

Curriculum Vitae

BEN WEBSTER

Office Address: Department of Pure Mathematics Email: ben.webster@uwaterloo.ca
University of Waterloo Website: <https://uwaterloo.ca/scholar/b2webste>
Waterloo, ON, Canada

Employment/Education:

2017 – **Associate Professor**, University of Waterloo.
2017 – **Associate Faculty**, Perimeter Institute.
2016 – 2017 **Associate Professor**, University of Virginia.
2013 – 2016 **Assistant Professor**, University of Virginia.
2011 – 2013 **Assistant Professor**, Northeastern University.
2010 – 2011 **Assistant Professor**, University of Oregon.
2008 – 2010 **C.L.E. Moore Instructor and NSF Postdoctoral Fellow**, M.I.T.
 Sponsoring Scientist: R. Bezrukavnikov.
2007 – 2008 **Member and NSF Postdoctoral Fellow**, Institute for Advanced Study.
2002 – 2007 **Ph.D. in Mathematics**, University of California, Berkeley.
 Supervisor: N. Reshetikhin.
 Thesis: “Algebraic Poisson Geometry in Representation Theory and Combinatorics.”
1998 – 2002 **B.A. in Mathematics**, Simon’s Rock College.
 Supervisor: W. Dunbar

As visitor

2014 Spring **Junior Chair**, Université Denis Diderot–Paris VII,
 sponsored by Fondation Sciences Mathématiques de Paris.
2006 Fall Center for the Topology and Quantization of Moduli Spaces (Århus, Denmark).
2001 Spring Budapest Semesters in Mathematics (Budapest, Hungary).

Scientific/Academic Honors and Grants:

2019 Golden Jubilee Research Excellence Award (UW Faculty of Math)
2018 – 2023 NSERC Discovery Grant (\$140,000)
2016 Cory Family Teaching Award (recognizes excellence in lower division teaching;
 one awarded for all STEM fields at UVA per year)
2015 Kavli Fellow, National Academy of Sciences
2015 International Researcher Collaboration Award from Sydney University
2014 – 2016 Sloan Research Fellowship (\$50,000)
2012 – 2017 NSF CAREER grant: “Representation theory of symplectic singularities” (\$416,905)
2013 NSF conference grant “Algebra, Combinatorics, and Representation Theory.” (\$40,000)
2010 – 2012 NSA Young Investigator Grant (\$30,000)
2007 – 2011 NSF Postdoctoral Research Fellowship
2007 June Clay Liftoff Fellowship
2003 – 2007 NSF Graduate Research Fellowship

Research Interests:

Knot theory and representation theory via algebraic geometry.

Publications: available at <https://uwaterloo.ca/scholar/b2webste/publications>

2021 1. *Quantum Frobenius Heisenberg categorification* (with Jonathan Brundan and Alistair Savage).
 J. Pure Appl. Algebra 226 (2022), no. 1, Paper No. 106792, 50 pp. [arXiv:2009.06690](https://arxiv.org/abs/2009.06690)

2. *Foundations of Frobenius Heisenberg categories* (with Jonathan Brundan and Alistair Savage). J. Algebra 578 (2021), 115–185. [arXiv:2007.01642](#)
- 2020 3. *Heisenberg and Kac-Moody categorification* (with Jonathan Brundan and Alistair Savage). Selecta Math. (N.S.) 26 (2020), no. 5, 74. [arXiv:1907.11988](#)
4. *On the definition of quantum Heisenberg category*. (with Jonathan Brundan and Alistair Savage). Algebra and Number Theory **14** (2020), no. 2, 275–321. [arXiv:1812.04779](#)
5. *A quantum Mirković–Vybornov isomorphism*. (with A. Weekes and O. Yacobi). Representation Theory 24 (2020), 38–84. [arXiv:1706.03841](#)
6. *On graded presentations of Hecke algebras and their generalizations*. Algebraic Combinatorics, Volume 3 (2020) no. 1, pp. 1–38. [arXiv:1305.0599](#)
- 2019 7. *Representation theory of the cyclotomic Cherednik algebra via the Dunkl-Opdam subalgebra*. New York J. Math. 25 (2019), 10171047 [arXiv:1605.03780](#)
8. *Weighted Khovanov-Lauda-Rouquier algebras*. to appear in Documenta Mathematica. Doc. Math. 24 (2019), 209250. [arXiv:1209.2463](#)
9. *On category \mathcal{O} for affine Grassmannian slices and categorified tensor products*. (with J. Kamnitzer, P. Tingley, A. Weekes and O. Yacobi). Proc. Lond. Math. Soc. (3) 119 (2019), no. 5, 11791233. [arXiv:1806.07519](#)
10. *Highest weights for truncated shifted Yangians and product monomial crystals* (with J. Kamnitzer, P. Tingley, A. Weekes and O. Yacobi). J. Comb. Algebra 3 (2019), no. 3, 237303. [arXiv:1511.09131](#)
11. *A categorical action on quantized quiver varieties*. Mathematische Zeitschrift, **292** Issue 1-2 (2019), 611–639.
12. Appendix to *Coulomb branches of 3d $\mathcal{N} = 4$ quiver gauge theories and slices in the affine Grassmannian*. (with A. Braverman, M. Finkelberg, J. Kamnitzer, R. Kodera, H. Nakajima, and A. Weekes). Adv. Theor. Math. Phys. 23 (2019), no. 1, 75–166. [arXiv:1604.03625](#)
- 2018 13. *Categorified skew Howe duality and comparison of knot homologies* (with Marco Mackaay). Advances in Math **330** (2018), 876–945. [arXiv:1502.06011](#)
14. *Categorification of quantum symmetric pairs I*. (with H. Bao, P. Shan and W. Wang). Quantum Topology, **9**, Issue 4 (2018) pp. 643–714. [arXiv:1605.03780](#)
- 2017 15. *Rouquier’s conjecture and diagrammatic algebra*. Forum of Mathematics Sigma **5** (2017), e27, 71 pp. [arXiv:1306.0074](#)
16. *A geometric construction of colored HOMFLYPT homology* (with G. Williamson). Geometry & Topology **21-5** (2017), 2557–2600. [arXiv:0905.0486](#)
17. *On generalized category \mathcal{O} for a quiver variety*. Mathematische Annalen **368** (2017), no. 1–2, 483–536. [arXiv:1409.4461](#)
18. *Geometry and categorification*. “Categorification in Geometry, Topology and Physics,” 1–22, Contemp. Math., **680**, AMS, 2017. [arXiv:1602.05992](#)
19. *Comparison of canonical bases for Schur and universal enveloping algebras*. Transformation Groups, **22(3)**, 869–883. [arXiv:1503.08734](#)
20. *Current algebras and categorified quantum groups* (with A. Beliakova, K. Habiro and A. Lauda). Journal of the London Mathematical Society, **95**, 248–276 [arXiv:1412.1417](#)
21. *Knot invariants and higher representation theory*. Memoirs of the American Mathematical Society **250**, no. 1191, pp. 133. [arXiv:1309.3796](#)

- 2016 22. *Quantizations of conical symplectic resolutions II: category \mathcal{O} and symplectic duality.* (with T. Braden, A. Licata and N. Proudfoot). *Astérisque* No. 384, 75–179. [arXiv:1407.0964](#)
23. *Quantizations of conical symplectic resolutions I: local and global structure* (with T. Braden and N. Proudfoot). *Astérisque* No. 384, 1–73. [arXiv:1208.3863](#)
24. *Tensor product algebras, Grassmannians and Khovanov homology.* “Physics and mathematics of link homology,” 23–58, *Contemp. Math.*, **680**, AMS, 2016. [arXiv:1312.7357](#)
25. *Cyclicity for categorified quantum groups* (with A. Beliakova, K. Habiro and A. Lauda). *Journal of Algebra* **452**, 118–132. [arXiv:1506.04671](#)
26. *Mirković-Vilonen polytopes and Khovanov-Lauda-Rouquier algebras* (with Peter Tingley). *Compositio Mathematica* **152**, no. 8, 1648–1696. [arXiv:1210.6921](#)
27. *Tensor product categorifications and the super Kazhdan-Lusztig conjecture* (with Jonathan Brundan and Ivan Losev). *International Mathematics Research Notices*, Volume 2017, Issue 20, Pages 6329–6410. [arXiv:1310.0349](#)
- 2015 28. Appendix to *Indecomposable Soergel bimodules for universal Coxeter groups* (by Ben Elias and Nicolas Libedinsky). to appear in *Transactions of the AMS*. [arXiv:1401.2467](#)
29. *On uniqueness of tensor products of irreducible categorifications* (with Ivan Losev). *Selecta Math. (N.S.)* **21**, no. 2, 345–377. [arXiv:1303.1336](#)
30. *Canonical bases and higher representation theory.* *Compositio Mathematica* **151**, no. 1, 121–166. [arXiv:1209.0051](#)
- 2014 31. *Yangians and quantizations of slices in the affine Grassmannian* (with J. Kamnitzer, A. Weekes and O. Yacobi). *Journal of Algebra and Number Theory* **8** (2014), no. 4, 857–893. [arXiv:1209.0349](#)
- 2012 32. *An introduction to categorifying quantum knot invariants.* “The FreedmanFest,” *Geometry and Topology Monographs*, **18**, Mathematical Sciences Publishers, Berkeley
33. *2-block Springer fibers: convolution algebras and coherent sheaves* (with C. Stroppel). *Commentarii Mathematici Helvetici* **87** (2012), no. 2, 477–520. [arXiv:0802.1943](#)
34. *Hypertoric category \mathcal{O}* (with T. Braden, A. Licata, and N. Proudfoot). *Advances in Mathematics*. **231** (2012), no. 3-4, 1487–1545. [arXiv:1010.2001](#)
35. *Schur-Weyl-type duality for $\mathfrak{gl}(1|1)$, the Burau representation of braid groups, and invariants of tangled graphs* (with N. Reshetikhin and C. Stroppel). “Perspectives in analysis, geometry, and topology,” 389–401, *Progress in Mathematics*, **296**, Birkhuser/Springer, New York, 2012.
- 2011 36. *Localization algebras and deformations of Koszul algebras* (with T. Braden, A. Licata, C. Phan and N. Proudfoot). *Selecta Mathematica*, **17** (2011) 533–572. [arXiv:0905.1335](#)
37. *The geometry of Markov traces* (with G. Williamson). *Duke Mathematics Journal*, **160** (2011) 401–419. [arXiv:0911.4494](#)
38. *Singular blocks of parabolic category \mathcal{O} and finite W -algebras.* *Journal of Pure and Applied Algebra* **215** (2011), no. 12, 2797–2804. [arXiv:0909.1860](#)
- 2010 39. *Gale duality and Koszul duality* (with T. Braden, A. Licata, and N. Proudfoot). *Advances in Mathematics*, **225** (2010) 2002–2049. [arXiv:0806.3256](#)
- 2008 40. *A geometric model for the Hochschild homology of Soergel bimodules* (with G. Williamson). *Geometry and Topology*, **12** (2008) 1243–1263. [arXiv:0707.2003](#).
41. *Cramped subgroups and generalized Harish-Chandra modules.* *Proceedings of the AMS*, **136** (2008), 3809–3814. [arXiv:math.RT/0609846](#).
- 2007 42. *Small linearly equivalent G -sets and a construction of Beaulieu.* *Journal of Algebra*, **317** (2007), no. 1, 306–323. [arXiv:math.GR/0610205](#).

43. *Khovanov-Rozansky homology via a canopolis formalism*.
Algebraic and Geometric Topology, **7** (2007), 673–699. [arXiv:math.GT/0610650](#).
44. *A Deodhar type stratification of the double flag variety* (with M. Yakimov).
Transformation Groups, **12** (2007), no. 4, 769–785. [arXiv:math.SG/0607374](#).
45. *Intersection cohomology of hypertoric varieties* (with N. Proudfoot).
Journal of Algebraic Geometry **16** (2007), 39–63. [arXiv:math.AG/0411350](#).
- 2006 46. *Stabilization phenomena in Kac-Moody algebras and quiver varieties*. [arXiv:math.RT/0505619](#).
International Mathematics Research Notices, vol. 2006, Article ID 36856.

Preprints:

1. *Gelfand-Tsetlin modules: canonicity and calculations* (with Turner Silverthorne).
[arXiv:2011.06029](#)
2. *Three perspectives on categorical symmetric Howe duality* [arXiv:2001.07584](#)
3. *Rational Cherednik algebras of $G(\ell, p, n)$ from the Coulomb perspective* (with Elise LePage)
[arXiv:1912.00046](#)
4. *Coherent sheaves and quantum Coulomb branches I: tilting bundles from integrable systems*.
[arXiv:1905.04623](#)
5. *Coherent sheaves and quantum Coulomb branches II: quiver gauge theories and knot homology*.
Draft available on my website.
6. *Gelfand-Tsetlin modules in the Coulomb context*. [arXiv:1904.05415](#)
7. *Homological mirror symmetry for hypertoric varieties II*. (with Benjamin Gammage
and Michael McBreen). [arXiv:1903.07928](#)
8. *The degenerate Heisenberg category and its Grothendieck ring*.
(with Jonathan Brundan and Alistair Savage). [arXiv:1812.03255](#)
9. *Homological mirror symmetry for hypertoric varieties I*. (with Michael McBreen).
[arXiv:1804.10646](#)
10. *Koszul duality between Higgs and Coulomb categories \mathcal{O}* . [arXiv:1611.06541](#)
11. *Unfurling Khovanov-Lauda-Rouquier algebras*. [arXiv:1603.06311](#)
12. *Centers of KLR algebras and cohomology rings of quiver varieties*. [arXiv:1504.04401](#)
13. *Quiver Schur algebras and q -Fock space* (with C. Stroppel). [arXiv:1110.1115](#)

Students & postdocs supervised:

- 2016 – 2019 Chris Leonard (PhD, Virginia; joint with Weiqiang Wang)
- 2017 – 2019 Alex Weekes (postdoc, Perimeter)
- 2018 – Aiden Sutter (MSc, PSI; PhD, Perimeter/Waterloo)
- 2019 Amanda Garcia (MMath, Waterloo)
- 2019 Edward Poon (MMath, Waterloo)
- 2019 Elise LePage (MSc, PSI)
- 2019 Turner Silverthorne (USRA, Waterloo)
- 2019 Jerry Guan (USRA, Waterloo)
- 2019 – Justin Hilburn (postdoc, Perimeter)
- 2019 – 2020 Mark Penney (postdoc, Perimeter)
- 2020 – Dene Lepine (PhD, Waterloo)
- 2020 – Dinushi Munasinghe (PhD, Toronto)
- 2020 Baorui Zhou (undergrad, Waterloo)

- 2021 Jeremy Peters (MSc, PSI)
 2021 Shannon Jeffries (USRA, Waterloo)
 2021 – Ethan Kowalenko (postdoc, Waterloo)

Selected Lectures (since 2015):

- 2021 Oct. **Zoom** (Berkeley String-Math Seminar):
Noncommutative resolutions of Coulomb branches
- Jun. **Zoom** (NSF-FRG workshop on Categorical braid group actions and categorical representation theory): *Knot homology from coherent sheaves on Coulomb branches*
- May **Zoom** (BIRS Workshop on Perspectives on Knot Homology):
Knot homology from coherent sheaves on Coulomb branches
- April **Zoom** (Kansas State M-Seminar):
Knot homology from coherent sheaves on Coulomb branches
- 2020 Nov. **Zoom** (Yale Geometry, Symmetry and Physics Seminar):
Knot homology and coherent sheaves on Coulomb branches
- Nov. **Zoom** (Northwestern Geometry and Physics Seminar): *Hypertoric mirror symmetry*
- Sep. **Zoom** (Learning Seminar on Categorification): *Coulomb branches and cylindrical KLRW algebras [2 talks]*
- Aug. **Zoom** (Quantum groups, Representation theory, Superalgebras, and Tensor categories):
Tensor products and categorification
- Aug. **Zoom** (QUACKS): *Howe to translate Gelfand-Tsetlin*
- Aug. **Zoom** (Western Hemisphere Colloquium on Geometry and Physics):
3d mirror symmetry and its discontents
- May **Zoom** (Gone Fishin’): *Coulomb branches in math and physics*
- Apr. **Zoom** (UC Davis Coulomb seminar): *Tilting bundles from positive characteristic [2 talks]*
- Feb. **Fields Institute** (Geometric Representation Theory Seminar):
Symplectic duality: where do we stand?
- 2019 Nov. **Fields Institute** (Workshop on Higher Structures in Geometry and Physics): *Line defects and tilting bundles*
- Sep. **KSU** [remote] (Kansas State M-Seminar): *Tilting bundles and 3-dimensional field theory*
- Aug. **CRM Montreal** (Workshop on quiver varieties and representation theory): *Quiver varieties as Coulomb branches*
- Jul. **Warsaw** (Symposium on Integrable Systems): *Representation theory, topology and quantum field theory*
- Apr. **Berkeley** (String-Math seminar): *Mathematical hints of 3-d mirror symmetry*
- Apr. **Luminy** (Symplectic representation theory): *Gelfand-Tsetlin theory and Coulomb branches*
- Jan. **VUB** (Aspects of Higher Representation Theory): *Heisenberg v. Kac-Moody*
- 2018 Nov. **Oberwolfach** (Enveloping Algebras and Geometric Representation Theory):
The classification of Gelfand-Tsetlin modules and the Braverman-Finkelberg-Nakajima construction
- Oct. **U. Virginia** (Representation theory, Combinatorics, and Geometry):
Coherent sheaves on Hilbert schemes through the Coulomb lens
- Aug. **SUNY Buffalo** (Algebra Seminar): *Representation theory of symplectic singularities*
- Jul. **ECNU, Shanghai** (Workshop on Lie Theory and Representation Theory):
Coulomb branches and Cherednik algebras
- Jul. **ECNU, Shanghai** (Summer School on Lie Theory and Representation Theory):
Categorification: Heisenberg and Kac-Moody (8 talk series)
- Jun. **Notre Dame** (Thematic Program in Geometric Representation Theory):
Coulomb branches and applications (4 talk series)

- Jun. **Oberwolfach** (Interactions between Algebraic Geometry and Noncommutative Algebra):
Coulomb branches and KLR algebras
- 2017 Dec. **Macquarie** (AustMS Representation Theory Keynote):
Representation theory of symplectic singularities
- Dec. **Sydney** (Future Directions in Representation Theory): *Symplectic duality and KLR algebras*
- Oct. **Northeastern** (GASC Seminar): *Coherent sheaves and Coulomb branches*
- Oct. **U. Toronto** (Geometric Representation Theory Seminar):
The extended BFN category and shifted Yangians
- Sep. **Perimeter Institute** (Mathematical Physics Seminar):
An extended category for the BFN construction
- Sep. **U. Buffalo** (AMS Sectional): *Representation theory and the Coulomb branch*
- Aug. **U. of Oregon** (WARTHOG): *Symplectic duality (the abelian case)* (five day workshop)
- Jun. **Newton Institute** (Quantum topology and categorified representation theory):
Representation theory and the Coulomb branch
- Apr. **GWU** (Knots in Washington): *Knot invariants via quantizations of Hecke modifications*
- Mar. **UCLA** (Gauge Theory and Categorification):
Knot invariants via quantizations of Hecke modifications
- Mar. **Perimeter Institute**: *3-dimensional mirror symmetry: a mathematical perspective*
- Jan. **Texas** (Colloquium): *Representation theory of symplectic singularities*
- Jan. **Rice** (Colloquium): *Representation theory of symplectic singularities*
- 2016 Dec. **Waterloo** (Colloquium): *Representation theory of symplectic singularities*
- Oct. **UNC** (Symplectic Varieties and Geometric Representation Theory):
Representation theory and the Coulomb branch
- June **City University London** (London Algebra Colloquium):
The discreet charm of the Coulomb branch
- June **Imperial** (Geometry Seminar): *Representation theory of symplectic singularities*
- May **Michigan** (Advances in Geometric Representation Theory):
The discreet charm of the Coulomb branch
- May **NCSU** (Knots in the Triangle): *Annular homology and Hochschild homology*
- Apr. **Perimeter Institute** (Symplectic Duality and Gauge Theory):
Symplectic duality for hyperkähler quotients
- 2015 Oct. **NCSU** (Workshop on Algebraic and Combinatorial Representation Theory):
Unexpected gradings in representation theory
- Sept. **Loyola** (Algebra Seminar): *Gradings on $(q-)$ Schur algebras and quiver representations*
- July **ANU** (Algebra Seminar): *Mirror symmetry for hypertoric varieties*
- July **Melbourne** (Algebra Seminar): *Representation theory of symplectic singularities*
- June **Sydney** (series of 4 talks): *Representation theory through the lens of categorical actions*
- May **Cargèse, France** (Categorification in Algebra, Geometry and Physics):
Isomorphisms of knot homologies and skew Howe duality
- Mar. **Bonn** (On the interaction of representation theory with geometry and combinatorics):
Categorical restrictions
- Mar. **Warwick** (Derived categories in representation theory):
The discreet charm of the Coulomb branch
- Mar. **LSU** (Algebra Seminar): *Representation theory of symplectic singularities*
- Mar. **Georgetown** (AMS Sectional): *Uniqueness (or lack thereof) for categorical restrictions*
- Mar. **Georgetown** (AMS Sectional): *On isomorphisms between categorified \mathfrak{sl}_n invariants*
- Jan. **George Mason** (Topology, Arithmetic, and Dynamics Seminar):
Representation theory of symplectic singularities

Jan. UNAM (US-Mexico Meeting on Noncommutative Algebra):
Uniqueness (or lack thereof) for categorical restrictions

Professional Activities:

- Journals refereed:

Annals of Math	Algebra and Number Theory
Selecta Mathematica	Journal of the EMS
American Journal of Mathematics	Moscow Mathematical Journal
Advances in Mathematics	Algebraic & Geometric Topology
Representation Theory	Quantum Topology
Transactions of the AMS	International Mathematics Research Notices
Banach Center Publications	Duke Mathematics Journal
Nagoya Math Journal	Mathematische Zeitschrift
Compositio Mathematica	International Journal of Mathematics & Mathematical Sciences
Proceedings of the LMS	Journal of the AMS
Journal of Algebra	Inventiones Mathematicae
SIGMA	Acta Mathematica
Fundamenta Mathematicae	Journal of the LMS
Math Annalen	
Birkhäuser Festschriften	

- *Math Reviews* reviewer.

- Departmental committees served:

DACA (UW)	PhD Thesis Chair Pool (UW)
Graduate/admissions committees (UW, UVA)	Library committee (PI)
Assessment committee (UVA)	Undergraduate advisor (UVA)
Postdoctoral search committee (NU & PI)	Graduate Open House committee (NU)
Niven and Moursund Lectures committee (UO)	

- External committees served:

AMS Web Editorial Group (2014–2016)	AMS Committee on Publications (2015–2018)
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- Reviewed grants for:

NSA Mathematics	Portuguese Foundation for Science and Technology
NSF Mathematics	France Berkeley Fund
European Research Council	Swiss National Science Foundation
BIRS workshops	National Fund for Scientific Research (Belgium)
EPSRC	

- Expository talks given:

Waterloo PMC	UVA Math Club
Simon's Rock College Math Club	Boston Math Circle
Northeastern incoming math majors	Western Albemarle High School
LSU graduate colloquium	

- Conferences co-organized:

- “Perspectives on knot homology” planned for Banff; held online (2021)
- “Geometric Representation Theory” planned for Perimeter Institute and MPIM Bonn; held online (2020)
- “Algebraic and Geometric Categorification” in CMO (2019)
- “QFT for Mathematicians” summer school at Perimeter Institute (2019)

- “Representation theory, mathematical physics and integrable systems” in Luminy (2018)
- “Virginia Topology Conference 2016” in Charlottesville (2016)
- “Algebraic Groups, Quantum Groups and Geometry” in Charlottesville (2016)
- “Categorification and Geometric Representation Theory” in Montréal (2014)
- “Workshop on Quiver Representations and Geometric Representation Theory” in Paris (2014)
- “Algebra, Combinatorics and Representation Theory: an international conference in memory of Andrei Zelevinsky” in Boston (2013)
- “Representation Theory and Geometry” in Berkeley (2005)

Teaching Activities:

At Waterloo:

- 2021 Fall Taught “Topics in Algebra: Category \mathcal{O} ” (MATH 945)
 2021 Winter Taught “Topics in Geometry: Symplectic Geometry” (MATH 965)
 2020 Fall Taught “Linear Algebra 2 for Honours Mathematics” (MATH 235)
 2020 Spring Taught “Euclidean Geometry” (MATH 320)
 2020 Winter Taught “Calculus 1 for Honours Mathematics” (MATH 128)
 2019 Fall Taught “Linear Algebra 2 for Honours Mathematics” (MATH 235)
 2019 Winter Taught “Linear Algebra 1 for Honours Mathematics” (MATH 136)
 2018 Fall Taught “Representation Theory of Finite Groups” (PMATH 4/745)
 2018 Winter Taught “Combinatorial Representation Theory” (PMATH 945)
 2017 Fall Taught “Representation Theory of Finite Groups” (PMATH 4/745)

At UVA, NU, UO and MIT:

- undergrad: Calculus (single and multivariable), Differential Equations with Linear Algebra, Transition to Higher Mathematics, Number Theory, Project Lab in Mathematics, Representations of Finite Groups
- graduate: Algebra, Measure Theory, Lie Groups, Homological, Algebraic Topology, Symplectic Geometry, Quiver Representations, reading courses on categorification, geometric representation theory and quiver varieties.