CV of Balázs Elek

Personal information

Name: Balázs Elek
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Employment

2023-2024 Postdoctoral Research Fellow, The University of British Columbia

2022-2023 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

- Representation Theory
- Combinatorial Algebraic Geometry
- Kashiwara crystals

Papers

7. (with Jim Bryan) Based Linear Maps to the Flag Variety (Mathematical Research Postcards) https://secure.math.ubc.ca/Links/mrp/cards/mrp_2_2.pdf

6. (with Daoji Huang) A Gröbner basis for Kazhdan-Lusztig ideals of the Affine Flag Variety (Advances in Mathematics) https://arxiv.org/abs/1911.07760

5. (with Anne Dranowski, Joel Kamnitzer, and Calder Morton-Ferguson) Heaps, Crystals and Preprojective Algebra Modules (Selecta Mathematica) 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 (PhD thesis), 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

2025 Algebra Seminar, The University of Sydney

2024 Algebraic Geometry Seminar, The University of British Columbia

2023 Algebraic Geometry Seminar, The University of British Columbia

2022 Combinatorics Seminar, Cornell University

Geometry Seminar, Virginia Commonwealth University

Combinatorics Seminar, University of Minnesota

2020 Geometry, Physics, and Representation Theory Seminar, Northeastern Univeristy

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

The University of British Columbia

2024 Fall	MATH223, Honours Linear Algebra
2024 Summer	MATH100, Differential Calculus with Applications
2024 Spring	MATH101, Integral Calculus with Applications
2023 Fall	MATH100, Differential Calculus with Applications

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

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.