

# Curriculum vitae - Rishi De-Kayne

I am an evolutionary biologist using computational genomics to study the genetic basis of traits and evolutionary processes, including adaptation, with the ultimate goal of solving real-world problems.

## Personal information:

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**Postdoctoral Researcher – University of Edinburgh, UK**

**Email:** [Rishi.De-Kayne@ed.ac.uk](mailto:Rishi.De-Kayne@ed.ac.uk)

**Website:** <https://rishidekayne.github.io/>

**Google scholar:** <https://scholar.google.co.uk/citations?user=mgVYiCQAAAAJ&hl=en>

**GitHub:** <https://github.com/RishiDeKayne/>

## Academic education and employment:

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| 08/2021-present | <b>SNSF Early Postdoc Mobility Fellow – Independent Postdoctoral Researcher</b><br>Martin Lab – University of Edinburgh, UK<br><u>Project:</u> The evolution and maintenance of wing-pattern supergenes in <i>Danaus</i> butterflies                                 |
| 02/2021-07/2021 | <b>Postdoctoral Research Associate</b><br>Martin Lab – University of Edinburgh, UK   |
| 10/2016-12/2020 | <b>PhD – Pass <i>insigni cum laude</i></b><br>University of Bern, Switzerland<br><u>Title:</u> The genetic basis of adaptation and speciation in the Swiss Alpine whitefish radiation<br><u>Project supervisors:</u> Prof. Ole Seehausen & Dr. Philine G. D. Feulner |
| 10/2015-10/2016 | <b>MRes Tropical Forest Ecology – Pass with Distinction</b><br>Imperial College London, UK<br><u>Thesis:</u> Endophytic fungal, not bacterial, communities differ between sympatric palm species<br><u>Project supervisor:</u> Prof. Vincent Savolainen              |
| 08/2015-09/2015 | <b>Field Technician</b><br>Savolainen Lab – Imperial College London/Lord Howe Island   |
| 07/2014-09/2014 | <b>Undergraduate Research Opportunity Placement Student</b><br>Bidartondo Lab – Kew Gardens  |
| 10/2012-10/2015 | <b>BSc Biology – 1<sup>st</sup> Class Honours</b><br>Imperial College London, UK<br><u>Thesis:</u> Resolving the phylogeny of the sharks using 20 transcriptomes<br><u>Project supervisor:</u> Prof. Vincent Savolainen  |

## Publications:

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I have **6 publications (5/6 as first author)** accepted for publication in internationally recognised peer reviewed journals with a total of **85 citations and an h-index of 4** (Google Scholar) – with 3 additional manuscripts in peer review (2 as first author). \* = joint first authorship

9. K-W Kim\*, **R De-Kayne\***, IJ Gordon, KS Omufwoko, DJ Martins, SH Martin  
Stepwise evolution of a butterfly supergene via duplication and inversion – *in review at*  
*Proceedings of the Royal Society B* (preprint – [bioRxiv 2021.12.06.471392](https://doi.org/10.1101/2021.12.06.471392))

8. **R De-Kayne**, OM Selz, D Frei, O Seehausen, PGD Feulner  
Hybridization and mixed genetic architectures facilitate adaptive radiation – *in second round of review at Nature Communications* (manuscript available upon request)
7. D Frei, **R De-Kayne**, OM Selz, O Seehausen, PGD Feulner  
Speciation reversal impacts genomes of all species in an adaptive radiation – *accepted with minor revision at Nature Ecology and Evolution* (manuscript available upon request)
6. KS Singh\*, **R De-Kayne\***, KS Omufwoko, R ffrench-Constant, C Bass, D Martins, SH Martin  
Genome assembly of *Danaus chrysippus* and comparison with the Monarch *Danaus plexippus* – *accepted, in press G3: Genes, Genomes, Genetics* (preprint – bioRxiv 2021.11.27.470194)
5. **R De-Kayne\***, D Frei\*, R Greenway, SL Mendes, C Retel, PGD Feulner (2021)  
The future of next generation sequencing datasets: technological shifts provide opportunities but pose challenges for reproducibility and reusability. *Molecular Ecology Resources* 21: 653–660
4. **R De-Kayne**, S Zoller, PGD Feulner (2020)  
A de novo chromosome-level genome assembly of *Coregonus* sp. “Balchen”: one representative of the Swiss Alpine whitefish radiation. *Molecular Ecology Resources* 20:1093–1109
3. **R De-Kayne**, PGD Feulner (2018)  
A European whitefish linkage map and its implications for understanding genome-wide synteny between salmonids following whole genome duplication. *G3: Genes, Genomes, Genetics* 8: 3745-3755
2. OG Osborne\*, **R De-Kayne\***, MI Bidartondo, I Hutton, WJ Baker, CGN Turnbull, V Savolainen (2017) Arbuscular Mycorrhizal fungi promote coexistence and niche divergence of sympatric palm species on a remote oceanic island. *New Phytologist* 217:1254-1266
1. PGD Feulner, **R De-Kayne** (2017)  
Genome evolution, structural rearrangements and speciation. *Journal of Evolutionary Biology* 30:1488-1490

## Personal skills:

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- Programming: proficient in R and Bash, experience with Python and using Git.
- Experience in genome assembly and annotation, genetic association studies, and population genetic analysis of large datasets, all using high performance scientific computing clusters.
- Molecular lab experience: extensive molecular lab experience including and sequencing library preparation and high molecular weight DNA extraction for genome sequencing.
- Wet-lab experience: Aquarium experience breeding and rearing salmonid larvae.
- Fieldwork experience: biodiversity studies and species-specific collections in multiple habitats across Australia, Malaysia, and South Africa.
- Herbarium specimen preparation and organization.

## Grants, prizes, and awards:

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- SNSF Early Postdoc Mobility fellowship (18 months) – **CHF 73,150/£**
- Best student talk at PopGroup53 01/2020 – **1st Place - CHF 316/£**
- Best student poster at PopGroup51 01/2018 – **2nd Place - CHF 190/£**
- Best conference poster at Biology20 02/2020 – **2nd Place - CHF 150/£**

## Teaching Experience:

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### **OH-KNOW Bioinformatics Workshop 09/2021**

I co-organised this four-day online workshop aimed at teaching and discussing the latest k-mer based tools for bioinformatics using high-performance computing platforms. During the workshop I wrote and taught a ‘bash refresher’ course introducing participants to bash scripting for bioinformatics and the programming basics required for working on a computer cluster and assisted with all subsequent teaching topics. I am currently writing a manuscript with my co-organizers about the power of k-mers for addressing genome evolution questions that directly resulted from the workshop.

### **University of Bern – Practical in Aquatic Ecology and Evolution 03-05/2018, 03-05/2019, and 04/2021**

In this course, students designed their own practical investigation to study the ecology and evolution of fish in Swiss lakes. In both 2018 and 2019 these projects revolved around scale and fossil bones excavated from sediment cores collected from various Swiss lakes. The students collected the sediment cores, extracted fossils, carried out the necessary molecular lab, analysed their data, and wrote the investigation up in manuscript format. I assisted during all stages of the practical and wrote and presented an ‘introduction to scientific writing’ guide to help the students through the writing process. I then graded student reports at the end of the practical. In 2021 I was invited to give a guest lecture on scientific writing.

### **University of Bern – Introduction to R for Beginners 09/2019**

In this five-day course, second- and third-year BSc students received an introduction to R covering basic syntax, an outline of different data types, linear modelling, writing functions, and carrying out descriptive statistics in R. I assisted students to work through R exercises throughout the course and provided them with feedback on their code. I also graded the final homework exercises from the course.

## Student mentorship:

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### **Co-supervision of Michelé Leemann – University of Bern MSc Bioinformatics Student 07-09/2021**

This short project aimed to use existing sequencing data for Alpine whitefish to assemble and annotate the Alpine whitefish mitochondrial genome. My supervision involved setting up Michelé to work on the computer cluster and advising her on the most suitable approaches and software to carry out the genome assembly and annotation as well as possible analyses with this new data including the production of a new mitochondrial phylogeny for the Alpine whitefish radiation. We are in the process of pursuing the publication of this work.

### **Co-supervision of Romano Josi – University of Bern BSc Summer Research Student 06-07/2017**

This research project used diagnostic microsatellites to determine the pedigree of lab-reared whitefish larvae and test for the presence of gynogenetic haploid individuals. My supervision involved training Romano in molecular lab techniques including DNA extraction, PCR, and microsatellite sequencing and analysis.

## Outreach and science communication:

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I founded and manage the PhDetails blog: <http://phdetails.blogspot.com/> - featuring interviews with biology PhD students from around the world to promote the diversity of students in biology. Over 100 PhD students have been featured to date. I also write broader interest articles on the PhDetails blog and have contributed to The Molecular Ecologist Blog <https://www.molecular ecologist.com/>.

## Contributions to conferences and seminars:

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20. **R De-Kayne**, K-W Kim, IJ Gordon, KS Omufwoko, DJ Martins, SH Martin - Stepwise evolution of a butterfly supergene via duplication and inversion. *55nd Population Genetics Group Meeting (PopGroup55)*, Norwich, UK (online) 01/2021 - **Oral presentation**
19. **R De-Kayne**, OM Selz, D Frei, O Seehausen and PGD Feulner. A mixed genetic architecture and gene flow facilitate adaptive radiation. *Understanding 'reproductive isolation'? ESEB satellite symposium*, Online 09/2021 - **Oral presentation**
18. **R De-Kayne**, OM Selz, O Seehausen and PGD Feulner. The genomic basis of adaptation and speciation in the Alpine whitefish radiation. *COMgen Seminar Series*, University of Nottingham 02/2021 - **Invited Seminar**
17. **R De-Kayne**, OM Selz, D Frei, O Seehausen and PGD Feulner. Genomic insights into the evolution of the Alpine whitefish radiation. *CIGENE Seminar Series*, Norwegian University of Life Sciences 02/2021 - **Invited Seminar**
16. **R De-Kayne**, OM Selz, D Frei, O Seehausen and PGD Feulner. Dissecting the evolutionary mechanisms driving Alpine whitefish diversification, *54nd Population Genetics Group Meeting (PopGroup54)*, Liverpool, UK (online) 01/2021 - **Oral presentation**
15. **R De-Kayne**, S Zoller, O Seehausen and PGD Feulner. From palms to whitefish – understanding the genetic basis of adaptation and speciation. *Eawag Aquatic Ecology & Macroevolution Seminar Series 2020*, Kastanienbaum, Switzerland 04/2020 - **Seminar**
14. **R De-Kayne**, S. Zoller, O Seehausen and PGD Feulner. Towards understanding adaptation and speciation in the Swiss Alpine whitefish radiation. *Biology20 Conference*, Freiburg, Switzerland 02/2020 – **Poster presentation**
13. **R De-Kayne**, S Zoller, O Seehausen and PGD Feulner. Towards understanding adaptation and speciation in the Swiss Alpine whitefish radiation. *53<sup>rd</sup> Population Genetics Group Meeting (PopGroup53)*. Leicester, UK 01/2020 - **Oral presentation**
12. **R De-Kayne**, S Zoller, O Seehausen and PGD Feulner. A de novo chromosome-level genome assembly of *Coregonus steinmanni* – towards understanding adaptation and speciation in the Swiss Alpine whitefish radiation. *4th International Conference on Integrative Salmonid Biology (ICISB2019)*. Edinburgh, UK 11/2019 - **Oral presentation**
11. **R De-Kayne**, S Zoller, O Seehausen and PGD Feulner. Genomics of adaptation in the Alpine whitefish radiation - genomic resources to study adaptation and speciation. *2019 Congress of the European Society for Evolutionary Biology (ESEB2019)*. Turku, Finland 08/2019 - **Poster presentation**
10. **R De-Kayne**, S Zoller and PGD Feulner. Assembling the genome of *Coregonus steinmanni* – unlocking the secrets of the Swiss Alpine whitefish radiation. *EAWAG Fish Ecology and Evolution Symposium 2019*. Kastanienbaum, Switzerland 07/2019 - **Oral presentation**
9. **R De-Kayne**, S Zoller, O Seehausen and PGD Feulner. Towards the understanding of adaptation and speciation in the Swiss Alpine whitefish radiation. *Biology19 Conference*. Zurich, Switzerland 02/2019 - **Oral presentation**

8. **R De-Kayne**, S Zoller, O Seehausen and PGD Feulner.. Towards the understanding of adaptation and speciation in the Swiss Alpine whitefish radiation. *52nd Population Genetics Group Meeting (PopGroup52)*. Oxford, UK 01/2019 - **Oral presentation**
7. **R De-Kayne**, S Zoller, O Seehausen and PGD Feulner.. The Swiss Alpine whitefish radiation – first steps in understanding the genomic basis of adaptation and speciation. *Programming for Evolutionary Biology (PEB) Conference 2018*. Buttermere, UK 09/2018 - **Oral presentation**
6. **R De-Kayne**, O Seehausen and PGD Feulner. The Swiss Alpine whitefish radiation – genomic resources to study adaptation and speciation. *2018 Congress of the European Society for Evolutionary Biology (ESEB2018)*. Montpellier, France 08/2018 - **Poster presentation**
5. **R De-Kayne**, O. Seehausen and P.G.D. Feulner. Producing genomic resources for pre-Alpine whitefish and what they can tell us about genome evolution. *EAWAG Fish Ecology and Evolution Symposium 2018*. Kastanienbaum, Switzerland 06/2018 - **Oral presentation**
4. **R De-Kayne**, O Seehausen and PGD Feulner. Constructing a linkage map for Swiss Alpine whitefish. *Biology18 Conference*. Neuchatel, Switzerland 02/2018 - **Poster presentation**
3. **R De-Kayne**, O Seehausen and PGD Feulner. Constructing a linkage map for Swiss Alpine whitefish. *51st Population Genetics Group Meeting (PopGroup51)*. Bristol, UK 01/2018 - **Poster presentation**
2. **R De-Kayne**, O Seehausen and PGD Feulner. Investigating the genomic basis of adaptation and speciation in the Alpine whitefish radiation. *EAWAG Fish Ecology and Evolution symposium 2017*. Kastanienbaum, Switzerland 06/2017 - **Oral presentation**
1. **R De-Kayne**, O Seehausen and PGD Feulner. The genomic basis of adaptation and speciation in the Swiss Alpine whitefish radiation. *Biology17 Conference*. Bern, Switzerland 01/2017 **Poster presentation**

## Academic Service:

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- Scientific manuscript reviewing for: G3 (Genes, Genomes and Genetics), Molecular Ecology Resources, Journal of Evolutionary Biology, Genome Biology and Evolution, Molecular Biology and Evolution, and Proceedings of the Royal Society B.
- Scientific grant reviewing for: Great Lakes Fisheries Commission
- PhD and Postdoc representative (Unteren Mittelbau) on the hiring committee for a new Professor for Theoretical Ecology and Evolution at the University of Bern 2019.

## References (available upon request):

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### **Dr. Simon Martin**

Institute of Evolutionary Biology  
The University of Edinburgh  
Simon.Martin@ed.ac.uk

### **Prof. Ole Seehausen**

Department of Fish Ecology and Evolution  
Eawag/University of Bern  
ole.seehausen@eawag.ch

### **Dr. Philine Feulner**

Department of Fish Ecology and Evolution  
Eawag  
philine.feulner@eawag.ch

### **Prof. Catherine Peichel**

Institute of Ecology and Evolution  
University of Bern  
catherine.peichel@iee.unibe.ch