BEN SALISBURY

CURRICULUM VITAE

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EDUCATION

UNIVERSITY OF CONNECTICUT, STORRS, CONNECTICUT. 2007–2012

Ph.D. in Mathematics, 2012.
Thesis Advisor: Kyu-Hwan Lee.
Thesis Title: *A combinatorial description of the Gindikin–Karpelevich formula*

M.S. in Mathematics, 2009.

UNIVERSITY OF RHODE ISLAND, KINGSTON, RHODE ISLAND. 2002–2007

B.S. in Mathematics, 2007.

EMPLOYMENT

CENTRAL MICHIGAN UNIVERSITY, MOUNT PLEASANT, MICHIGAN. 2013–PRESENT

Department Chair, 2019–present.
Professor of Mathematics, 2020–present.
Associate Professor of Mathematics, 2017–2020.
Assistant Professor of Mathematics, 2013–2017.

ICERM, BROWN UNIVERSITY, PROVIDENCE, RHODE ISLAND. 2013

Postdoctoral Fellow, Spring 2013.
Mentor: Anne Schilling, University of California, Davis.

THE CITY COLLEGE OF NEW YORK, CUNY, NEW YORK, NEW YORK. 2012

Postdoctoral Fellow, Fall 2012.
Mentor: Gautam Chinta.

AWARDS AND GRANTS

COLLABORATION GRANT FOR MATHEMATICIANS, SIMONS FOUNDATION. 2016

Awarded $35,000 over a five-year term 2016–2021.

CONNIE STRANGE SERVICE AWARD, UNIVERSITY OF CONNECTICUT. 2011

Awarded for outstanding service to the Department of Mathematics.

PUBLICATIONS

[17] B. Salisbury and T. Scrimshaw, *Candidate for the crystal $B(-\infty)$ for the queer Lie superalgebra*, to appear in Kyoto J. Math; Proceedings of the 31st International Conference on Formal Power Series and Algebraic Combinatorics (Ljubljana), Sém. Lothar. Combin. **82B** (2019), Art. 54, 12 pp.

[16] B. Salisbury and T. Scrimshaw, *Rigged configurations and the $*$-involution for generalized Kac–Moody algebras*, J. Algebra **573** (2021), 148–168; Proceedings of the 30th International Conference on Formal Power Series and Algebraic Combinatorics (Hanover), Sém. Lothar. Combin. **80B** (2018), Art. 20, 12 pp.

[15] J. Criswell, B. Salisbury, and P. Tingley, *PBW bases and marginally large tableaux in types B and C*, Canad. Math. Bull. **62** (2019), no. 1, 37–54; Proceedings of the 30th International Conference on Formal Power Series and Algebraic Combinatorics (Hanover), Sém. Lothar. Combin. **80B** (2018), Art. 35, 12 pp.

[14] B. Salisbury and T. Scrimshaw, *Virtual crystals and Nakajima monomials*, SIGMA **14** (2018), 103, 19 pages.

[13] B. Salisbury and T. Scrimshaw, *Rigged configurations and the $*$-involution*, Lett. Math. Phys. **108** (2018), no. 9, 1985–2007; Proceedings of the 29th International Conference on Formal Power Series and Algebraic Combinatorics (London), Sém. Lothar. Combin. **78B** (2017), Art. 34, 12 pp.

[12] B. Salisbury, A. Schultze, and P. Tingley, *Combinatorial descriptions of the crystal structure on certain PBW bases*, Transform. Groups **23** (2018), no. 2, 501–525; Proceedings of the 28th International Conference on Formal Power Series and Algebraic Combinatorics (Vancouver), DMTCS proc. **BC** (2016), 1063–1074.

[11] B. Salisbury, A. Schultze, and P. Tingley, *PBW bases and marginally large tableaux in type D*, J. Comb. **9** (2018), no. 3, 535–551.

[10] L. James and B. Salisbury, *The weight function for monomial crystals of affine type*, Comm. Alg. **46** (2018), no. 8, 3622–3641.

[9] M. Mainkar, M. Plante, and B. Salisbury, *Counting Anosov graphs*, Ars Combin. **141** (2018), 29–51.

[8] B. Salisbury and T. Scrimshaw, *Rigged configurations for all symmetrizable types*, Electron. J. Combin. **24** (2017), no. 1, #P1.30.

[7] B. Salisbury and T. Scrimshaw, *Connecting marginally large tableaux and rigged configurations via crystals*, Algebr. Represent. Theory **19** (2016), 523–546.

[6] S.-J. Kang, K.-H. Lee, H. Ryu, and B. Salisbury, *A combinatorial description of the affine Gindikin-Karpelevich formula in type $A_n^{(1)}$*, Lie Algebras, Lie Superalgebras, Vertex Algebras and Related Topics, Proc. Sympos. Pure Math., vol. 92, Amer. Math. Soc., Providence, RI, 2016, pp. 145–165.

[5] B. Salisbury and T. Scrimshaw, *A rigged configuration model for $B(\infty)$*, J. Combin. Theory Ser. A **133** (2015), 29–57.

[4] B. Salisbury, *The flush statistic on semistandard Young tableaux*, C. R. Math. Acad. Sci. Paris, Ser. I **352** (2014), 367–371.

[3] K.-H. Lee, P. Lombardo, and B. Salisbury, *Combinatorics of the Casselman-Shalika formula in type A*, Proc. Amer. Math. Soc. **142** (2014), 2291–2301.

[2] K.-H. Lee and B. Salisbury, *Young tableaux, canonical bases, and the Gindikin-Karpelevich formula*, J. Korean Math. Soc. **51** (2014), no. 2, 289–309.

[1] K.-H. Lee and B. Salisbury, *A combinatorial description of the Gindikin-Karpelevich formula in type A*, J. Combin. Theory Ser. A **119** (2012), 1081–1094.

PRESENTATIONS AT INTERNATIONAL MEETINGS

[15] *Rigged configurations for generalized Kac–Moody algebras*, AMS Special Session on *Diagrammatic and Combinatorial Methods in Representation Theory*, San Francisco State University, Virtual Meeting, 2021

[14] *Rigged configurations for generalized Kac–Moody algebras*, AMS Special Session on *Combinatorics in Algebra and Algebraic Geometry*, University of Michigan, Ann Arbor, MI, 2018.

[13] *Introduction to Sage*, SageDays@ICERM: Combinatorics and Representation Theory, Institute for Computational and Experimental Research in Mathematics (ICERM), Brown University, Providence, RI, 2018.

[12] *Using rigged configurations to model $B(\infty)$* (poster), Formal Power Series and Algebraic Combinatorics, Queen Mary University of London, London, UK, 2017.

[11] *Rigged configurations and $B(\infty)$*, Fourth Lake Michigan Workshop on Combinatorics and Graph Theory, Western Michigan University, Kalamazoo, MI, 2017.

[10] *Rigged configurations and $B(\infty)$*, AMS Special Session on *Combinatorial Representation Theory*, University of St. Thomas, Minneapolis, MN, 2016.

[9] *Combinatorial descriptions of the crystal structure on certain PBW bases* (poster), Formal Power Series and Algebraic Combinatorics, Simon Fraser University, Vancouver, BC, Canada, 2016.

[8] *Crystal Structure on certain PBW bases*, AMS Special Session on *Algebraic Combinatorics*, University of Utah, Salt Lake City, UT, 2016.

[7] *Rigged configurations and $B(\infty)$*, AMS Special Session on *Automorphic Forms, Combinatorics and Representation Theory*, University of Utah, Salt Lake City, UT, 2016.

[6] *Affine crystals in Sage*, Sage Days 65, Loyola University Chicago, Chicago, IL, 2015.

[5] *A rigged configuration model for $B(\infty)$*, AMS Special Session on *Algebraic Combinatorics*, Michigan State University, East Lansing, MI, 2015.

[4] *Combinatorics of the Casselman–Shalika formula in type A*, Whittaker Functions: Number Theory, Geometry, and Physics, Banff International Research Station, Banff, AB, Canada, 2013.

[3] *Monomial crystals in Sage* (demonstration), Sage Days 49, Université Paris Sud XI, Orsay, France, 2013.

[2] *Crystals of generalized Young walls in Sage* (poster), Sage Days 45, Institute for Computational and Experimental Research in Mathematics (ICERM), Providence, RI, 2013.

[1] *A combinatorial description of the affine Gindikin-Karpelevich formula of type $A_n^{(1)}$*, AMS–MAA Joint Mathematics Meetings, San Diego, CA, 2013.

SEMINARS AND COLLOQUIA

[42] *LaTeX: Learn it, or else!*, Kappa Mu Epsilon Seminar, Central Michigan University, Mount Pleasant, MI, 2021.

[41] *Representations of the symmetric group*, Kappa Mu Epsilon Seminar, Central Michigan University, Mount Pleasant, MI, 2019.

[40] *LaTeX: Learn it, or else!*, Kappa Mu Epsilon Seminar, Central Michigan University, Mount Pleasant, MI, 2018.

[39] *Crystal structure on certain PBW bases and tableaux*, Algebra Seminar, Michigan State University, East Lansing, MI, 2018.

[38] *Latin squares*, Colloquium, Washington College, Chestertown, MD, 2018.

[37] *Rigged configurations and $B(\infty)$*, Algebra and Combinatorics Seminar, Loyola University Chicago, Chicago, IL, 2017.

[36] *Path algebras and projective modules*, Algebra and Combinatorics Seminar, Central Michigan University, Mount Pleasant, MI, 2017.

[35] *Crystal structure on certain PBW bases and tableaux*, Algebra Seminar, University of Connecticut, Storrs, CT, 2017.

[34] *Using TikZ in LaTeX*, Graduate Student Seminar, Central Michigan University, Mount Pleasant, MI, 2017.

[33] *Latin squares*, Kappa Mu Epsilon Seminar, Central Michigan University, Mount Pleasant, MI, 2016.

[32] *Introduction to crystals of tableaux*, Student Combinatorics Seminar, University of Minnesota, Minneapolis, MN, 2016.

[31] *Rigged configurations and $B(\infty)$*, Algebra and Combinatorics Seminar, Central Michigan University, Mount Pleasant, MI, 2016.

[30] *Crystal structure on certain PBW bases and tableaux*, Philadelphia Area Combinatorics and Algebraic Geometry Seminar, Drexel University, Philadelphia, PA, 2016.

[29] *Crystal structure of certain PBW bases*, Combinatorics Seminar, University of Minnesota, Minneapolis, MN, 2016.

[28] *Representations of the symmetric group*, Graduate Student Seminar, Central Michigan University, Mount Pleasant, MI, 2015.

[27] *Introduction to crystals of tableaux*, Colloquium, Oakland University, Rochester, MI, 2015.

[26] *An overview of p-adic numbers*, Graduate Student Seminar, Central Michigan University, Mount Pleasant, MI, 2015.

[25] *The Gindikin–Karpelevich formula, the Casselman–Shalika formula, and crystals of tableaux*, Philadelphia Area Combinatorics and Algebraic Geometry Seminar, Drexel University, Philadelphia, PA, 2014.

[24] *What is a crystal?*, Bi-College Math Colloquium, Haverford College, Philadelphia, PA, 2014.

[23] *Some common notions from representation theory*, Algebra and Combinatorics Seminar, Central Michigan University, Mount Pleasant, MI, 2014.

[22] *The Gindikin–Karpelevich formula and combinatorics of crystals*, Algebra and Combinatorics Seminar, Central Michigan University, Mount Pleasant, MI, 2014.

[21] *The Gindikin–Karpelevich formula and combinatorics of crystals*, Tutte Seminar Series, University of Waterloo, ON, Canada, 2014.

[20] *Representations of the symmetric group*, Kappa Mu Epsilon Seminar, Central Michigan University, Mount Pleasant, MI, 2014.

[19] *The Casselman–Shalika formula and crystals of tableaux* (poster), Faculty Excellence Exhibition, Central Michigan University, Mount Pleasant, MI, 2014.

[18] *Introduction to crystals and an application*, Graduate Student Seminar, Central Michigan University, Mount Pleasant, MI, 2014.

[17] *The Gindikin–Karpelevich formula, the Casselman–Shalika formula, and crystals of tableaux*, Algebra/Discrete Math Seminar, University of California, Davis, CA, 2013.

[16] *Combinatorics of Crystals*, Algebraic Combinatorics Seminar, Central Michigan University, Mount Pleasant, MI, 2013.

[15] *The Gindikin–Karpelevich formula and marginally large Young tableaux*, Algebra and Combinatorics Seminar, Loyola University Chicago, Chicago, IL, 2013.

[14] *Combinatorics of Young tableaux and p-adic integrals*, Postdoc and Graduate Student Seminar, ICERM, Providence, RI, 2013.

[13] *What is a crystal?*, Colloquium, Central Michigan University, Mount Pleasant, MI, 2013.

[12] *What is a crystal?*, UMass Graduate Student Seminar, Amherst, MA, 2013.

[11] *Crystals of tableaux and t-deformation of characters*, Algebra/Topology Seminar, University at Albany SUNY, Albany, NY, 2012.

[10] *The Gindikin–Karpelevich formula in affine type A*, Representation Theory Seminar, CUNY Graduate Center, New York, NY, 2012.

[9] *The Gindikin–Karpelevich formula, the Casselman–Shalika formula, and crystals of tableaux*, Representation Theory Seminar, CUNY Graduate Center, New York, NY, 2012.

[8] *What is a crystal?*, S.I.G.M.A. Seminar, University of Connecticut, Storrs, CT, 2012.

[7] *The Jacobi triple product identity*, S.I.G.M.A. Seminar, University of Connecticut, Storrs, CT, 2011.

[6] *Combinatorics of the Casselman–Shalika formula*, Algebra Seminar, University of Connecticut, Storrs, CT, 2011.

[5] *What is a crystal?*, Colloquium, Central Connecticut State University, New Britain, CT, 2011.

[4] *Combinatorics of the Gindikin–Karpelevich formula*, Algebra Seminar, Wesleyan University, Middletown, CT, 2011.

[3] *The Gindikin–Karpelevich formula in type A*, Algebra Seminar, University of Connecticut, Storrs, CT, 2011.

[2] *The Hopf fibration*, UConn Math Club, University of Connecticut, Storrs, CT, 2011.

[1] *A not-so-long survey of LaTeX*, S.I.G.M.A. Seminar, University of Connecticut, Storrs, CT, 2010.

COURSES TAUGHT

Central Michigan University, Mount Pleasant, Michigan. 2013–present

Intermediate Algebra; Calculus I; Honors Calculus I; Business Calculus; Calculus II; Multivariable Calculus; Linear Algebra and Matrix Theory; Linear Algebra and Differential Equations; Introduction to Mathematical Proof; Discrete Structures; Theory of Numbers; Abstract Algebra; Advanced Linear Algebra; Representation Theory of the Symmetric Group; Combinatorics and Graph Theory; Theory of Modules and Fields; Representation Theory of Lie Algebras; Combinatorics II.

University of Connecticut, Storrs, Connecticut. 2007–2012

Problem Solving; Mathematics for Business and Economics; Calculus I (as both sole instructor and recitation leader); Calculus II (as both sole instructor and recitation leader); Honors Multivariable Calculus; Elementary Differential Equations.

CURRICULUM DEVELOPMENT

- Member of the team which brought in a third-party Mathematics Placement Exam to Central Michigan University, 2020–2021.
- Authored or co-authored revisions to the Master Course Syllabi at Central Michigan University for more than 25 courses in the Department of Mathematics, including standardizing the use of Open Educational Resources in the Calculus sequence, creation of two graduate courses in the field of representation theory, and major revisions to Introduction to Mathematical Proof, Theory of Numbers, and Combinatorics and Graph Theory.
- Research Assistant in the Department of Mathematics at the University of Connecticut on the project *Pedagogy in Large Lectures*, in which digital resources (digital flashcards, micro-videos, and clicker questions) were created for students in Calculus I. This was part of "The Provost's General Education Course Enhancement Grant," 2010–2011.
- Research Assistant in the Department of Mathematics at the University of Connecticut on the projects *Calculus Labs for Math 1131Q* and *Calculus Labs for Math 1132Q*, in which worksheets to be completed in groups during recitation sections were created for Calculus I and II. This was part of "The Provost's General Education Course Enhancement Grant," 2009–2010.

ADVISING AND MENTORING

- "Plan A" Master's Thesis projects supervised at Central Michigan University.
  - Jackson Criswell, *Connecting PBW bases and Young tableaux via the infinity crystal in types B and C*, 2016–2017.
  - Luke James, *The weight function for Nakajima monomials of types* $A_n^{(1)}$ *and* $B_3^{(1)}$, 2016–2017.
  - Matthew Plante, *Counting Anosov graphs*, 2014–2015.
- "Plan B" projects supervised at Central Michigan University.
  - April Grow, *Coxeter Groups*, Summer 2017.
  - Robert Crombez, *p-adic Numbers*, Spring 2015.
  - Katherine Radler, *Knot Theory*, Spring 2015.

- Christal Ross, *Crystal Bases and Young Tableaux*, Spring 2015.
- Kathryn Haske, *Matroid Theory*, Fall 2014.

- Teaching internships supervised at Central Michigan University.
  - Oluremi Abayomi, MTH 223: Linear Algebra and Matrix Theory, Spring 2017.
  - Nonhle Mdziniso, MTH 223: Linear Algebra and Matrix Theory, Fall 2015.
- Mentor in the Mathematics T.A. Network at the University of Connecticut, 2010–2012.
- Advisor in the Directed Reading Program in the Department of Mathematics at the University of Connecticut, 2010.

SERVICE FOR THE PROFESSION

- External member of the Ph.D. dissertation committee for Peter Broe, Western Michigan University, 2021.
- Referee or reviewer for Algebraic Combinatorics; Algebras and Representation Theory (four times); College Mathematics Journal (twice); Electronic Journal of Combinatorics (twice); Isreal Journal of Mathematics; Journal of Algebraic Combinatorics; Journal of Combinatorial Theory, Series A (three times); Journal of Combinatorics; Journal of Integer Sequences; Journal of Mathematical Physics; Journal of Pure and Applied Algebra; Mathematical Reviews (six times); Proceedings for *Formal Power Series and Algebraic Combinatorics* (four times); Transformation Groups; zbMath (three times)
- External examiner for the Ph.D. thesis of Joel Gibson, The University of Sydney, 2020.
- Co-organizer of international workshop *Free and Practical Software for Algebraic Combinatorics 2019* at the University of Ljubljana, Slovenia, July 8–12, 2019.
- Co-organizer of international workshop *SageDays@ICERM: Combinatorics and Representation Theory* at the Institute for Computational and Experimental Research in Mathematics, Brown University, Providence, RI, USA, July 23–27, 2018.
- Co-organizer of Special Session SS 5A entitled *Combinatorial and Geometric Representation Theory* at the AMS Fall Sectional Meeting, Loyola University Chicago, October 3–4, 2015.
- Co-organizer of Special Session SS 36A entitled *Algebraic Combinatorics and Representation Theory* at the 2015 AMS-MAA Joint Mathematics Meetings, San Antonio, TX, January 10–13, 2015.

SERVICE FOR CENTRAL MICHIGAN UNIVERSITY

- University ERP/SIS Selection and Implementation Advisory Team, 2021–present.
- University Admissions Appeals Review Committee, 2021–present.
- University Council of Chairs, 2019–present (chair: 2020–present).
- Department of Mathematics Executive Council, 2018–present (chair: 2019–present).
- Department of Mathematics Liaison to the Mathematical Association of America, 2017–present.
- Faculty Advisor, Kappa Mu Epsilon, 2017–present.

- Department of Mathematics Personnel Committee, 2017–present (chair: 2019–present).
- Ad-hoc University Committee for selecting and organizing the implementation of a Mathematics Placement Exam from a third-party vendor, 2020–2021.
- University Honors Council, 2017–2019 (chair: 2018–2019).
- Co-founder/Co-organizer of the Algebra and Combinatorics Seminar, 2013–2019.
- Department of Mathematics Hiring Committee, 2017–2018.
- Department of Mathematics Awards and Scholarships Committee, 2014–2018 (chair: 2014–2018).
- University Degrees, Admissions, Standards, and Honors Committee, 2014–2017 (chair: 2016–2017).
- Department of Mathematics Curriculum Committee, 2016.
- Department of Mathematics Graduate Committee, 2014–2015.
- Department of Mathematics Colloquium Speakers Committee, 2013–2014.
- Department of Mathematics Special Events Committee, 2013–2014.

MEMBERSHIP

American Mathematical Society; Mathematical Association of America.

COMPUTER SKILLS

- See contributions to SageMath at trac.sagemath.org under the username *bsalisbury1*.
- LaTeX, Python, macOS, unix, HTML, Microsoft Excel and Word, Adobe Acrobat and inDesign.