

Dr. Milan Malinsky

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EMPLOYMENT HISTORY

*Institute of Ecology and Evolution, University of Bern, Switzerland***Principal Investigator, SNSF Ambizione Grant** **Apr. 2021 – (Mar. 2025)**

- "Evolution of meiotic recombination and genomic divergence in percomorph fishes"

*Zoological Institute, University of Basel, Switzerland***EMBO Postdoctoral Fellowship + SNSF postdoc** **Oct. 2016 – Mar. 2021**

- Advisor: Prof. Walter Salzburger
- Initially funded by a personal EMBO fellowship, this then expanded into Prof. Salzburger's SNSF grant "The genomic basis of divergence and convergence in fish species-flocks"

*Gurdon Institute, University of Cambridge, UK***Postdoctoral scientist** **Oct. 2015 – Sep. 2016**

- Advisor: Prof. Eric Miska; continuing work on topics arising from my PhD
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EDUCATION

*Sanger Institute, University of Cambridge, UK***PhD in Mathematical Genomics** **Oct. 2011 - Sep. 2015**

- **PhD defense 9th November 2015**
- Main advisor: Prof. Richard Durbin, co-advisor: Prof. Eric Miska
- Thesis: "Genomic diversity and speciation in East African cichlid fish"

*Department of Applied Mathematics, University of Cambridge, UK***Master's (MPhil) in Computational Biology** **Oct. 2010 - Aug. 2011****Graduated with a distinction**

- Course covering various approaches to working with quantitative biological data, from computational neuroscience, to systems biology, to statistical genetics.
Dissertation: "*C. elegans* chromatin proteins HPL-2 and LIN-13"

*University of Birmingham, UK***BSc Computer Science with Business Management, Class: I** **Sep. 2007-Jun. 2010**

- Two thirds Computer Science, one third Business Management
 - Final year project in the field of algorithms for medical imaging
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Continuing education:**EMBO Laboratory Leadership Course, Heidelberg, Germany** **Sep. 2018**

- A three-day course covering e.g. leadership roles, team development, delegation, communication, feedback + coaching, negotiation, recruitment

Workshop on Molecular Evolution, MBL, Woods Hole, MA, USA **Jul. 2013**

TEACHING ACTIVITIES

Workshops on Population and Speciation Genomics Feb. 2016, 2018, 2020; Jun. 2022

Co-organiser of two-week courses for ~70 scientists across all seniority levels

Running classes e.g., on UNIX introduction, population structure/size, probability and likelihood.

<https://evomics.org/2022-workshop-on-population-and-speciation-genomics-cesky-krumlov/>**Evolutionary Genomics MSc Course, University of Bern** **May 2022 - 2024**

Development of curriculum, computer labs, lecturing on topics at the intersection of phylogenomics and population genetics

Phylogenomics Workshop - Physalia Courses **Nov. 2020**Instructor on a one-week online course for ~25 scientist

APPROVED RESEARCH PROJECTS

"Evolution of meiotic recombination and genomic divergence in percomorph fishes",
SNSF Ambizione Grant (954,789CHF ~ €950,000), Apr. 2021 – Mar. 2025
Grant number: PZ00P3_193464; <https://p3.snf.ch/project-193464>

"Molecular basis of convergent evolution between cichlid fishes of lakes Malawi and Tanganyika", EMBO Postdoctoral fellowship (157,659CHF ~ €155,000), Oct. 2016 – Sep. 2018
Grant number: ALTF 456-2016

"Genotype/phenotype relationships in fast evolving vertebrate species - African Lake cichlids as a model system", Wellcome Trust PhD studentship (£155,658 ~ €185,000), Oct. 2011 – Sep. 2015
Grant number: 097677/Z/11/Z; <https://app.dimensions.ai/details/grant/grant.3640527>

SUPERVISION OF JUNIOR RESEARCHERS

Formal supervisor role:

PhD project at University of Bern – main supervisor **Sep. 2021 – now**
Marion Talbi – "Evolution of recombination landscapes"

PhD student, University of Antwerp – co-supervisor **Jan. 2021 – now**
Sophie Gresham; main PI Prof. Hannes Svandal
"The role of gene-flow in adaptive radiations"

Master's project, University of Bern **Sep. 2023 – now**
Laura Dekker – "Building a 'pangenome' for a massive adaptive radiation"

Master's project, University of Cambridge **Mar. 2013 – Jul. 2013**
Joseph J. Hanly – "Evidence for functional evolution of a miR-99b target site in related species of cichlid fishes"

Informal supervision (examples):

Training a new postdoc at the Sanger Institute **Apr. 2016**
Ian Wilson – Alignment, variant calling etc. with a high-performance computing cluster

Supervising a research assistant at the Sanger Institute **Feb. 2014 – Apr. 2014**
Daniel James – Automating genome assembly pipelines

REVIEWING ACTIVITIES

Grant proposal reviews:

European Research Council – ERC Starting Grant, August 2022
Austrian Academy of Sciences – DOC fellowship, May 2018

Manuscript reviews (22 manuscripts):

Current Biology – 3x, Jan. 2017, Feb. 2019 (with W. Salzburger), May 2024
Evolution – 1x, Dec. 2021
Genome Biology and Evolution – 2x, Nov. 2015, Nov. 2021
GigaScience – 2x, Sep. 2018 and Feb. 2019
Journal of Evolutionary Biology – 2x, Oct. 2020, Apr. 2021
Molecular Biology and Evolution – 2x, Jul. 2020, Oct. 2021
Molecular Ecology – 2x, Jul. 2018, May 2024
Molecular Ecology Resources – 2x, Aug. 2016 and Jun. 2018
Nature Ecology and Evolution – 1x, Sep. 2018
PLoS Genetics – 2x, Sep. 2019, Dec. 2020
Science – 2x, Aug. 2016 (with E. A. Miska), May 2023
Systematic Biology – 1x, Jan. 2024

Reviewing workshop applications:

Together with a panel of co-directors, selecting participants for the Workshop on Population and Speciation genomics, based on CVs and cover letters – Sep. 2017, Sep. 2019, and April 2022

PRIZES, AWARDS, FELLOWSHIPS

EMBO Postdoctoral fellowship	Oct. 2016 – Sep. 2018
Wellcome Trust PhD studentship - See "Approved research projects"	Oct. 2011 – Sep. 2015
BBSRC Master's Studentship - £18,151 (≈23,000 CHF) - Competitive studentship to fund the fees and living costs for my course in Cambridge	Oct. 2010 – Aug. 2011

RESEARCH OUTPUT

Publications:

Peer reviewed:

1. Sommer-Trembo, C., Santos, M. E., Clark, B., Werner, M., Fages, A., Matschiner, M., Hornung, S., Ronco, F., Oliver, C., Garcia, C., Tschopp, P., **Malinsky, M.*** & Salzburger, W.* (2024) The genetics of niche-specific behavioral tendencies in an adaptive radiation of cichlid fishes. *Science* 384, 470–475. doi: <https://doi.org/10.1126/science.adj9228>. *joint corresponding authors
2. Koppetsch, T., **Malinsky, M.** & Matschiner, M. (2024) Towards reliable detection of introgression in the presence of among-species rate variation. *Systematic Biology* syae028. doi: <https://doi.org/10.1093/sysbio/syae028>.
3. Choo, L.Q., Spaggiardi, G., **Malinsky, M.**, Choquet, M., Goetze, E., Hoarau, G. & Peijnenburg, K.T.C.A. (2023), Genome-wide phylogeography reveals cryptic speciation in the circumglobal planktonic calcifier *Limacina bulimoides*. *Molecular Ecology* 32, 3200–3219. doi: <https://doi.org/10.1111/mec.16931>.
4. Barth, J.M.I., Handley, S.A., Kintzi, D., Leonard, G., **Malinsky, M.**, Matschiner, M., Meyer, B. S., Salzburger, W., Stefka, J., Trucchi, E. (2023) The history and organization of the Workshop on Population and Speciation Genomics. *Evolution: Education & Outreach* 16, 2. doi: <https://doi.org/10.1186/s12052-023-00182-w>.
5. Vernaz, G., Hudson, A. G., Santos, M. E., Fischer, B., Carruthers, M., Shechonge, A. H., Gabagambi, N. P., Tyers, A. M., Ngatunga, B. P., **Malinsky, M.**, Durbin, R., Turner, G. F., Genner, M. J. & Miska, E. A. (2022) Epigenetic Divergence during Early Stages of Speciation in an African Crater Lake Cichlid Fish. *Nature Ecology & Evolution*, 1-12. doi: <https://doi.org/10.1038/s41559-022-01894-w>.
6. Ciezarek, A., Ford, A.G.P., Etherington, G.J., Kasozic, N., **Malinsky, M.**, Mehta, T., Penso-Dolfine, L., Ngatunga, B.P., Shechonge, A., Tamatamah, R., Haerty, W., Di Palma, F., Genner, M.J. & Turner, G.F. (2022) Whole genome resequencing data enables a targeted SNP panel for conservation and aquaculture of *Oreochromis* cichlid fishes. *Aquaculture*, 548 (2). doi: <https://doi.org/10.1016/j.aquaculture.2021.737637>.
7. Vernaz, G., **Malinsky, M.**, Svoldal, M., Du, M., Tyers, A. M., Santos, M. E., Durbin, R., Genner, M. J., Turner, G. F. & Miska, E. A. (2021) Mapping Epigenetic Divergence in the Massive Radiation of Lake Malawi Cichlid Fishes. *Nature Communications*, 12, 5870. doi: <https://doi.org/10.1038/s41467-021-26166-2>.
8. Svoldal, H., Salzburger, W. & **Malinsky, M.** (2021) Genetic Variation and Hybridization in Evolutionary Radiations of Cichlid Fishes. *Annu. Rev. Anim. Biosci.* 9, 55–79. doi: <https://doi.org/10.1146/annurev-animal-061220-023129>.
9. **Malinsky, M.**, Matschiner, M. & Svoldal, H. (2021) Dsuite - Fast D-statistics and related admixture evidence from VCF files. *Molecular Ecology Resources*, 21, 584–595. doi: <https://doi.org/10.1111/1755-0998.13265>.
10. Ronco, F., Matschiner, M., Böhne, A., Boila, A., Büscher, H.H., El Taher, A., Indermaur, A., **Malinsky, M.**, Ricci, V., Kahmen, A., Jentoft, S. & Salzburger, W. (2021) Drivers and dynamics of a massive adaptive radiation in cichlid fishes. *Nature*, 589, 76–81. doi: <https://doi.org/10.1038/s41586-020-2930-4>.
11. Rhie, A., McCarthy, S. A. ... (44 others) ... **Malinsky, M.**, ... (72 others) ... Durbin, R., Phillippy, A. M. & Jarvis, E. D. (2021) Towards complete and error-free genome assemblies of all vertebrate species. *Nature*, 592, 737–746. doi: <https://doi.org/10.1038/s41586-021-03451-0>.
12. Patil, C., Sylvester, J. B., Abdilleh, K., Norsworthy, M. W., Pottin, K., **Malinsky, M.**, Bloomquist, R. F., Johnson, Z. V., McGrath, P. T. & Strelman, J. T. (2021) Genome-enabled inference of evolutionary divergence in brains and behaviour. *Scientific Reports*, 11, 13016. doi: <https://doi.org/10.1101/2020.10.12.336453>.
13. Carleton, K. L., Conte, M. A., **Malinsky, M.**, Nandamuri, S. P., Sandkam, B. A., Meier, J. I., Mwaiko, S., Seehausen, O. & Kocher, T. D. (2020) Movement of transposable elements contributes to cichlid diversity. *Molecular Ecology*, 29, 4956–4969. doi: <https://doi.org/10.1111/mec.15685>.

14. Svardal, H., Quah, F. S., **Malinsky, M.**, Ngatunga, B. P., Miska, E. A., Salzburger, W., Genner, M. J., Turner, G. F., Durbin, R. (2020) Ancestral hybridisation facilitated species diversification in the Lake Malawi cichlid fish adaptive radiation. *Mol. Biol. Evol.* 37, 1100–1113. doi: <https://doi.org/10.1093/molbev/msz294>.
15. **Malinsky, M.**, Svardal, H., Tyers, A. M., Genner, M. J., Turner, G. F. Miska, E. A., Durbin, R. (2018) Whole genome sequences of Malawi cichlids reveal multiple radiations interconnected by gene flow. *Nature Ecology & Evolution* 2, 1940–1955. doi: <https://doi.org/10.1038/s41559-018-0717-x>.
16. **Malinsky, M.**, Trucchi, E., Lawson, D. J. & Falush, D. (2018) RADpainter and fineRADstructure: Population Inference from RADseq data. *Mol. Biol. Evol.* 35, 1284–1290. doi: <https://doi.org/10.1093/molbev/msy023>.
17. **Malinsky, M.** and Salzburger, W. (2016) Environmental context for understanding the iconic adaptive radiation of cichlid fishes in Lake Malawi. *PNAS*, 113, 11654–11656. doi: <https://doi.org/10.1073/pnas.1614272113>.
18. **Malinsky, M.**, Challis, R., Tyers, A. M., Schiffels, S., Terai, Y., Ngatunga, B. P., Miska, E. A., Durbin, R., Genner, M. J., Turner, G. F. (2015). Genomic islands of speciation separate cichlid ecomorphs in an East African crater lake. *Science* (New York, N.Y.), 350(6267), 1493-8. doi: <https://doi.org/10.1126/science.aac9927>.
19. Brawand, D., Wagner, C. E., Li, Y. I., **Malinsky, M.**, Keller, I., Fan, S., Simakov, O., Ng, A. Y., Lim, Z. W., Bezault, E., ... (76 others) ... and Di Palma, F. (2014). The genomic substrate for adaptive radiation in African cichlid fish. *Nature*, 513(7518), 375–381. doi: <https://doi.org/10.1038/nature13726>.
20. **M. Malinsky**, M. Jermyn, B. Pogue, and H. Dehghani (2010). "An Online Modeling and Image Reconstruction Tool for Optical Imaging Based on NIRFAST" in *Biomedical Optics and 3-D Imaging, OSA Technical Digest* , paper BSuD27; doi: <https://doi.org/10.1364/BIOMED.2010.BSuD27>.

Preprints:

1. Talbi, M., Turner, G. F & **Malinsky, M.** (2024) Rapid evolution of recombination landscapes during the divergence of cichlid ecotypes in Lake Masoko. bioRxiv 2024.03.20.585960; doi: <https://doi.org/10.1101/2024.03.20.585960>.
2. Nichols, A. L. A., Shafer, M. E. R, Indermaur, A., Rüegg, A., Gonzalez-Dominguez, R., **Malinsky, M.**, Sommer-Trembo, C., Fritschi, L., Salzburger, W. & Schier, A. F. (2024) Widespread temporal niche partitioning in an adaptive radiation of cichlid fishes. bioRxiv 2024.05.29.596472, doi: <https://doi.org/10.1101/2024.05.29.596472>.
3. Omelchenko, D., Bitja-Nyom, A. R., Matschiner, M., **Malinsky, M.**, Indermaur, A., Salzburger, W., Bartoš, O. & Musilova, Z. (2024) Hemoglobin gene repertoire in teleost and cichlid fishes shaped by gene duplications and genome rearrangements. bioRxiv 2024.03.26.586788; doi: <https://doi.org/10.1101/2024.03.26.586788>.
4. **Malinsky, M.**, Simpson, J. T. & Durbin, R. (2016) trio-sga: facilitating de novo assembly of highly heterozygous genomes with parent-child trios. *bioRxiv* 20, 051516. doi: <https://doi.org/10.1101/051516>.

Contributions to international conferences:

Conference organizer:

1. **RecomBern 2024**: "Evolution of recombination landscapes - Facilitating adaptation?", Bern, Switzerland. www.recombern2024.org

Symposium organizer:

1. ESEB conference (2022) "Characterizing genomic landscapes of recombination and their evolution" Co-organized with Pierre-Alexandre Gagnaire
Link: https://www.eseb2022.cz/en/event-programme?programme_block_id=23

Oral contributions:

1. **Malinsky, M.** "Exploratory behavior and genetics of species diversification". **NORBIS (Norwegian Bioinformatics Graduate school) annual conference (2024)**, Egmond aan Zee, Netherlands. Invited Keynote lecture.
2. **Malinsky, M.** "Genome evolution, natural selection, and recombination landscapes". **NORBIS (Norwegian Bioinformatics Graduate school) annual conference (2022)**, Rosendal (Bergen), Norway. Invited Keynote lecture.
3. **Malinsky, M.** "Evolution of genomes and meiotic recombination rates". *Biology* 22 (2022), Basel, Switzerland.
4. **Malinsky, M.** "Evolution of recombination rate landscapes along the genome". **MACSPRO (Modelling and Analysis of Complex Systems and Processes) conference (2021)**, Moscow, Russia. Invited Keynote lecture.

5. **Malinsky, M.** "Genetic Variation in Evolutionary Radiations of Cichlid Fishes". **Cichlid science conference (2021), Cambridge, UK.**
6. **Malinsky, M.** "Molecular basis of convergent evolution between cichlid fishes of lakes Malawi and Tanganyika". **Cichlid science conference (2019), Madrid, Spain.**
7. **Malinsky, M.,** Svardal, H., Vernaz, G., Miska, E. A., Salzburger, W., Durbin, R. "Genetic basis of functional differences between closely related species". **EMBO at Basel Life: Genomes in Biology and Medicine (2017), Basel, Switzerland.**
8. **Malinsky, M.,** Svardal, H., Genner, M. J., Turner, G. F., Durbin, R., and Salzburger, W. "Shared variation between Great Lakes: do they all use the same variation?" **Cichlid science conference (2017), Prague, Czech Republic.**
9. **Malinsky, M.,** Trucchi, E., Lawson, D. J. & Falush, D. "RADpainter and fineRADstructure: Population Inference from RADseq Data" **Society for Molecular Biology and Evolution (SMBE) annual meeting (2016), Brisbane, Australia.**
10. **Malinsky, M.,** Tyers, A., Miska, E. A., Genner, M. J., Durbin, R, Turner, G. F. "Speciation in Lake Malawi and in Tanzanian crater lakes". **Cichlid science conference (2015), Graz, Austria.**
11. **Malinsky, M.,** Challis, R. J., Tyers, A., Miska, E. A., Genner, M. J., Durbin, R., Turner, G. F. "Speciation in cichlid fishes in Lake Malawi catchment" **Society for Molecular Biology and Evolution (SMBE) annual meeting (2015), Vienna, Austria.**
12. **Malinsky, M.** "Genomic diversity and speciation in East African cichlid fish". **Cambridge Evolutionary Genetics & Genomics Symposium (2015), Cambridge, UK.**
13. **Malinsky, M.,** Challis, R. J., Tyers, A., Miska, E. A., Genner, M. J., Durbin, R., Turner, G. F. "Islands of positive selection and speciation with gene flow in African crater lake cichlids". **Society for Molecular Biology and Evolution (SMBE) annual meeting (2014), San Juan, USA.**

Poster presentations:

1. **Malinsky, M.** "Disentangling the genomic interplay of selection and recombination" **Society for Molecular Biology and Evolution (SMBE) annual meeting (2023), Ferrara, Italy.**
2. **Malinsky, M.** "Disentangling the genomic interplay of selection and recombination" **European Society for Evolutionary Biology (ESEB) congress (2022), Prague, Czech Republic.**
3. **Malinsky, M.** and Matschiner, M. "c-genie - Assessing the impact of recombination on phylogenomic inference" **Society for Molecular Biology and Evolution (SMBE) annual meeting (2018), Yokohama, Japan.**
4. **Malinsky, M.** and Matschiner, M. "microRNA evolution in East African cichlids" **Society for Molecular Biology and Evolution (SMBE) annual meeting (2013), Chicago, USA.**
5. **Malinsky, M.** and Dehghani, H. "An Online Modeling and Image Reconstruction Tool for Optical Imaging Based on NIRFAST". **The Optical Society of America annual meeting (2010), Miami, USA.**

General contributions to science:

1. Cambridge University Museum of Zoology - Lake Malawi cichlid fish collection
 - Key role in establishing one of the largest Lake Malawi fish collections in the world (>1200 specimens, >200 species)
 - Planning and participating in the three-week field expedition in 2016, participating in the cataloguing in the museum
 - The full collection is accessible to researchers and used in teaching in Cambridge too. See e.g.: https://youtu.be/XYyu6ln_khQ; <https://www.zoo.cam.ac.uk/news/teaching-and-the-museum-of-zoology>
2. Software package trio-sga: <https://github.com/millanek/trio-sga> (see the Publications - Preprints)
 - An extension of the SGA *de novo* genome assembly tool by Jared Simpson
 - Facilitating assembly of highly heterozygous genomes by using data from mother-father-offspring trios
3. Software package fineRADstructure: <https://github.com/millanek/fineRADstructure>
 - Widely used population structure inference package, using clustering code from fineSTRUCTURE
 - Publication in Molecular Biology and Evolution (see "Publications in peer-reviewed journals")
4. Software package D-suite: <https://github.com/millanek/Dsuite>
 - Widely used package for detecting signatures of gene-flow among species or among populations from genomic polymorphism data
 - Publication in Molecular Ecology Resources (see "Publications in peer-reviewed journals")
5. Co-author, with Michael Matschiner of the c-genie software: <https://github.com/millanek/c-genie>
 - Simulation-based software for assessing the impact of recombination on phylogenomic inference
 - Presented by me at the SMBE annual meeting in 2018

6. Generated two high quality *de novo* genome assemblies from long read (PacBio) data; now publicly available:
 - *Astatotilapia calliptera* - http://www.ensembl.org/Astatotilapia_calliptera/Info/Index
 - *Simochromis diagramma* - https://www.ncbi.nlm.nih.gov/assembly/GCA_900408965.1/
7. microRNA gene annotation for five cichlid fish genomes
 - e.g., <http://www.mirbase.org/summary.shtml?org=mze>

REFEREES

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