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## Employment

- 2024–present **Senior Expert II Data Science**, *Biomedical Research, Novartis*  
2023–2023 **Senior computational scientist**, *DQBM/IMHS, University of Zurich/ETH Zurich*  
2019–2022 **Postdoctoral fellow**, *DQBM, University of Zurich*

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## Education

- 2015–2019 **Computational Biology, PhD**, *EMBL-EBI, University of Cambridge*  
2012–2015 **Molecular Biotechnology, M.Sc.**, *University of Heidelberg, Grade: 1.0*  
2009–2012 **Molecular Biotechnology, B.Sc.**, *University of Heidelberg, Grade: 1.1*

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## Projects

**Senior scientist** *Computational approaches for highly multiplexed image analysis.*

Supervisor Bernd Bodenmiller, Single cell systems biology of cancer, DQBM/IMHS, University of Zurich/ETH Zurich

Description My role involves the development of computational approaches for multiplexed image analysis, teaching and training, and data analysis as part of the IMMUCan project.

**Postdoc** *Profiling the emergence of cellular heterogeneity in breast cancer organoids.*

Supervisor Bernd Bodenmiller, Single cell systems biology of cancer, DQBM, University of Zurich

Description My postdoctoral work focuses on understanding the emergence of phenotypic heterogeneity in breast cancer and how this relates to treatment efficiency. In parallel, I develop computational approaches and tools for analysing multiplexed imaging data.

**PhD** *Quantifying expression variability in single-cell RNA sequencing data.*

Supervisor John Marioni, Single-cell and computational biology, EMBL-EBI and CRUK CI, Cambridge

Description During my PhD I focused on quantifying and understanding the functional role of transcriptional variability in immune responses and development. For this, I developed a statistical approach to correct the confounding effect of mean expression on transcriptional variability.

**M.Sc.** *Characterization of programmed cell death modalities induced by piperlongumine and artesunate in pancreatic cancer cells.*

Supervisor Dr. Anne Hamacher-Brady, Lysosomal Systems Biology, DKFZ, Heidelberg

**B.Sc.** *Modelling the Nrf2-Keap1 signalling pathway in human pancreatic carcinoma cells.*  
Supervisor Dr. Nathan Brady, Systems Biology of cell death mechanisms, DKFZ, Heidelberg

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## Research Experience

### Internships

- 2013–2014 **Research Internship**, THE GARVAN INSTITUTE OF MEDICAL RESEARCH, Sydney, Australia  
Defining the role of Sirtuin 1 in the onset of Pancreatic Ductal Adenocarcinoma.
- 2012 **Research Internship**, THE SCRIPPS RESEARCH INSTITUTE, La Jolla, CA  
Activation of CD8<sup>+</sup> T cells *in vitro* as well as *in vivo* in order to specifically target pancreatic tumors in 8–14 week old mice.
- 2011 **Industrial Internship**, MERCK KGAA, Darmstadt, Germany  
Proliferation induction in human cancer stem cells using different cytokines.
- 2009 **Research Internship**, UNIVERSITY OF DUISBURG-ESSEN, Duisburg, Germany  
Collaboration with the SulfoSYS project in order to analyse the central carbohydrate metabolism of *S. solfataricus*.
- 2005 **High School Intern**, EVONIK GOLDSCHMIDT GMBH, Essen, Germany  
Characterisation of polyurethane foam properties.

### Research Assistances

- 2012–2014 **Research Assistant**, Max Planck Institute for Medical Research  
DJANGO/MYSQL based website development to process spatially annotated electron imaging data.
- 2011–2012 **Research Assistant**, Complex biological systems group, IWR, Heidelberg  
ODE based modelling of the chemotactic pathway of *E. coli*.
- 2010–2011 **Research Assistant**, Signal transduction in cancer and metabolism, DKFZ, Heidelberg  
Using *D. melanogaster* as model organism for analysing caloric restriction and the Akt/mTOR signalling pathway.

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## Selected publications

- 2024 *An end-to-end workflow for multiplexed image processing and analysis*, Windhager, J., Zanotelli, V.R.T., Schulz, D., Meyer, L., Daniel, M., Bodenmiller, B.\*, Eling, N.\*, *Nature Protocols*, \*Corresponding author
- 2020 *cytomapper: an R/Bioconductor package for visualisation of highly multiplexed imaging data*, Eling, N.\*, Damond, N., Hoch, T., Bodenmiller, B., *Bioinformatics*, \*Corresponding author
- 2019 *Challenges in measuring and understanding biological noise*, Eling, N., Michael Morgan, John Marioni, *Nature Reviews Genetics*
- 2019 *Staged developmental mapping and X chromosome transcriptional dynamics during mouse spermatogenesis*, Ernst, C.\*, Eling, N.\* et al., *Nature Communications*, \*Co-first authors
- 2018 *Correcting the mean-variance dependency for differential variability testing using single-cell RNA sequencing data*, Eling, N. et al., *Cell Systems*

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- 2018 *Whole-Body Single-Cell Sequencing Reveals Transcriptional Domains in the Annelid Larval Body*, Achim, K.\*, Eling, N.\* et al., *Molecular Biology and Evolution*, \*Co-first authors
- 2017 *Aging increases cell-to-cell transcriptional variability upon immune stimulation*, Martinez-Jimenez, C.P.\*, Eling, N.\* et al., *Science*, \*Co-first authors
- 2015 *Identification of artesunate as a specific activator of ferroptosis in pancreatic cancer cells*, Eling, N. et al., *Oncoscience*, 2(5), 517-532

## Scholarships and awards

- 2021-2022 Marie Skłodowska-Curie Actions Individual Fellowship
- 2019-2020 EMBO Long-Term Fellowship
- 2017 Kurt Hahn Award for German nationals in Cambridge
- 2015-2019 EMBL international PhD fellowship
- 2011-2015 Scholar of the foundation of German business
- 2011-2015 Scholar of e-fellows.net

## Conferences, workshops, certificates

### Certificate

- 2023 EMBO Project Management
- 2021 EMBO Lab Leadership
- 2016-2017 Academy for PhD Training in Statistics

### Talk

- 2023 Labex Signallife technological day (invited)
- 2022 ISSCR Spatial Transcriptomics (invited)
- 2022 Cytométrie de Masse, 4<sup>e</sup> édition (invited)
- 2022 Centre for Computational Biomedicine, Harvard (invited)
- 2021 Frontline Genomics, Single Cell & Spatial Omics ONLINE (invited)
- 2021 University of Sydney, Statistical Bioinformatics Seminar Series (invited)
- 2018 Francis Crick institute artificial intelligence seminar (invited)
- 2018 EBI Sanger Cambridge PhD Symposium
- 2017 EMBL Lab Day
- 2015 EMBL PhD Symposium

### Poster

- 2023 Spatial Omics meeting Lausanne
- 2022 Applied Bioinformatics in Life Sciences
- 2021 AACR
- 2020 Systems biology of cancer: promises of artificial intelligence
- 2020 BioC 2020
- 2015-2017 Single Cell Genomics

2016 Single Cell Biology  
 2016 Quantitative Genomics  
[Workshop](#)  
 2022 EuroBioC 2022 (presenter)  
 2022 BioC 2022 (presenter)  
 2021 BioC 2021 (presenter)  
 2021 Indiana O'Brien Center Microscopy Workshop (invited presenter)  
 2015 Statistics and Computing in Genome Data Science (attendee)  
[Conference/meeting organiser](#)  
 2023 Highly Multiplexed Tissue Imaging Computational Workshop  
 2023 Highly Multiplexed Imaging Developers Meeting  
 2018 Quantitative Genomics  
 2017 Science and Society: Gut feeling  
 2016 Science and Society: Rewriting the Code of Life  
 2015 EBI Sanger Cambridge PhD Symposium  
[Hackathon](#)  
 2020 Hack Zurich  
 2017 Human Cell Atlas  
 2017 MLH Prime  
 2017 Hack Cambridge Recurse

## Teaching and supervision

### Teaching

2023 Current Approaches in Single Cell Analysis - Spatial analysis of single cell data (BME327)  
 2023 Current Approaches in Single Cell Analysis - Single cell data extraction from multiplexed images (BME327)  
 2023 ETH/UZH PhD Program in Cancer Biology Module B - Multiplexed image analysis  
 2023 ETH/UZH PhD Program in Cancer Biology Module B - Multiplexed image analysis  
 2023 Highly Multiplexed Tissue Imaging Computational Workshop  
 2022 ETH/UZH PhD Program in Cancer Biology Module B - Multiplexed image analysis  
 2020 DQBM online course: Introduction to data analysis  
 2016 EMBL: Bioinformatics Teaching Module  
 2015 Machine Learning for Personalised Medicine summer school (assistant)

### Supervision

Since 2022 Computational research assistant  
 2022 Computational Master student (co-supervision)  
 2022 Computational rotation student

- 2021 Experimental rotation student (SEMP and PROMOS awardee)
- 2020 Computational Master student
- 2020 Experimental Master student (co-supervisor)
- 2020 Computational rotation student

## Engagement

### Societies

- 2021 DQBM JUSCOR

### Scientific reviewer

- 2022 Bioconductor
- 2021 Bioinformatics

## Technical skills

- Basic Matlab, C++
- Intermediate Python, html/css, JavaScript
- Advanced R, git,  $\LaTeX$ , bash, Docker

## Languages

- German Mother tongue
- English Advanced
- French Basic

*Conversationally and scientifically fluent*  
*Basic words and phrases*