Marc Härkönen

Curriculum Vitae

Education

2017–2022	**Georgia Institute of Technology**, *Atlanta, Georgia*, USA. PhD, School of Mathematics. Advisor: Anton Leykin. Thesis title: Dual representations of polynomial modules with applications to partial differential equations.
2016–2017	**The University of Tokyo**, *Tokyo*, Japan. Exchange studies, Master's thesis. Supervisor: Associate Professor Tomonari Sei, Department of Mathematical Informatics, Graduate School of Information Science and Technology.
2015–2017	**Aalto University School of Science**, *Espoo*, Finland, MSc.. Master's Programme in Mathematics and Operations Research. GPA 5/5. Thesis title: Holonomic extended least angle regression. Co-supervised by Tomonari Sei and Kaie Kubjas
2014–2015	**The University of Hong Kong**, *Hong Kong*, China. Exchange studies: mathematics, computer science, Cantonese
summer 2014	**Stanford University**, *Stanford, California*, USA. Stanford Summer International Honors Program: computer science & scientific computing.
2012–2015	**Aalto University School of Science**, *Espoo*, Finland, BSc. (pass with Distinctions). Engineering Physics and Mathematics, Mathematics major. GPA 4.96/5. Thesis title: Distributed storage systems and product matrix codes. Supervised by Camilla Hollanti.

Work Experience

2022	**Max Planck Institute for Mathematics in the Sciences**, *Leipzig*, Germany. Postdoctorate researcher in the nonlinear algebra group. Mentor: Bernd Sturmfels.
2017–2022	**Georgia Institute of Technology**, *Atlanta, Georgia*, USA. Graduate student instructor and graduate teaching assistant.
2016	**Aalto University, School of Science**, *Espoo*, Finland. Teaching assistant, Introduction to abstract algebra & Introduction to discrete mathematics
summer 2015	**CERN (Helsinki Institute of Physics)**, *Geneva*, Switzerland. Summer trainee, Diffractive Physics in the ALICE collaboration.
summer 2014	**Aalto University, School of Science**, *Espoo*, Finland. Research assistant, Algebra, Number Theory and Applications Research Group
summer 2013	**Aalto University, School of Chemical Technology**, *Espoo*, Finland. Research assistant, Novel Materials via Self-Assembly Research Group

Publications

Published

2022	J.Chen, M.Härkönen, R.Krone, A.Leykin: Noetherian operators and primary decomposition. *Journal of Symbolic Computation*, `https://doi.org/10.1016/j.jsc.2021.09.002`
2021	R.Ait el Manssour, M.Härkönen, B.Sturmfels: Linear PDE with Constant Coefficients. *Glasgow Mathematical Journal*, `https://doi.org/10.1017/S0017089521000355`
2020	M.Härkönen, Y.Hirose, T.Sei: Holonomic extended least angle regression, *Information Geometry*, `https://doi.org/10.1007/s41884-020-00035-1`
2020	M.Härkönen, B.Hollering, F.Tarashi Kashani, J.I.Rodriguez: Algebraic Optimization Degree, *ACM Communications in Computer Algebra*, `https://doi.org/10.1145/3427218.3427222`
2015	H.Antila, M.Härkönen, M.Sammalkorpi: Chemistry specificity of DNA-polycation complex salt response: A simulation study of DNA, polylysine and polyethyleneimine, *Physical Chemistry Chemical Physics*, `https://doi.org/10.1039/C4CP04967E`

Preprints

2021	M.Härkönen, B.Raiţă, L.Nicklasson: Syzygies, constant rank, and beyond. arXiv preprint arXiv:2112.12663. Submitted for publication
2021	M.Härkönen, J.Hirsch, B.Sturmfels: Making Waves. arXiv preprint arXiv:2111.14045. Submitted for publication

2021　J.Chen, Y.Cid-Ruiz, M.Härkönen, R.Krone, A.Leykin: Noetherian Operators in Macaulay2. arXiv preprint arXiv:2101.01002. Submitted for publication

Software and other activities

Service　I organized the Student Algebra Seminar at Georgia Tech (2020-2022). In June 2022 I organized the Workshop on Differential Algebra at the Max Planck Institute, Leipzig, Germany

Peer-review　I have reviewed manuscripts for the following journals: Journal of the Royal Statistical Society Series B (Statistical Methodology), Algebraic Statistics.

Open source　I contribute to Macaulay2 and attend internal meetings

Other　I was a member of the Aalto University Algorithmic Problem Solving team, and attended the 2015 Northwestern Europe Regional Contest (NWERC) in Linköping, Sweden.

Computer skills

Advanced　Linux, Macaulay2
Intermediate　LATEX, C++ , R, Python
Basic　Mathematica, C, Rust

Languages

Fluent　**Finnish, French, English**
Others　**Japanese (intermediate), Swedish (basic), Cantonese (basic), Mandarin (basic)**

Awards

2021　Outstanding Teaching Assistant Award, *Georgia Tech,* Atlanta, GA

2020　Outstanding MathLab Tutor Award, *Georgia Tech,* Atlanta, GA

2019　Chateaubriand Fellowship, *Embassy of France,* Washington D.C.

2019　SIAM Student Travel Award, *Society for Industrial and Applied Mathematics*

2019　Vilho, Yrjö and Kalle Väisälä Foundation scholarship, *Finnish Academy of Sciences and Letters,* Helsinki, Finland

2018　Bob Price Travel award, *Georgia Tech,* Atlanta, GA

2012　Commendable Service as Electronic Warfare NCO, *Air Force Academy,* Tikkakoski, Finland

Selected talks, conferences, workshops, summer schools

2022/06　**Workshop on Differential Algebra**, *Max Planck Institute for Mathematics in the Sciences*, Leipzig, Germany.
Organizer

2021/08　**SIAM Conference on Applied Algebraic Geometry**, *Texas A&M*, College Station, TX, USA.
Invited talk

2021/07　**ACA 2021, Algebraic and Algorithmic Aspects of Differential and Integral Operators**, *Online*.
Invited talk

2021/07　**Math-to-Industry workshop**, *University of Minnesota*, Minneapolis, MN, USA.

2021/06　**Workshop on Software and Applications of Numerical Nonlinear Algebra**, *Max Planck Institute*, Leipzig, Germany.

2020/06　**ISSAC 2020 (virtual)**, Kalamata, Greece.
Software presentation

2020/05　**Macaulay2 Workshop (virtual)**, *Cleveland State University*, Cleveland, OH.

2019/12　**PGMO Days**, *EDF'Lab Paris-Sarclay*, Paris, France.
Invited talk

2019/07　**SIAM Conference on Applied Algebraic Geometry**, *University of Bern*, Bern, Switzerland.
Invited talk in Algebraic Statistics mini-symposium

2019/04　**Meeting on Applied Algebraic Geometry**, *Georgia Institute of Technology*, Atlanta, USA.

2018/09　**Nonlinear Algebra in Applications**, *ICERM (Brown University)*, Providence, USA.
Part of the semester program in Nonlinear Algebra

2018/09　**Real Algebraic Geometry and Optimization**, *ICERM (Brown University)*, Providence, USA.
Part of the semester program in Nonlinear Algebra

2018/09　**Core computational methods**, *ICERM (Brown University)*, Providence, USA.
Part of the semester program in Nonlinear Algebra

2018/09   **Nonlinear Algebra Bootcamp**, *ICERM (Brown University)*, Providence, USA.
Part of the semester program in Nonlinear Algebra

2018/08   **Hyperplane arrangements and computations with CoCoA**, *Hokkaido University*, Sapporo, Japan.

2018/04   **Meeting on Applied Algebraic Geometry**, *Georgia Tech*, Atlanta, USA.

2018/02   **TAGS - Linking Topology to Algebraic Geometry and Statistics**, *Max Planck Institute for Mathematics in the Sciences*, Leipzig, Germany.
Poster presented: Holonomic extended least angle regression

2017/01   **Workshop on Non-Linear Algebra**, *Max Planck Institute for Mathematics in the Sciences*, Leipzig, Germany.

2016/08   **26th Jyväskylä Summer School**, Jyväskylä, Finland.
Attended course MA4: Lévy and Feller Processes and Applications

2016/06   **Summer School on Algebra, Statistics and Combinatorics**, Helsinki, Finland.

2015/08   **WE-Heraeus Physics School**, *Diffractive and Electromagnetic processes at high energies*, Bad Honnef, Germany.
Poster presented: Soft classification for particle identification in central exclusive production