

Sarah Bockting-Conrad

Curriculum Vitae

CONTACT INFORMATION

Department of Mathematical Sciences
DePaul University
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Chicago, Illinois 60614, USA

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EDUCATION

University of Wisconsin – Madison

Ph.D. in Mathematics, Advisor: Paul Terwilliger
M.A. in Mathematics

Madison, WI
May 2014
December 2009

University of Evansville

B.S. in Pre-doctoral Mathematics and Physics

Evansville, IN
May 2007

ACADEMIC APPOINTMENTS

DePaul University

Associate Professor of Mathematics
Assistant Professor of Mathematics

Chicago, IL
2022 – Present
2015 – 2022

Oberlin College

Visiting Assistant Professor of Mathematics

Oberlin, OH
2014 – 2015

PUBLICATIONS

9. S. Bockting-Conrad, H.-W. Huang. **The Casimir elements of the Racah algebra.** *J. Algebra Appl.*, **20** (2021), no. 8, article no. 2150135, 1–22. DOI 10.1142/s0219498821501358.
8. S. Bockting-Conrad, Y. Kashina, T. K. Petersen, B. Tenner. **Sós Permutations.** *American Mathematical Monthly*, **128** (2021) 407–422. DOI 10.1080/00029890.2021.1889911.
7. H. Barcelo, M. Bernstein, S. Bockting-Conrad, E. McNicholas, K. Nyman, S. Viel. **Algebraic Voting Theory & Representations of $S_m \wr S_n$.** *Adv. in Appl. Math.* **120** (2020). DOI 10.1016/j.aam.2020.102077.
6. S. Bockting-Conrad. **Some q -exponential formulas involving the double lowering operator ψ for a tridiagonal pair.** *Advances in Mathematical Sciences*, Proceedings of the 2019 AWM Research Symposium, Springer, 2020, 19–43. DOI 10.1007/978-3-030-42687-3_2.
5. S. Bockting-Conrad, H.-W. Huang. **Finite-dimensional irreducible modules of the Racah algebra at characteristic zero.** *SIGMA* **16** (2020), 018, 17 pages. DOI 10.3842/sigma.2020.018.
4. S. Bockting-Conrad, H.-W. Huang. **The universal enveloping algebra of \mathfrak{sl}_2 and the Racah algebra.** *Comm. Algebra* **48** (2020), no. 3, 1022–1040. DOI 10.1080/00927872.2019.1670199.
3. S. Bockting-Conrad, P. Terwilliger. **The algebra $U_q(\mathfrak{sl}_2)$ in disguise.** *Linear Algebra Appl.* **459** (2014) 548–585. DOI 10.1016/j.laa.2014.07.022.

2. S. Bockting-Conrad. **Tridiagonal pairs of q -Racah type, the double lowering operator ψ , and the quantum algebra $U_q(\mathfrak{sl}_2)$.** *Linear Algebra Appl.* **445** (2014) 256-279. DOI 10.1016/j.laa.2013.12.007.
1. S Bockting-Conrad. **Two commuting operators associated with a tridiagonal pair.** *Linear Algebra Appl.* **437** (2012) 242–270. DOI 10.1016/j.laa.2012.02.007.

GRANTS AND CONTRACTS

External

- Initiative for Mathematics Learning by Inquiry Grant 2020
(on behalf of the Chicagoland COMMIT) Funded, \$2,000

Internal

- Diversity and Inclusion Initiative Grant (DIIG) 2021
(with Shannon Simonovich, on behalf of the CSH Diversity, Equity, and Inclusion Committee) Funded, \$2,000
Conversations in Color
- College of Science and Health Faculty Summer Research Grant Summer 2020
Exponential formulas involving the double-lowering operator ψ for tridiagonal pairs of Racah type Funded, \$5,300
- University Research Council (URC) Research Leave Spring 2019
Tridiagonal pairs of Racah type Funded
- College of Science and Health Faculty Summer Research Grant Summer 2016
An investigation of non-thin tridiagonal pairs Funded, \$4,200

SCHOLARLY PAPERS PRESENTED

Invited Research Presentations

- *Tridiagonal pairs of Racah type and the universal enveloping algebra $U(\mathfrak{sl}_2)$* , AMS Session on Aspects and Applications of Algebraic Combinatorics, AMS-MAA Joint Mathematics Meetings, Denver, Colorado, January 2020
- *Where Graphs and Algebra Meet*, Talk for undergraduate students, Trinity Christian College, October 2019
- *Tridiagonal pairs of Racah type and the universal enveloping algebra $U(\mathfrak{sl}_2)$* , Special Session on Special Functions and Orthogonal Polynomials, AMS Fall Central Sectional Meeting, University of Wisconsin–Madison, September 2019
- *Tridiagonal pairs of Racah type and the universal enveloping algebra $U(\mathfrak{sl}_2)$* , Special Session on Distance-Regular Graphs, 9th Slovenian International Conference on Graph Theory, Slovenia, June 2019
- *A Journey Toward Tridiagonal Pairs*, Colloquium, University of North Florida, April 2019
- *Tridiagonal pairs of Racah type*, ACxx: Women in Algebraic Combinatorics, AWM Research Symposium, Rice University, April 2019
- *Three bases associated with a thin tridiagonal pair of q -Racah type*, Special Session on Algebraic Combinatorics: Association Schemes, Finite Geometry, and Related Topics, AMS Spring Central Sectional Meeting, The Ohio State University, March 2018
- *Some linear transformations associated with a tridiagonal pair of q -Racah type*, Combinatorics Seminar, University of Wisconsin–Madison, November 2017

- *A decomposition between the split decompositions for a tridiagonal pair*, Special Session on Algebraic Combinatorics of Flag Varieties, AMS Fall Central Sectional Meeting, University of North Texas, September 2017
- *Some linear transformations associated with a tridiagonal pair of q -Racah type*, 2017 Meeting of the International Linear Algebra Society, Iowa State University, July 2017
- *A journey toward tridiagonal pairs*, DePaul Math Club, DePaul University, May 2017
- *Some q -exponential formulas involving the double lowering operator ψ for a thin tridiagonal pair*, Algebraic Combinatorixx 2 Workshop, Banff International Research Station, Banff, Alberta, Canada, May 2017
- *A Journey Toward Tridiagonal Pairs*, Colloquium, Butler University, February 2017
- *Connections between the ψ , Δ , and \mathcal{M} operators for a thin tridiagonal pair*, Special Session on Algebraic Combinatorics, AMS Fall Western Sectional Meeting, University of Denver, October 2016
- *Some q -exponential formulas involving the double lowering operator ψ for a tridiagonal pair*, Combinatorics Seminar, University of Wisconsin–Madison, March 2016
- *Some q -exponential formulas involving the double lowering operator ψ for a tridiagonal pair*, Special Session on Algebraic Methods Common to Association Schemes, Hopf Algebras, Tensor Categories, Finite Geometry, and Related Areas, AMS Fall Central Sectional Meeting, Loyola University, October 2015
- *Tridiagonal pairs and the quantum group $U_q(\mathfrak{sl}_2)$* , Colloquium, Kent State University, January 2015
- *Tridiagonal pairs of q -Racah type and the quantum group $U_q(\mathfrak{sl}_2)$* , AMS Session on Combinatorics, AMS-MAA Joint Mathematics Meetings, San Antonio, Texas, January 2015
- *Tridiagonal pairs and the quantum enveloping algebra $U_q(\mathfrak{sl}_2)$* , Algebra Seminar, University of Akron, November 2014
- *Tridiagonal pairs of q -Racah type and the quantum enveloping algebra $U_q(\mathfrak{sl}_2)$* , Modern Trends in Algebraic Graph Theory, Villanova University, June 2014
- *Tridiagonal pairs, double lowering operators, and $U_q(\mathfrak{sl}_2)$* , Combinatorics Seminar, University of Wisconsin–Madison, April 2014
- *Tridiagonal pairs of q -Racah type, the double lowering operator ψ , and $U_q(\mathfrak{sl}_2)$* , Special Session on Algebraic Methods in Graph Theory and Combinatorics, AMS Spring Southeastern Sectional Meeting, University of Tennessee, Knoxville, March 2014
- *Tridiagonal systems and $U_q(\mathfrak{sl}_2)$* , Combinatorics Seminar, University of Wisconsin–Madison, March 2014
- *Tridiagonal pairs of height one*, Combinatorics Seminar, University of Wisconsin–Madison, May 2013
- *Connections between $U_q(\mathfrak{sl}_2)$ and tridiagonal systems*, Special Session on Algebraic and Geometric Combinatorics, AMS Spring Central Sectional Meeting, Iowa State University, April 2013
- *Connections between $U_q(\mathfrak{sl}_2)$ and tridiagonal systems*, Combinatorics Seminar, University of Wisconsin–Madison, September 2012
- *Connections between $U_q(\mathfrak{sl}_2)$ and tridiagonal pairs*, 2012 Shanghai Conference on Algebraic Combinatorics, Shanghai Jiao Tong University, Shanghai, China, August 2012
- *Two commuting operators associated with a tridiagonal pair*, 8th Annual Graduate Student Combinatorics Conference, University of Illinois at Urbana–Champaign, April 2012
- *Nomura’s refinement of the split decomposition for a tridiagonal pair*, Combinatorics Seminar, University of Wisconsin–Madison, February 2012
- *Two commuting operators associated with a tridiagonal pair*, Special Session on Association Schemes and Related Topics, AMS Fall Central Sectional Meeting, University of Nebraska–Lincoln, October 2011

- $U_q(\mathfrak{sl}_2)$ -modules arising from tridiagonal systems, Geometric and Algebraic Combinatorics 5, Oisterwijk, The Netherlands, August 2011
- $U_q(\mathfrak{sl}_2)$ -modules arising from tridiagonal systems, Combinatorics Seminar, University of Wisconsin–Madison, April 2011
- *An operator associated with tridiagonal pairs*, Combinatorics Seminar, University of Wisconsin–Madison, August 2010
- *An operator associated with tridiagonal pairs*, Algebraic and Geometric Combinatorics Conference 2010, Gyeongju, South Korea, July 2010

Other Invited Scholarly Presentations

- *Conversations in Chicagoland: A Way to Connect with Colleagues while Preparing for Pandemic Teaching and Beyond*, Session on Using Inquiry and Collaboration in Faculty Professional Development during the Pandemic and Beyond, MAA MathFest, Virtual, August 2021
- *Executing Inquiry-Based Learning*, Breakout Session, Chicago Symposium Series, University of Illinois at Chicago, February 2020

Contributed Poster Presentations

- *Connections between tridiagonal systems and $U_q(\mathfrak{sl}_2)$* (poster), Midwestern Women in Math Symposium, University of Illinois at Urbana-Champaign, April 2016

Invited Presentations Cancelled or Postponed Due to COVID-19

- *Tridiagonal pairs and the universal enveloping algebra $U(\mathfrak{sl}_2)$* , Combinatorics Around the q -Onsager Algebra Conference, Satellite event of the 8th European Congress of Mathematics, Slovenia. Originally scheduled for June 2020, currently rescheduled for June 2022.
- *Connections between tridiagonal systems and $U(\mathfrak{sl}_2)$* , Algebra and Combinatorics Seminar, Loyola University Chicago. Originally scheduled for March 2020, Cancelled.
- *Adopting Student-Created Norms in Active-Learning Classrooms*, Annual Meeting of the Illinois Section of the MAA, University of St. Francis. Originally scheduled for March 2020, Cancelled.

Other Participation in Scholarly Meetings

- Session Moderator, Annual Meeting of the Illinois Section of the MAA, March 2021
- Faculty Mentor for graduate students at AWM Workshop Luncheon at the 2020 AMS-MAA Joint Mathematics Meetings, January 2020
- Judge for the MAA Undergraduate Student Poster Session at the 2020 AMS-MAA Joint Mathematics Meetings, January 2020
- Session Moderator, Annual Meeting of the Illinois Section of the MAA, March 2019
- Graded for the IL–IN–MI Intersectional College Mathematics Competition, March 2018
- Judge for the MAA Undergraduate Student Paper Sessions at MAA MathFest 2016, August 2016

TEACHING EXPERIENCE

Undergraduate Courses Taught

DePaul University

- MAT 110 - Foundations of Math. for Elementary School Teachers I AQ 2015, AQ 2016
- MAT 111 - Foundations of Math. for Elementary School Teachers II WQ 2016, WQ 2017, WQ 2018
- MAT 135 - Business Calculus I SQ 2017, SuQ 2017, SQ 2018, SQ 2020
- MAT 140 - Discrete Mathematics I AQ 2021
- MAT 141 - Discrete Mathematics II WQ 2022
- MAT 150 - Calculus I SQ 2016, AQ 2016, SQ 2022
- MAT 151 - Calculus II WQ 2016, WQ 2017, WQ 2019
- MAT 152 - Calculus III SQ 2016
- MAT 215 - Introduction to Mathematical Reasoning SQ 2018, AQ 2021
- MAT 260 - Multivariable Calculus I WQ 2020, AQ 2020, SQ 2021
- MAT 261 - Multivariable Calculus II SQ 2020
- MAT 262 - Linear Algebra AQ 2015, SQ 2022
- MAT 310 - Abstract Algebra I AQ 2020
- MAT 311 - Abstract Algebra II WQ 2021
- MAT 397 - Mathematical Pedagogy: Theory and Practice AQ 2017, AQ 2018, AQ 2019

Oberlin College

- Math 131 - Calculus 1a Fall 2014
- Math 132 - Calculus 1b Spring 2015
- Math 220 - Discrete Math Spring 2015
- Math 231 - Multivariable Calculus Fall 2014, Spring 2015

University of Wisconsin – Madison

- Math 101 - Intermediate Algebra Spring 2011, Fall 2011
- Math 112 - College Algebra Spring 2012, 2013, 2014 & Fall 2012, 2013

Graduate Courses Taught

- MAT 472 - Fields and Galois Theory SQ 2021
- MAT 473 - Rings and Modules WQ 2019, WQ 2020, WQ 2021, WQ 2022
- MAT 640 - Multivariable Calculus I (M.A.M.Ed. program) AQ 2017, Summer 2018
- MAT 642 - Multivariable Calculus II (M.A.M.Ed. program) WQ 2018, AQ 2018, AQ 2019

Undergraduate Research Supervised

- Savannah Buik - Mathematics of the game SpotIt! Summer 2016

Online Courses Taught

– MAT 135: Business Calculus I	Summer 2017, SQ 2018, SQ 2020
– MAT 260 - Multivariable Calculus I	AQ 2020, SQ 2021
– MAT 261 - Multivariable Calculus II	SQ 2020
– MAT 310 - Abstract Algebra I	AQ 2020
– MAT 311 - Abstract Algebra II	WQ 2021
– MAT 472 - Fields and Galois Theory	SQ 2021
– MAT 473 - Rings and Modules	WQ 2021

SERVICE

Service to the University

– Grade Challenge Review Board (CSH)	2019 – Present
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Service to the College of Science and Health

– CSH Diversity, Equity, & Inclusion Committee	2020 – Present
– Editorial Board Member, <i>DePaul Discoveries</i>	2018
– Poster reviewer for CSH Undergraduate Research Showcase	2018
– Summer Premiere and Transition DePaul Advising	Summer 2017

Service to the Department of Mathematical Sciences

– Hiring Committees	
• NTT Term Faculty Search Committee	2021
• TT Assistant Professor Search Committee	2019-2020
• TT Assistant Professor & NTT Term Faculty Search Committee	2018-2019
– M.A.M.Ed. & K-12 Education Committee	2016 – Present
– Mathematics Scholarship Committee	2017 – Present
– Coordinator for the Mathematics Tutoring Room	2017 – Present
– Diversity, Equity, & Inclusion Committee	2020 – Present
– MAT 140/141 Redesign Committee	2021 – Present
– Math. Undergraduate Curriculum Committee	2015 – 2021
– Mathematics Website Committee	2015 – 2018
– Adjunct Personnel Committee	2016 – 2017
– MAT 110/111/115 Course Redesign Working Group	2016 – 2017

Service to the Community

– Facilitator for Chicago Math Teacher Circle (Southside location)	December 2019
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PROFESSIONAL ACTIVITIES

Ad Hoc Reviewer for Scholarly Journals

- Journal of Algebra
- Journal of Humanistic Mathematics
- Communications in Algebra
- Mathematics Magazine
- Rose-Hulman Undergraduate Mathematics Journal

Professional Affiliations

- American Mathematical Society
- Mathematical Association of America
- Association for Women in Mathematics
- National Association of Mathematicians
- Chicagoland COMMIT (COMmunity for Mathematics Inquiry in Teaching)

Leadership

- Illinois Section of the Mathematical Association of America (ISMAA)
 - Board of Directors – Section Information Coordinator, 2020 – Present
 - Board of Directors – Interim Section Information Coordinator, 2019 – 2020
 - Board of Directors – Director-At-Large, 2017 – 2020
 - Teacher Education Committee, Fall 2018 – Present
- COMMIT Network (COMmunities for Mathematics Inquiry in Teaching Network)
 - Board of Directors, 2022 – Present
- Chicagoland COMMIT, formerly chIBL
 - Community Co-Founder, 2019
 - Member of the Leadership Team, 2019 – Present

Conference and Conference Session Organizing

- Co-organized Chicagoland COMMIT 2021 Summer Conversation Series on adapting IBL and active learning methods to socially-distanced classrooms, Summer 2021
- Co-organized the AlGeCom XX Conference, December 2020
- Co-organized Chicagoland COMMIT 2020 Summer Conversation Series on adapting IBL methods to online/hybrid teaching with an eye toward equity, Summer 2020
- Organized “Teaching and Assessing Conceptual Learning” interactive panel at MAA MathFest 2016
- Co-coordinator of the Project NExT Fellow organized sessions for the 2016 AMS-MAA Joint Mathematics Meetings

PROFESSIONAL DEVELOPMENT

- **Participant, Workshop on Algebraic Graph Theory and Quantum Information** August 2021
Virtual/Online via the Fields Institute for Research in Mathematical Sciences
 - Participated in a week-long workshop intended to foster cross-collaboration among mathematicians, physicists and computer scientists, in order to explore the deep connections between quantum information and algebraic graph theory.

- **Participant, Mastery Grading Conference** June 2020 & 2021
Virtual/Online
 - Participated in a two day conference/workshop on using and improving mastery grading implementations in math classes

- **Participant, Advocating for Students of Color: There’s More You Can Do** Fall 2020
Virtual/Online via the American Mathematical Society
 - Participated in a four-part webinar series on how to better advocate for students of color in our classrooms, departments, institutions, and the larger mathematical community.

- **Participant, Inquiry-Based Learning: Math & Beyond (Workshop)** March 2018
2018 IL-IN-MI MAA Tri-Section Meeting, Valparaiso University, Valparaiso, Indiana, USA

- **Researcher, Algebraic Combinatorixx 2: Follow-up to BIRS Workshop** July 2017
Mathematical Sciences Research Institute, Berkeley, California, USA
 - Continued work with collaborators on open problems in algebraic voting theory

- **Participant, Academy of Inquiry Based Learning Workshop** June 2017
DePaul University, Chicago, Illinois, USA
 - Attended an IBL workshop which focused on developing the skills and practices necessary for successful implementation of IBL.
 - Began planning and creating materials for an IBL-style calculus class

- **Participant, Algebraic Combinatorixx 2 (Workshop)** May 2017
Banff International Research Station, Banff, Alberta, Canada
 - Attend several lectures and talks on a variety of topics in algebraic combinatorics
 - Studied open questions in algebraic voting theory in a small team
 - Spoke about my own research in a formal talk to participants

- **Participant, Improv for Professors Workshop** April 2017
Illinois Section of the MAA Annual Meeting, College of DuPage, Glen Ellyn, Illinois, USA

- **Participant, Illinois Section NExT Workshop** April 2017
Illinois Section of the MAA Annual Meeting, College of DuPage, Glen Ellyn, Illinois, USA
 - Participated in a workshop which explored issues of special relevance to new faculty

- **Participant, Midwestern Women in Mathematics Symposium** February 2017
Indiana University–Purdue University Indianapolis, Indianapolis, Indiana
 - Took part in various activities and discussions meant to stimulate collaborations, networking, and mentoring relations among the participants
 - Discussed possible connections between subfields with another Chicago-area mathematician and made plans to explore further this during August 2017
 - Moderated a round-table discussion

- **Participant, DePaul Online Teaching Series (DOTS)** December 2016
DePaul University, Chicago, Illinois, USA

 - During this faculty development program, I learned how to design, build, and facilitate successful online and hybrid courses. Using this training, I developed an online, asynchronous version of MAT 135: Business Calculus I, which was offered in Summer 2017, SQ 2018, and SQ 2020. I was awarded a QM+ Star Award for this class.

- **Participant, Basic SCK Institute** November 2016
Mathematics Teaching and Learning to Teach Project, College of Education, University of Michigan, Ann Arbor, Michigan, USA

 - Participated in a workshop focused on using cross-community collaboration to develop specialized-content knowledge tasks for teacher preparation and professional development
 - Worked collaboratively with Prof. Nell Cobb from the College of Education at DePaul University to create SCK tasks for use in MAT 110 & MAT 111

- **Participant, Academy of Inquiry Based Learning Workshop** June 2016
California Polytechnic State University, San Luis Obispo, California, USA

 - Attended the first portion of an IBL workshop which focused on developing the skills and practices necessary for successful implementation of IBL.

- **Attendee, AWM Workshop on Algebraic Combinatorics** January 2016

 - Attended several talks on algebraic combinatorics and networked with other mathematicians in my research area

- **Project NExT Fellow** 2015 – 2016
Mathematical Association of America

 - Participated in a yearlong professional development program for recent Ph.D.s in the mathematical sciences which addresses all aspects of an academic career: improving the teaching and learning of mathematics, engaging in research and scholarship, finding exciting and interesting service opportunities, and participating in professional activities
 - Attended associated workshops at MAA MathFest 2015, 2016 AMS-MAA Joint Mathematics Meetings, and MathFest 2016

- **NExT Fellow, Ohio NExT Workshop** March 2015
MAA Ohio Section Spring Meeting, Marshall University, Huntington, West Virginia, USA

 - Participated in a workshop which explored issues of special relevance to new faculty

- **Participant, Women and Math Program** May 2013
Institute for Advanced Study, School of Mathematics, Princeton, New Jersey, USA

 - Participated in an intensive two-week mentoring program which included several lectures and seminars on a variety of topics including matroids, polytopes, and graph theory

AWARDS AND RECOGNITIONS

MAA Project NExT (New Experiences in Teaching) Fellow 2015-2016

DePaul University

- QIC Excellence in Teaching Award 2022
- Nominated for the QIC Excellence in Teaching Award 2021
- Nominated for the Spirit of DePaul Award 2021
- Woman of Spirit & Action Award, DePaul Women's Network 2020
- Nominated for the QIC Excellence in Teaching Award 2019
- DePaul QM+ Star Award for online MAT 135: Business Calculus I course 2018

University of Wisconsin – Madison

- Superior TA rating 11 of 14 Semesters
- UW–Madison Exceptional Service Award - Nominee 2012-2013
- College of Letters & Science Teaching Fellow Award - Alternate 2012-2013
- Honored Instructors Award, Division of University Housing Spring 2011
- Elizabeth Hirschfelder Award, Department of Mathematics 2010-2011
- Mathematics Graduate Teaching Award, Department of Mathematics 2010
- Honored Instructors Award, Division of University Housing Fall 2009