

Max Frank

PhD Candidate

★ 26.02.1993, Vienna ✉ max.frank@embl.de

☎ +49 151 106 616 07 🌐 /in/max-frank

📍 Heidelberg, Germany 🎧 Max Frank

SCIENTIFIC DEGREES

2024: PhD, EMBL & Heidelberg University

2017: Master's Degree in Systems Biology, ETH Zurich

2016: Bachelor's Degree in Biology, ETH Zurich

SKILLS

Single-cell multi-omics data, Proteomics, Epigenomics

Probabilistic modeling, Statistics, Python and R

HPC cluster, Workflow management, Bash, Linux

Basic molecular biology skills

Data presentation, Scientific communication

DOCTORAL STUDIES

10/2018 - 05/2024 **Group of Prof. Oliver Stegle**
Joint Ph.D. Program of EMBL and Heidelberg University

Thesis Title **Modeling epigenetic heterogeneity across time and genome in single-cell multi-omics experiments**

Summary During my PhD., I developed modeling frameworks to study developmental processes using multimodal single-cell sequencing technologies. My approach leveraged the combination of pseudotime inference on transcriptomics data with base-pair resolution modeling of DNA methylation and chromatin accessibility. To model highly sparse single-cell epigenetic data accurately I developed a custom model utilizing Gaussian process regression, that dynamically shares information between cells and across the genome. This model allowed the study of gene-regulatory processes in mouse gastrulation with high temporal resolution.

Teaching

- EMBO Integrative analysis of multi-omics data: 2022 · Practical course
- EMBL Predoc Course: 2019, 2020, 2021 · Single-cell Practical for PhD students
- Single cell course at University of Heidelberg 2020, 2021, 2022 · Practical for University students
- Supervised Master students: 2022 Caroline Wandlinger

Conferences **Selected talks/posters/workshops:**

- Talk: Probabilistic Modeling in Genomics, Aussois, October 2019
- Poster: From functional Genomics to Systems Biology, Heidelberg 2022
- Workshop: Human Cell Atlas Jamboree, Boston, 2018
- Workshop: Gaussian Process Summer School, Sheffield, September 2019
- Workshop: Mathematical Frameworks for Integrative Analysis of Emerging Biological Data Types, BIRS, June 2020

Extracurricular **PhD Symposium 2019 – Organizer**
Website Team Leader – phdsymposium-archive/2019/

UNDERGRADUATE STUDIES

9/2015 – 9/2017 MSc. System Biology **ETH Zurich**
ETH Zurich, Diploma: 5.91 (Scale: 6 highest, 1 lowest)
Received ETH Medal for outstanding Master's theses 2017

9/2016 – 5/2017 Development of a proteogenomic strategy to assess splice- and sequence variant impact on protein complex assembly – Master Thesis **ETH Zurich**

Group of Prof. Ruedi Aebersold · Supervisors: Dr. Isabell Bludau, Dr. Moritz Heusel
Development of R-package · Algorithm development for differential protein complex detection
· Establishing a proteogenomics pipeline

3/2016 – 7/2016 Assessing the impact of disease mutations on the quantitative proteome – 5 month MSc. Project **ETH Zurich**

Laboratory of Prof. Dr. Ruedi Aebersold · Supervisor: Dr. Marija Buljan
Integration of genomics and proteomics data · Genomic variant calling

9/2012 – 9/2016 BSc. Biology
ETH Zurich, Diploma: Ø 5.26 (Scale: 6 highest, 1 lowest)

2015 Exchange Semester on Stipend **Princeton University**

EXPERIENCE

1/2018 – 7/2018 **Computational Proteomics – Research assistant** **University of Toronto**
Group of Prof. Hannes Röst
Developed computational methods for diaPASEF, a strategy that enables proteomics experiments with low input amounts at high accuracy

2014 – 2016 **Fundamentals of Computer Science – Teaching assistant** **ETH Zurich**
Received best Teaching assistant of the year award 2016

LANGUAGES

English – fluent · **German** – native · **Italian** – basic

INTERESTS

Rock climbing · Personal genomics · Skiing · Hiking · Cycling

SELECTED PUBLICATIONS

2024 **GPmeth: Modeling continuous epigenetic changes based on single-cell multi-omics profiling** **In preparation**
[Frank M.](#), Stegle O.

2021 **Systematic detection of functional proteoform groups from bottom-up proteomic datasets** **Nature communications**
Bludau I., [Frank M.](#), Dörig C., Cai Y., Heusel M., Rosenberger G., Picotti P., Collins B., Röst H., Aebersold R.

2020 **diaPASEF: parallel accumulation–serial fragmentation combined with data-independent acquisition** **Nature methods**
Meier F., Brunner A., [Frank M.](#), Ha A., Bludau I., Voytik E., Kaspar-Schoenefeld S., Lubeck M., Raether O., Bache N., Aebersold R., Collins B., Röst H., Mann M.

2020 **Complex-centric proteome profiling by SEC-SWATH-MS for the parallel detection of hundreds of protein complexes** **Nature protocols**
Bludau, I., Heusel, M., [Frank, M.](#), Rosenberger G., Hafen R., Banaei-Esfahani A., van Drogen A., Collins B., Gstaiger M., Aebersold, R.

2019 **Multi-omic measurements of heterogeneity in HeLa cells across laboratories** **Nature biotechnology**
Liu Y., Mi Y., Mueller T, Kreibich S., Williams E., Van Drogen A., Borel C., [Frank M.](#), Germain P., Bludau I., Mehnert M., Seifert M., Emmenlauer M., Sorg I., Bezrukov F., Bena F., Zhou H., Dehio C., Testa G., Saez-Rodriguez J., Antonarakis S., Hardt W., Aebersold R.

2019 **Complex-centric proteome profiling by SEC-SWATH-MS** **Molecular systems biology**
Heusel M., Bludau, I., Rosenberger G., Hafen R., [Frank, M.](#), Banaei-Esfahani A., van Drogen A., Collins B., Gstaiger M., Aebersold, R.

REFERENCES

PhD supervisor
Prof. Oliver Stegle
o.stegle@dkfz.de

Close Colleague
Dr. Danila Bredikhin
danila@stanford.edu

Supervisor during 6-month internship
Prof. Hannes Röst
hannes.rost@utoronto.ca

Supervisor MSc Thesis
Prof. Ruedi Aebersold
aebersold@imsb.biol.ethz.ch