Sequencing Data** *UC Davis, USA*
Data Intensive Biology Summer Institute

2018 **Software Carpentry Workshop - R, Unix shell, Git** *Curtin University, AUS*

Professional Membership & Reviews

MEMBERSHIP

2022- **Society for Molecular Biology and Evolution** (SMBE)

2020- **Genetics Society of AustralAsia** (GSA)

2019- **AustralAsian Evolution Society** (AES)

2018-2024 **Australian Bioinformatics and Computational Biology Society** (ABACBS)

2018-2021 **Ecological Society of Australia** (ESA)

REVIEWS

Biological Conservation, Biological Invasions, Biological Reviews, Ecology and Evolution, European Journal of Wildlife Research, Evolutionary Applications, Molecular Ecology, Molecular Ecology Resources, PeerJ, Scientific Reports

REFERENCES

Associate Professor Anna Santure a.santure@auckland.ac.nz
School of Biological Sciences, University of Auckland, Auckland, NZ

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Dr Rich Edwards | Ocean Genomes Laboratory Lead rich.edwards@uwa.edu.au
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