

# Ragnar Freij-Hollanti

Date of birth: September 28, 1984  
Citizenship: Swedish  
Permanent residency: Finland  
Marital status: Married to Camilla Hollanti.

Dept of Mathematics and Systems Analysis  
Aalto University  
Espoo, Finland  
Email: [ragnar.freij@aalto.fi](mailto:ragnar.freij@aalto.fi)

## Education

**Ph.D Mathematics**, Chalmers University of Technology, Sweden, 2012.

*Thesis title:* Topics in Algorithmic, Enumerative and Geometric Combinatorics.  
*Supervisors:* Jeffrey Steif and Johan Wästlund.

**M.S. Mathematics**, University of Gothenburg, Sweden, 2007.

*Exchange studies:* McGill University, Canada, 2005.

## Employment

5/2019–, **University Lecturer**,  
9/2018–4/2019, **University Teacher**,  
Dept of Mathematics and Systems Analysis, **Aalto University, Finland**.  
11/2017–8/2018, **Senior Researcher**,  
Dept of Electrical and Computer Engineering, **Technical University of Munich, Germany**.  
8/2012–10/2017, **Postdoctoral Researcher**,  
Dept of Mathematics and Systems Analysis (8/2012–7/2014 and 8/2016–10/2017) and Dept of  
Communications and Networking (8/2014–7/2016), **Aalto University, Finland**.  
8/2007–7/2012, **PhD Candidate**,  
Dept of Mathematical Sciences, **Chalmers University of Technology, Sweden**.  
9/2006–5/2007, **Teaching Assistant**,  
Dept of Mathematical Sciences, **Chalmers University of Technology, Sweden**.

## Grants and awards

|                                          |                           |               |           |
|------------------------------------------|---------------------------|---------------|-----------|
| Ruth and Nils-Erik Stenbäck Foundation   | <i>Research grant</i>     | € 30 000      | 2021      |
| Vilho, Yrjö and Kalle Väisälä Foundation | <i>Research grant</i>     | € 10 000      | 2013      |
| Magnus Ehrnrooth Foundation              | <i>Postdoctoral grant</i> | € 21 000      | 2012      |
| Various foundations                      | <i>Travel grants</i>      | Total € 6 000 | 2011–2021 |

## Research interests

Algebraic and topological methods in combinatorics.  
Codes, graphs, matroids, polytopes.  
Applications to communications and information theory.

## Leadership and organizational work

### Thesis advising

**PhD:** Matteo Allaix 2020–; Matthias Grezet, 2016–2019; Junquan Deng, 2015–2016.

**MSc:** Olga Kuznetsova, 2017–2019; Henri Losoi, 2015–2016; Tuomas Tajakka, 2014–2015.

**BSc:** Meri Aho, 2020–2021; Kai Hippi, 2020; Paul Juillard, 2020; Perttu Saarela, 2020; Jeremias Pettinen, 2019–2021; Markus Kullberg, 2016.

### Project management

Task leader for two subprojects (40 person months), and  
Project manager of the Aalto node (24 person months),  
*Coordinated control and spectrum management for 5G heterogeneous radio access networks*,  
European Commission, 5G Private Public Partnership, 2015–2016.

Total budget: € 5 500 000.

14 partners (universities, research centers, companies and state operators) from 8 countries.

### Conference organization

Session organizer, *Finnish Mathematical Days*, Oulu University, 2020.

Cochair, *Munich Workshop on Coding and Cryptography*, Technical University of Munich, 2018.

Organizer, *Summer School on Algebra, Statistics and Combinatorics*, Aalto University, 2016.

Session organizer, *Finnish Mathematical Days*, Turku University, 2016.

Local organizer, *Multiple Access Communications*, Aalto University, 2015.

### Seminar series organization

Organizer, *Algebra, Number Theory, and Applications Seminar*, Aalto University, 2019–.

Organizer, *Large Structures Seminar*, Aalto University, 2016–2017.

### Committee work

Research Board, School of Science, University of Gothenburg, 2011–2012.

Graduate Students' Council, School of Science, University of Gothenburg, 2011–2012.

President of the Graduate Students' Council, Department of Mathematics, Chalmers University of Technology and University of Gothenburg, 2010–2012.

Hiring Committee, Mathematical Sciences, University of Gothenburg, 2008.

### Participation in consortium proposals

Cowriter, *MSCA Innovative Training Networks*, European Commission, Horizon 2020, 2019–2020.

Cowriter, *Center of Excellence*, Academy of Finland, 2016–2017.

Cowriter, *WiFiUS*, Academy of Finland and National Science Foundation (US), 2016.

Cowriter, *FET Open*, European Commission, Horizon 2020, 2014–2015.

## Research

### Project participation

*Coordinated control and spectrum management for 5G heterogeneous radio access networks*, European Commission, 5G Private Public Partnership, 2015–2016.

*Random network coding and designs over  $GF(q)$* , European Science Foundation’s COST Action, 2014–2016.

### Invited visits<sup>1</sup>

*UiT Arctic University, Norway*, invited by Prof. Trygve Johnsen, June 1–30, 2021 (*upcoming*).  
*Chalmers University of Technology, Sweden*, invited by Prof. Johan Wästlund, May 22–26, 2017.  
*University of Canterbury, New Zealand*, invited by Prof. Felipe Voloch, Dec 12–Dec 16, 2016.  
*Victoria University of Wellington, New Zealand*, invited by Prof. Geoff Whittle, Dec 5–9, 2016.  
*University College Dublin, Ireland*, invited by Prof. Eimear Byrne, May 23–27, 2016.  
*Illinois Institute of Technology, USA*, invited by Prof. Salim El Rouayheb, Sep 21–28, 2015.  
*University of Zürich, Switzerland*, invited by Prof. Joachim Rosenthal, Nov 17–Dec 19, 2014.  
*University of Washington, USA*, invited by Prof. Isabella Novik, May 19–June 20, 2014.  
*Free University Berlin, Germany*, invited by Prof. Günter Ziegler, Apr 21–May 16, 2014.  
*Universitat Politècnica de Catalunya, Spain*, invited by Prof. Julian Pfeifle, Feb 3–21, 2014.  
*Otto von Guericke-University, Germany*, invited by Prof. Martin Henk, May 4–8, 2009.

### Invited presentations at international conferences and workshops

*Algebra Meets Combinatorics*, Neuchâtel, Switzerland, July 15–17, 2019.  
*SIAM Conference on Applied Algebraic Geometry*, Bern, Switzerland, July 9–13, 2019.  
*Number Theory and Coding Theory: Contemporary Applications in Security*, Turku, Finland, May 28–June 1, 2018.  
*Munich Workshop on Coding and Cryptography*, Munich, Germany, Apr 10–11, 2018.  
*Nordic Congress of Mathematicians*, Stockholm, Sweden, Mar 16–20, 2016.  
*AMS Fall Sectional Meeting*, Chicago, IL, USA, Oct 3–4, 2015.  
*Expanders Everywhere*, Neuchâtel, Switzerland, Dec 1–5, 2014.  
*Aurora Borealis Combinatorics*, Abisko, Sweden, Dec 5–8, 2012.  
*Discrete Morse Theory and Commutative Algebra*, Stockholm, Sweden, July 18–Aug 1, 2012.

### External reviewer for project applications

*European Research Council Advanced Grant*.

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<sup>1</sup>Visits lasting less than a week not included.

## Referee for scientific journals

*Advances in Mathematics of Communications; Combinatorica; Communications in Statistics - Theory and Methods; Designs, Codes, and Cryptography; Discrete Mathematics; Electronic Journal of Combinatorics; Entropy; IEEE Access; IEEE Communication Letters; IEEE Transactions on Information Theory; Information; International Journal on Game Theory; Journal of Applied Probability; Random Structures and Algorithms; Statistics and Probability Letters; Symmetry; Wireless Networks.*

## Teaching

### Graduate level

Lecturer and course organizer *Algebraic Topology; Enumerative Combinatorics; Hyperbolic Geometry; Singularities, Expanders, and Topology of Maps; Subgroup Complexes; Diagrams of Spaces; A Networked Life*; Aalto University, 2012–2015.

Teaching assistant for summer schools *Discrete Morse Theory and Commutative Algebra*, Mittag-Leffler Institute, 2012, and *Noise Sensitivity and Percolation*, Clay Mathematics Institute, 2010.

### Undergraduate level

Lecturer (16 courses), *Calculus, Discrete Mathematics, Matrix Algebra, Probability and Statistics, Security in Communications and Storage*, Chalmers University of Technology, Technical University of Munich, Aalto University, 2011–2020.

Teaching Assistant ( $\approx 20$  courses), Chalmers University of Technology, University of Gothenburg, Aalto University, 2006–2016.

## Membership in professional societies

Institute for Electrical and Electronic Engineers (IEEE):  
Information theory society.

Finnish Mathematical Society

Society for Industrial and Applied Mathematics (SIAM):  
Activity group in algebraic geometry.

## Other merits

### Mathematics competitions

*1:st rank*, Swedish Mathematical Olympiad, 2002.

### Computer skills

Haskell, Java, Maple, Mathematica, Matlab, Pascal, Python, Sage.

### Language skills

Native Swedish

Fluent English and Finnish

Fair French and German

Last updated: 20 april 2021