

## Oliver Pechenik

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### Employment

- 2017-2020 University of Michigan, Assistant Professor and NSF Postdoctoral Fellow  
*Mentor:* David Speyer
- 2016-2017 Rutgers University, Hill Assistant Professor  
*Mentor:* Anders Buch

### Education

- 2016 PhD Mathematics  
University of Illinois at Urbana-Champaign, Urbana, IL  
*Advisor:* Alexander Yong
- 2010 BA Mathematics  
Oberlin College, Oberlin, OH  
*Minor:* Greek language and literature  
*Honors:* Highest Honors in Mathematics, Phi Beta Kappa, Sigma Xi
- 2009 Budapest Semesters in Mathematics Program  
Budapest University of Technology and Economics, Budapest, Hungary

### Selected Prizes, Awards, and Fellowships

- 2017 Mathematical Sciences Postdoctoral Research Fellowship, National Science Foundation
- 2016 Philippe Tondeur Dissertation Prize, University of Illinois at Urbana-Champaign
- 2015 Irving Reiner Memorial Award in Algebra, University of Illinois at Urbana-Champaign
- 2011 Graduate Research Fellowship, National Science Foundation
- 2010 Illinois Distinguished Fellowship, University of Illinois at Urbana-Champaign
- 2010 Rebecca Orr Prize in Mathematics, Oberlin College
- 2009 Barry M. Goldwater Scholarship

### Publications and Preprints († denotes undergraduate mentee)

24. O. Pechenik and T. Scrimshaw, *K-theoretic crystals for set-valued tableaux of rectangular shapes*, preprint (19 pages, submitted), [arXiv:1904.09674](https://arxiv.org/abs/1904.09674).
23. C. Monical, O. Pechenik and T. Scrimshaw, *Crystal structures for symmetric Grothendieck polynomials*, preprint (44 pages, submitted), [arXiv:1807.03294](https://arxiv.org/abs/1807.03294).
22. C. Monical, O. Pechenik and D. Searles, *Polynomials from combinatorial K-theory*, preprint (35 pages, submitted), [arXiv:1806.03802](https://arxiv.org/abs/1806.03802).
21. Z. Hamaker, O. Pechenik, D. Speyer and A. Weigandt, *Derivatives of Schubert polynomials and proof of a determinant conjecture of Stanley*, to appear, Algebraic Combinatorics (7 pages), [arXiv:1812.00321](https://arxiv.org/abs/1812.00321).
20. O. Pechenik, *The genomic Schur function is fundamental-positive*, to appear, Annals of Combinatorics (12 pages), [arXiv:1810.04727](https://arxiv.org/abs/1810.04727).
19. Z. Hamaker, R. Patrias, O. Pechenik and N. Williams, *Doppelgängers: bijections of plane partitions*, to appear, International Mathematics Research Notices (54 pages), [arXiv:1602.05535](https://arxiv.org/abs/1602.05535).

18. O. Pechenik and D. Searles, *Decompositions of Grothendieck polynomials*, International Mathematics Research Notices **2019**(10), 2019, 3214–3241.
17. R. Ilango<sup>†</sup>, O. Pechenik and M. Zlatin<sup>†</sup>, *Unique rectification in  $d$ -complete posets: towards the  $K$ -theory of Kac-Moody flag varieties*, Electronic Journal of Combinatorics **25**(4), 2018, 1–35.
16. H. Mandel and O. Pechenik, *Orbits of plane partitions of exceptional Lie type*, European Journal of Combinatorics **74**, 2018, 90–109.
15. O. Pechenik and D. Searles, *Deformed cohomology of flag varieties*, Mathematical Research Letters **25**(2), 2018, 649–657.
14. L. Escobar, O. Pechenik, B. Tenner and A. Yong, *Rhombic tilings and Bott-Samelson varieties*, Proceedings of the American Mathematical Society **146**(5), 2018, 1921–1935.
13. O. Pechenik, *Promotion of increasing tableaux: frames and homomesies*, Electronic Journal of Combinatorics **24**(3), 2017, 1–14.
12. O. Pechenik and A. Yong, *Genomic tableaux*, Journal of Algebraic Combinatorics **45**(3), 2017, 649–685.
11. K. Dilks, O. Pechenik and J. Striker, *Resonance in orbits of plane partitions and increasing tableaux*, Journal of Combinatorial Theory Series A **148**, 2017, 244–274.
10. O. Pechenik and A. Yong, *Equivariant  $K$ -Theory of Grassmannians II: the Knutson-Vakil conjecture*, Compositio Mathematica **153**(4), 2017, 667–677.
9. O. Pechenik and A. Yong, *Equivariant  $K$ -Theory of Grassmannians*, Forum of Mathematics Pi **5**, 2017, 1–128.
8. J. Bloom, O. Pechenik and D. Saracino, *Proofs and generalizations of a homomesy conjecture of Propp and Roby*, Discrete Mathematics **339**(1), 2016, 194–206.
7. O. Pechenik, *Cyclic sieving of increasing tableaux and small Schröder paths*, Journal of Combinatorial Theory Series A **125**, 2014, 357–378.
6. O. Pechenik and J. Wise, *Generalized graph cordiality*, Discussiones Mathematicae Graph Theory **32**(3), 2012, 557–567.
5. A. Henrich, N. MacNaughton, S. Narayan, O. Pechenik and J. Townsend, *Classical and virtual pseudodiagram theory and new bounds on unknotting numbers and genus*, Journal of Knot Theory and Its Ramifications **20**(4), 2011, 625–650.
4. A. Henrich, N. MacNaughton, S. Narayan, O. Pechenik, R. Silversmith and J. Townsend, *A midsummer knot's dream*, College Mathematics Journal **42**(2), 2011, 126–134.
3. M. Axtell, J. Stickles, et al. *Zero-divisor ideals and realizable zero-divisor graphs*, Involve **2**(1), 2009, 17–27.
2. A. Bishop, T. Cuchta, K. Lokken and O. Pechenik, *The nilradical and non-nilradical graphs of commutative rings*, International Journal of Algebra **2**(20), 2008, 981–994.
1. J. Pechenik, I. Marsden and O. Pechenik, *Effects of temperature, salinity, and air exposure on development of the estuarine pulmonate gastropod *Amphibola crenata**, Journal of Experimental Marine Biology and Ecology **292**(2), 2003, 159–176.

## Refereed Conference Proceedings

7. O. Pechenik and D. Searles, *Asymmetric function theory*, to appear, Proceedings of the International Festival in Schubert Calculus (Guangzhou, China, 2017), 36 pages, [arXiv:1904.01358](https://arxiv.org/abs/1904.01358).
6. R. Ilango, O. Pechenik and M. Zlatin, *Unique rectification in  $d$ -complete posets*, Séminaire Lotharingien de Combinatoire **82B**, 2019, article #28, 12 pp. FPSAC 2019, Ljubljana, Slovenia.
5. C. Monical, O. Pechenik and T. Scrimshaw, *Crystal structures for symmetric Grothendieck polynomials*, Séminaire Lotharingien de Combinatoire **82B**, 2019, article #27, 12 pp. FPSAC 2019, Ljubljana, Slovenia.

4. C. Monical, O. Pechenik and D. Searles, *K-theoretic polynomials*, Séminaire Lotharingien de Combinatoire **82B**, 2019, article #10, 12 pp. FPSAC 2019, Ljubljana, Slovenia.
3. K. Dilks, O. Pechenik and J. Striker, *Resonance in orbits of plane partitions*, Discrete Mathematics and Theoretical Computer Science Proceedings **BC**, 2016, 383–394. FPSAC 2016, Vancouver, Canada.
2. O. Pechenik and A. Yong, *Genomic tableaux and combinatorial K-theory*, Discrete Mathematics and Theoretical Computer Science Proceedings **FPSAC'15**, 2015, 37–48. FPSAC 2015, Daejeon, Korea.
1. O. Pechenik, *Cyclic sieving of increasing tableaux and small Schröder paths*, Discrete Mathematics and Theoretical Computer Science Proceedings **AS**, 2013, 325–336. FPSAC 2013, Paris, France.

## Theses

2. O. Pechenik, *K-theoretic Schubert calculus and applications*, PhD Thesis (255 pages), University of Illinois at Urbana-Champaign, 2016.
1. O. Pechenik, *Large cardinals*, Undergraduate Honors Thesis (20 pages), Oberlin College, 2010.

## Selected Talks

### Invited Conference Talks

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|-----------|---|
| Mar 2020  | AMS Sectional Meeting (Medford, MA), Special Session on Recent Advances in Schubert Calculus and Related Topics                           |
| Jan 2020  | Joint Mathematics Meetings (Denver, CO), Special Session on Combinatorial Structures and Integrable Systems                               |
| Sept 2019 | Algebra, Geometry and Combinatorics Day (ALGECOM) XVIII, Washington University in St. Louis   |
| Mar 2019  | AMS Sectional Meeting (Honolulu, HI), Special Session on Dynamical Systems and Algebraic Combinatorics                                    |
| May 2018  | OSU Workshop on Schubert Calculus, The Ohio State University  |
| Apr 2018  | AMS Sectional Meeting (Boston, MA), Special Session on Combinatorial Aspects of Nilpotent Orbits  |
| Jan 2018  | Joint Mathematics Meetings (San Diego, CA), Special Session on Dynamical Algebraic Combinatorics  |
| Nov 2017  | International Festival in Schubert Calculus, Sun Yat-sen University, Guangzhou, China   |
| Sept 2016 | AMS Sectional Meeting (Brunswick, ME), Special Session on Algebraic and Enumerative Combinatorics   |
| Sept 2016 | AMS Sectional Meeting (Brunswick, ME), Special Session on Combinatorial Aspects of Nilpotent Orbits                                       |
| Apr 2016  | Workshop on Equivariant Generalized Schubert Calculus and its Applications, University of Ottawa  |
| Apr 2016  | AMS Sectional Meeting (Fargo, ND), Special Session on Algebraic and Geometric Combinatorics   |
| Apr 2016  | AMS Sectional Meeting (Salt Lake City, UT), Special Session on Combinatorial and Computational Commutative Algebra and Algebraic Geometry |
| Apr 2016  | AMS Sectional Meeting (Salt Lake City, UT), Special Session on Algebraic Combinatorics  |
| Dec 2015  | Canadian Math Society Winter Meeting (Montreal, QC), Scientific Session on Algebraic Combinatorics  |
| Nov 2015  | AMS Sectional Meeting (New Brunswick, NJ), Special Session on Modern Schubert Calculus  |
| Nov 2015  | AMS Sectional Meeting (New Brunswick, NJ), Special Session on Algebraic Geometry and Combinatorics  |

- Oct 2015 AMS Sectional Meeting (Chicago, IL), Special Session on Combinatorial and Geometric Representation Theory  
Sept 2014 AMS Sectional Meeting (Eau Claire, WI), Special Session on Algebraic Combinatorics

### **Seminar Talks**

- Apr 2019 Geometric Methods in Representation Theory Seminar, University of North Carolina at Chapel Hill  
Feb 2019 Algebra Seminar, University of Kentucky  
Feb 2019 Combinatorics Seminar, University of Michigan  
Mar 2018 Combinatorics Seminar, University of Washington  
Feb 2018 Combinatorics and Graph Theory Seminar, Michigan State University  
Oct 2017 Topology, Geometry, and Dynamical Systems Seminar, University of Texas at Dallas  
Oct 2017 Algebra and Combinatorics Seminar, University of Texas at Dallas  
Sept 2017 Combinatorics Seminar, University of Michigan  
Mar 2017 Algebra Seminar, Rutgers University  
Feb 2017 Algebra/Combinatorics/Geometry Seminar, Smith College  
Jan 2017 Philadelphia Area Combinatorics & Algebraic Geometry (CAGE) Seminar, University of Pennsylvania  
Dec 2016 Combinatorics and Discrete Mathematics Seminar, LaCIM, Université du Québec à Montréal  
Oct 2016 Algebra Seminar, Rutgers University  
Feb 2016 Combinatorics Seminar, Massachusetts Institute of Technology  
Jan 2016 Combinatorics Seminar, University of Michigan  
Nov 2015 Algebraic Geometry/Commutative Algebra Seminar, University of Notre Dame  
Oct 2015 Combinatorics Seminar, University of Minnesota  
Mar 2015 Combinatorics Seminar, University of California Berkeley  
Jan 2015 Algebra and Combinatorics Seminar, Tulane University  
Sept 2014 Algebra–Geometry–Combinatorics Seminar, University of Illinois at Urbana-Champaign

### **Teaching Experience**

#### **University of Michigan**

- Winter 2020 Instructor, Math 412: *Introduction to Modern Algebra*  
Fall 2019 Instructor, Math 565: *Combinatorics and Graph Theory*  
Fall 2018 Instructor, Math 115: *Calculus I* (2 sections)

#### **Rutgers University**

- Spring 2017 Instructor, Math 351: *Introduction to Abstract Algebra I*  
Spring 2017 Instructor, Math 152: *Calculus II for the Mathematical and Physical Sciences*  
Fall 2016 Instructor, Math 361: *Set Theory*

#### **University of Illinois at Urbana-Champaign**

- Fall 2014 Instructor, Math 119: *Ideas in Geometry*  
Fall 2011 Instructor, Math 124: *Finite Mathematics*

## Professional Service

### Organizer

- Mar 2019 Workshop on Crystals and Their Generalizations, Osaka City University Advanced Mathematical Institute (with M. Okado and T. Scrimshaw)
- Oct 2018 AMS Sectional Meeting (Ann Arbor, MI), Special Session on Combinatorics in Algebra and Algebraic Geometry (with Z. Hamaker and S. Karp)
- May 2017 AMS Sectional Meeting (New York, NY), Special Session on Cohomologies and Combinatorics (with R. Patrias)
- 2012-2013 Graduate Student Linear Algebra Seminar, University of Illinois at Urbana-Champaign (with S. Loeb)

### Referee

- general Annals of Mathematics  
Proceedings of the American Mathematical Society  
Transactions of the American Mathematical Society
- combo Annals of Combinatorics  
Australasian Journal of Combinatorics  
Electronic Journal of Combinatorics  
European Journal of Combinatorics  
Formal Power Series and Algebraic Combinatorics (international conference series)  
Journal of Algebraic Combinatorics  
Journal of Combinatorial Theory, Series A  
Journal of Combinatorics  
Order
- geometry Differential Geometry and Its Applications

### Contributor

- 2015- SageMath open-source mathematical software system (7 completed tickets)
- 2004- On-line Encyclopedia of Integer Sequences (4 sequences authored, material added to 8 others)

## Professional Memberships

- 2010- American Mathematical Society
- 2017- Association for Women in Mathematics

## Academic References

### Alexander Yong

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University of Illinois at Urbana-Champaign  
ayong@uiuc.edu  
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### David Speyer

Professor of Mathematics  
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### Scott Schneider (teaching)

Lecturer in Mathematics  
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sschnei@umich.edu

### Hugh Thomas

Professor of Mathematics  
Université du Québec à Montréal  
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### Vic Reiner

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University of Minnesota  
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