

CV of Balázs Elek

Personal information

Name: Balázs Elek
Position: Visiting Lecturer at Cornell University
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Employment

2022- Visiting Lecturer, Cornell University
2021-2022 Instructor, Virginia Commonwealth University.
2020-2021 Postdoctoral Fellow, Cornell University.
2018-2020 Postdoctoral Fellow, University of Toronto, Mentor: Joel Kamnitzer.

Education

2018 Ph.D. (Mathematics) Cornell University, Advisor: Allen Knutson.
2014 M.S. (Mathematics) Cornell University, Advisor: Allen Knutson.
2012 M.Phil, The University of Hong Kong, Advisor: Jiang-Hua Lu.
2010 B.Sc. (Major in Mathematics), The University of Hong Kong.

Research Interests

- Kashiwara crystals
- Combinatorial Algebraic Geometry
- Geometric Representation Theory

Papers

6. (with Daoji Huang) A Gröbner basis for Kazhdan-Lusztig ideals of the Affine Flag Variety (submitted) <https://arxiv.org/abs/1911.07760>
5. (with Anne Dranowski, Joel Kamnitzer, Tanny Libman and Calder Morton-Ferguson) Heaps, Crystals and Preprojective Algebra Modules (submitted) <https://arxiv.org/pdf/2202.02490.pdf>
4. (with Tair Akhmejanov) Promotion and Cyclic Sieving on Rectangular δ -Semistandard Tableaux <https://arxiv.org/abs/2010.13930>
3. (with Dan Barbasch, Sergio Da Silva and Gautam Gopal Krishnan) Finite type multiple flag varieties of exceptional groups <https://arxiv.org/abs/1708.06341>
2. Toric surfaces with equivariant Kazhdan-Lusztig atlases, <https://arxiv.org/abs/1610.04667>
1. (with Jiang-Hua Lu) Bott-Samelson varieties and Poisson Ore extensions, <https://doi.org/10.1093/imrn/rnz127> published in IMRN.

Conference Talks

- 2019 Quiver variety components and minuscule combinatorics, CMS winter meeting, Toronto.
- 2018 Kirillov-Reshetikhin crystals and Cacti, Participant talk at the University of Virginia.
- 2017 Pizzas and Kazhdan-Lusztig atlases in dimension 2, poster presentation at the Interactions between Representation Theory and Algebraic Geometry conference at the University of Chicago.
- 6th Swiss-French Workshop on Algebraic Geometry, Charmey, Switzerland
- 2016 Pizzas and Kazhdan-Lusztig atlases in dimension 2, poster presentation at Introductory Workshop on Combinatorial Algebraic Geometry at the Fields Institute.
- Pizzas and Kazhdan-Lusztig atlases in dimension 2, poster presentation at ALGECOM13.
- 2015 Toric Surfaces, Pizzas, and Kazhdan-Lusztig Atlases, BUGCAT2015.

Seminar Talks

- 2022 Combinatorics Seminar, Cornell University
- Geometry Seminar, Virginia Commonwealth University
- Combinatorics Seminar, University of Minnesota
- 2020 Geometry, Physics, and Representation Theory Seminar, Northeastern University

- 2018 Geometric Representation Theory Seminar, University of Toronto, Toronto, ON, Canada
Oberseminar Lie Theorie, Ruhr-Universität Bochum, Germany
- 2017 Geometry-Topology seminar, McMaster University, Hamilton, ON, Canada
Combinatorics seminar, University of Michigan, Ann Arbor
Algebra, Geometry and Combinatorics seminar, University of Illinois, Urbana-Champaign
- 2016 The Leech lattice, Olivetti Club, Cornell University
On grading, Teaching Seminar, Cornell University.
Students' understanding of proofs, Teaching Seminar, Cornell University.
Pizzas, Olivetti Club, Cornell University.
- 2015 Toric surfaces with Kazhdan-Lusztig atlases, Lie Groups Seminar, Cornell University.
The Springer Resolution, Olivetti Club, Cornell University.
- 2014 A gentle introduction to Schubert Calculus, Olivetti Club, Cornell University.
- 2013 G_2 and the rolling ball, Olivetti Club, Cornell University.
Simple Groups of Lie type, Olivetti Club, Cornell University.
- 2012 Semisimple Lie Groups and their Bott-Samelson and Flag varieties, Olivetti Club, Cornell University.
Computing the standard Poisson structure on Bott-Samelson varieties, Lie Groups Seminar, Cornell University.

Teaching

Cornell University

- 2023 Spring MATH1910, Calculus for Engineers, instructor
- 2023 Spring MATH1920, Calculus Multivariable Calculus for Engineers, instructor
- 2022 Fall MATH1120, Calculus II, instructor and course coordinator

Virginia Commonwealth University

- 2022 Spring MAT200 Calculus with Analytic Geometry, instructor
- 2022 Fall MAT307 Multivariable Calculus, instructor
- 2021 Fall MAT200 Calculus with Analytic Geometry, instructor
- 2021 Fall MAT141 College Algebra, instructor

Cornell University

2021 Spring MATH1910, Calculus for Engineers, lecturer

University of Toronto

2020 Summer MAT223, Linear Algebra (delivered online), instructor.

2020 Spring MAT223, Linear Algebra, instructor.

2019 Fall MAT344, Introduction to Combinatorics, instructor.

2019 Summer MAT344, Introduction to Combinatorics, instructor.

2018 Fall MAT188, Linear Algebra I, instructor.

2018 Fall MAT334, Complex Variables, instructor.

Cornell University

2022 Fall MATH1120, Calculus II, lecturer and course coordinator

2018 Spring MATH1110, Calculus I, lecturer.

2017 Fall MATH1110, Calculus I, lecturer.

2017 Spring MATH1110, Calculus I, lecturer.

2016 Fall Instructor, a short course on reflection groups, Ithaca High School Senior Math Seminar.

2016 Fall MATH1120 Calculus II, lecturer.

2016 Spring MATH3410 Prove it!, teaching assistant.

2016 Spring MATH6410 Enumerative Combinatorics, grader.

2015 Fall MATH4410 Introduction to Combinatorics I., grader.

2015 Spring MATH4420 Introduction to Combinatorics II., grader.

2014 Fall MATH4410 Introduction to Combinatorics I., grader.

2014 Spring Instructor, a short course on reflection groups, Ithaca High School Senior Math Seminar.

2014 Spring MATH2940 Linear algebra for engineers, teaching assistant.

2013 Fall MATH2940 Linear algebra for engineers, teaching assistant.

2013-present Teaching assistant at Cornell University.

2010-2012 Teaching assistant at The University of Hong Kong.