

# Rutger Campbell

Discrete Mathematics Group  
Institute for Basic Science (IBS)  
55 Expo-ro, Yuseong-gu,  
Daejeon 34126, South Korea

Office: B217 (Theory Building)

rutger@ibs.re.kr

## Employment

**Research Fellow**, Discrete Mathematics Group, Institute for Basic Science, Daejeon, South Korea, Aug 2020–.

**Postdoctoral Fellow**, Department of Combinatorics and Optimization, University of Waterloo, May–Aug 2020.

## Education

**Ph.D. in Combinatorics and Optimization**, University of Waterloo, May 2015–May 2020.

*Disasters in Abstracting Combinatorial Properties of Linear Dependence*

**Bachelor of Mathematics**, University of Waterloo, Sep 2011–Apr 2015.

*Pure Mathematics, Honours*

*Combinatorics and Optimization, Honours*

## Other Research Experience

**Undergraduate Research Assistant**, Department of Pure Mathematics, University of Waterloo, Sep–Dec 2014.

**Undergraduate Research Assistant**, Department of Combinatorics and Optimization, University of Waterloo, May–Aug 2014.

**Undergraduate Research Assistant**, Department of Combinatorics and Optimization, University of Waterloo, May–Aug 2013.

## Publications

### Peer-reviewed

(with Jim Geelen) **On the complex-representable excluded minors for real-representability**, *J. Combin. Theory Ser. B* 143 (2020), 16–28.

(with Kevin Grace, James Oxley, and Geoff Whittle) **On density-critical matroids**, *Electron. J. Combin.* 27 (2020), Paper 2.35, 16pp.

(with Nick Brettell, Deborah Chun, Kevin Grace, and Geoff Whittle) **On a generalisation of spikes**, *SIAM J. on Discrete Math.* 33 (2019), 358–372.

### Under review

**Dense  $PG(n-1, 2)$ -free binary matroids**, (11 pages).

## Conference Talks

**Representability of orientable matroids**, American Mathematical Society Sectional Meeting, Binghamton University, New York State, Oct 2019.

**Hajós construction for digraphs**, Waterloo Coloring Conference, University of Waterloo, Sep 2019.

**Representability of orientable matroids**, Oxley65, Louisiana State University, Baton Rouge, July 2019.

**Complexity of matroid representability**, Canadian Discrete and Algorithmic Mathematics Conference, Simon Fraser University, Vancouver, May 2019.

**Representable orientable matroids that are not real-representable**; Combinatorial Geometries: matroids, oriented matroids, and applications; Centre International de Recontres Mathématiques, Marseille, Sep 2018.

**On excluded minors for real-representability**, International Workshop on Structure in Graphs and Matroids, University of Waterloo, July 2017.

**On excluded minors for real-representability**, Canadian Discrete and Algorithmic Mathematics Conference, Ryerson University, Toronto, June 2017.

**Dense  $PG(t - 1, 2)$ -free binary matroids**, International Workshop on Structure in Graphs and Matroids, Eindhoven University of Technology, Netherlands, July 2016.

**Dense triangle-free binary matroids**, La Vacquerie Matroid Workshop, France, July 2015.

**Denser triangle-free binary matroids**, International Workshop on Structure in Graphs and Matroids, Princeton University, New Jersey, July 2014.

## Teaching

### Courses

Instructor, **CO 331 (Coding Theory)**, University of Waterloo, Jan–Apr 2019.

Teaching assistant, **CO 331 (Coding Theory)**, University of Waterloo, Jan–Apr 2017.

Teaching assistant, **CO 331 (Coding Theory)**, University of Waterloo, Jan–Apr 2016.

### Lectures

**Disasters in Abstracting Combinatorial Properties of Linear Dependence**, Discrete Math Seminar, Institute for Basic Science, Daejeon, Sep 2020.

**Matroids doing algebra**, Matroid Union Seminar, online, June 2020.

**Axiomatization of matroids**, Graduate Student Research Seminar, University of Waterloo, Nov 2019.

**Schrijver–Seymour conjecture**, Arithmetic and Geometric Combinatorics (Course), University of Waterloo, Feb 2019.

**Representable oriented matroids that are not real-representable**, Graph and Matroid Seminar, University of Waterloo, Oct 2018.

**Representability of matroids**, Graph and Matroid Seminar, University of Waterloo, May 2018.

**Introduction to gammoids**, Graph and Matroid Seminar, University of Waterloo, Feb 2018.

**Fair representation by independent sets**, Topological Methods (Course), University of Waterloo, Mar 2017.

**On excluded minors for real-representability**, Graph and Matroid Seminar, University of Waterloo, Dec 2016.

**Dense  $PG(t - 1, 2)$ -free binary matroids**, Graph and Matroid Seminar, University of Waterloo, Apr 2016.

**Factors of automorphy and Inoue surfaces**, Geometry Working Seminar, University of Waterloo, Dec 2014.

**Dense triangle-free binary geometries**, Combinatorics and Optimization Undergraduate Research Assistant Seminar, University of Waterloo, Jul 2014.

**T-Linked Matchings**, Combinatorics and Optimization Undergraduate Research Assistant Seminar, University of Waterloo, Aug 2013.

## Awards

**NSERC Alexander Graham Bell Canada Graduate Scholarship – Doctoral**, Natural Sciences and Engineering Research Council of Canada, 2016–2019.

**NSERC Alexander Graham Bell Canada Graduate Scholarship – Master’s**, Natural Sciences and Engineering Research Council of Canada, 2015–2019.

**President’s Graduate Scholarship**, University of Waterloo, 2015–2019.

**Jessie W. H. Zou Award**, Faculty of Mathematics, University of Waterloo, 2015.

**Combinatorics and Optimization Book Prize**, Department of Combinatorics and Optimization, University of Waterloo, 2015.

**NSERC Undergraduate Student Research Award**, Natural Sciences and Engineering Research Council of Canada, 2014–2015.

**Ronald G. Scoins National Scholarship**, Faculty of Mathematics, University of Waterloo, 2011–2015.

## Professionalization

### Seminars

**Graduate Teaching Seminar**, Faculty of Mathematics, University of Waterloo, Jan–Apr 2019.

### Workshops

**Teaching Methods**, Centre for Teaching Excellence, University of Waterloo, Dec 2018.

**Interactive Lectures**, Centre for Teaching Excellence, University of Waterloo, Dec 2018.

**Effective Lesson Plans**, Centre for Teaching Excellence, University of Waterloo, Dec 2018.