

EDUCATION

University of Helsinki, Helsinki, Finland

Doctor of Philosophy, computer science, 2017 – 2021 (Expected)

Master of Science, statistics (statistical machine learning), 2016 – 2017

Bachelor of Science, statistics, 2013 – 2016

RESEARCH EXPERIENCE

Doctoral Candidate – **Helsinki Institute for Information Technology**, University of Helsinki, Helsinki, Finland

January 2018 – ongoing

I develop Bayesian models for bacterial strain identification and apply them to studying microbial community dynamics with the use of high-throughput DNA sequencing data from bacterial cultures containing multiple strains or species. My research focuses on human pathogens and their antibiotic resistant variants.

Research Assistant – **Helsinki Institute for Information Technology**, University of Helsinki, Helsinki, Finland

May 2016 – December 2017 (20 months)

My doctoral research is a direct continuation of the work in my previous position as a research assistant that consisted of coming up with and providing a practical C++ implementation of a probabilistic model for bacterial strain identification.

OTHER PROFESSIONAL EXPERIENCE

Founding Partner – **Heldata Oy**, Helsinki, Finland

June 2018 – ongoing

We organize a yearly (for-profit) meetup and recruiting event for data science professionals in Finland. The event aims for around 1000 participants and consists of keynote talks and networking at industrial representative's stands. In particular, we aim to increasingly reach and represent minorities working in technology.

Independent Consultant – Helsinki, Finland

May 2016 – ongoing

I have occasionally consulted industry professionals on their statistical issues.

TOMMI MÄKLIN

TEACHING EXPERIENCE

Teaching Assistant – **Department of Mathematics and Statistics**, University of Helsinki, Helsinki, Finland

My duties included assisting students with solving weekly exercises, going through their solutions, and general assistance to the lecturers on the following courses:

- Computational Statistics I, Fall 2018, Spring 2019, Summer 2019, Fall 2019
- Calculus II, Spring 2016
- Calculus I, Fall 2015
- Probability, Fall 2015
- Introduction to Probability, Spring 2015
- Introduction to Statistical Inference, Spring 2015 and Summer 2015

Course Design – **Independent Consultant**, Helsinki, Finland

- Measuring Tax Avoidance Phenomena, Fall 2018

I designed and taught a three-day statistics and machine learning course for the Finnish Tax Agency with a focus on detecting tax fraud from self-reported data.

POSITIONS OF TRUST

Secretary – **Finnish Statistical Society**

February 2017 – ongoing

My duties as the secretary include communication between the society's members and its board, planning and implementing the yearly agenda, and routine matters.

Chair, Member of the Board – **Statistics students' association Moodi ry**

2015 (Board Member), 2016 (Chair)

In 2015, my responsibilities consisted of corporate relations and study affairs. As the chair, I was in charge of the association's general function.

SERVICE

Peer-reviewer

The 17th Bioinformatics Research and Education Workshop, 2019

International Conference on Machine Learning (ICML), 2019

Boards and Committees

Student Representative – **Temporary Board of Master's Program in Mathematics and Statistics**, University of Helsinki

June 2016 – Dec 2016

TOMMI MÄKLIN

The board was set up to plan implementation of the University's new teaching and research strategy. My participation consisted of voicing the students' concerns.

Member – Teaching Improvement Group, Department of Mathematics and Statistics, University of Helsinki

January 2015 – December 2015

Our aim was to set up a group to improve the quality of teaching at the Department.

LANGUAGE SKILLS

Finnish – native

English – near-native

Russian – basics

Swedish – basics

TECHNOLOGY

Programming languages: C++, Python, R, Shell Scripting (bash)

Software highlights: mSWEEP (<https://github.com/probic/msweep>) written in C++,

Political party composition estimator (<https://gitlab.com/themaklin/puoluekone>) written in R shiny.

Operating systems: Linux, macOS

Other skills: information security, data protection, open source software, web design (<https://maklin.fi>, <https://heldata.fi>)

PUBLICATIONS

Preprints

High-resolution sweep metagenomics using ultrafast read mapping and inference

T. Mäklin, T. Kallonen, S. David, B. Pascoe, G. Méric, D. M. Aanensen, E. J. Feil, S. K. Sheppard, J. Corander, and A. Honkela.

Preprint, *bioRxiv* (2018).

Book chapters

Identifying bacterial strains from sequencing data

T. Mäklin, J. Corander, and A. Honkela.

Data Mining for Systems Biology, pp. 1-7, Humana Press, New York, NY (2018).

CONFERENCE PRESENTATIONS (INTERNATIONAL)

Bacterial lineage identification from multi-strain sequencing data

Tommi Mäklin, Teemu Kallonen, Jukka Corander, and Antti Honkela

TOMMI MÄKLIN

Oral presentation, *27th Conference on Intelligent Systems for Molecular Biology and the 18th European Conference on Computational Biology (ISMB/ECCB) 2019*, 21-25 July 2019, Congress Center Basel, Basel, Switzerland

Reference-based metagenomics using probabilistic inference

Tommi Mäklin, Teemu Kallonen, Jukka Corander, and Antti Honkela

Oral presentation, *The 17th Bioinformatics Research and Education Workshop*, 23-24 May 2019, Max Planck Institute for Molecular Genetics, Berlin, Germany

Bacterial genome assembly from multi-strain sequencing data

Tommi Mäklin, Teemu Kallonen, Jukka Corander, and Antti Honkela

Flash talk, *30 years edition of the Annual Workshop in Mathematical and Statistical Aspects of Molecular Biology*, 25-26 April 2019, European Bioinformatics Institute, Hinxton, Cambridge, United Kingdom

Accurate bacterial genome assembly from multi-strain enrichment cultures

Tommi Mäklin, Teemu Kallonen, Jukka Corander, and Antti Honkela

Oral presentation, *Probabilistic Modeling in Genomics*, 4th-7th November, 2018 Cold Spring Harbor Laboratory, Cold Spring Harbor, NY, United States

Bayesian bacterial strain identification from plate sweep sequencing data

Tommi Mäklin

Oral presentation, *Regional Workshop of European young researchers in statistics*, 29th-31st October, 2018 Institut Henri Poincaré, Paris, France

Reliable detection of coexisting bacterial strains

Tommi Mäklin, Jukka Corander, and Antti Honkela

Oral presentation, *28th Annual Workshop on Mathematical and Statistical Aspects of Molecular Biology*, 19th-20th March, 2018 University of St Andrews, Scotland, United Kingdom

CONFERENCE AND SEMINAR PRESENTATIONS (NATIONAL)

Bacterial genome assembly from co-cultures using probabilistic inference

Tommi Mäklin

Oral presentation, *Bioinformatics Day 2019*, 29 May 2019, Department of Computer Science, University of Helsinki, Helsinki, Finland

Bacterial genome assembly from multi-strain enrichment cultures

Tommi Mäklin

Oral presentation, *Finnish Young Statisticians Workshop*, 20 November 2018, Department of Mathematics and Systems Analysis, Aalto University, Espoo, Finland

Bacterial strain identification from sequencing data

Tommi Mäklin

TOMMI MÄKLIN

Flash talk, *Pathogenesis and Sporulation in Foodborne and Clinically Important Bacteria*, 28-30 November 2017, Department of Food Hygiene and Environmental Health, University of Helsinki, Helsinki, Finland

Bacterial strain identification from sequencing data

Tommi Mäklin

Flash talk, *Data Science Fest*, 13 October 2017, Department of Computer Science, University of Helsinki, Helsinki, Finland

Probabilistic quantification of bacterial strain mixtures

Tommi Mäklin

Seminar presentation, *Statistics Seminar*, 28 November 2017, Department of Mathematics and Statistics, University of Helsinki, Helsinki, Finland

POSTER PRESENTATIONS (INTERNATIONAL)

Bacterial genome assembly from multi-strain sequencing data

Tommi Mäklin, Teemu Kallonen, Jukka Corander, and Antti Honkela

Poster presentation, *30 years edition of the Annual Workshop in Mathematical and Statistical Aspects of Molecular Biology*, 25-26 April 2019, European Bioinformatics Institute, Hinxton, Cambridge, United Kingdom

Bayesian quantification of bacterial strain mixtures

Tommi Mäklin, Teemu Kallonen, Jukka Corander, and Antti Honkela

Poster presentation, *Probabilistic Modeling in Genomics*, 18-20 September 2017, Aarhus University, Aarhus, Denmark

POSTER PRESENTATIONS (NATIONAL)

Bacterial strain identification from sequencing data

Tommi Mäklin, Teemu Kallonen, Jukka Corander, and Antti Honkela

Poster presentation, *Data Science Fest*, 5 April 2019, Department of Computer Science, University of Helsinki, Helsinki, Finland

Bacterial strain identification from sequencing data

Tommi Mäklin, Teemu Kallonen, Jukka Corander, and Antti Honkela

Poster presentation, *16th Finnish Microbial Pathogenesis Days*, 29-30 August 2018, Haartman Institute, University of Helsinki, Helsinki, Finland

Probabilistic quantification of bacterial strain mixtures

Tommi Mäklin, Jukka Corander, and Antti Honkela

Poster presentation, *Bioinformatics Day 2017*, 7 April 2017, CSC – IT Center for Science, Espoo, Finland