Curriculum Vitae

John D. Jasper
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Contact Information

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Academic Positions

- **South Dakota State University**
  Assistant Professor, Fall 2017–present
- **University of Cincinnati**
  Visiting Assistant Professor, Fall 2015–Spring 2017
- **University of Oregon**
  Courtesy Instructor, Fall 2014–Spring 2015
- **University of Missouri**
  Postdoctoral Fellow, Fall 2011–Spring 2014.
- **University of Oregon**
  Graduate Teaching Fellow, Fall 2005–Spring 2011.
- **Western Washington University**
  Teaching Assistant, Fall 2003–Spring 2005.

Education

- **University of Oregon**, Eugene, OR.
  - Ph.D. in Mathematics, June 2011.
    Dissertation Topic: Infinite Dimensional Generalizations of the Schur–Horn Theorem
    Advisor: Marcin Bownik.
  - M.S. in Mathematics, March 2007.
- **Western Washington University**, Bellingham, WA.

  B.S. in Mathematics, June 2003.
  Magna cum laude

Publications and Preprints

Journal Articles

- *Characterization of Sequences of Frame Norms* (with M. Bownik), J. Reine Angew. Math. **654** (2011), 219–244.
- *Dilations of Non-tight Frames,* (with M. Bownik and D. Speegle), Proc. Amer. Math. Soc. **139** (2011), 3247–3256.
- *The Schur–Horn Theorem for Operators with Three Point Spectrum,* J. Funct. Anal. **265** (2013), 1494–1521.
- *Tight projections of frames on infinite dimensional Hilbert spaces,* Oper. Matrices **8** (2014), no. 4, 1053–1063.
- *Constructive proof of the Carpenter's Theorem* (with M. Bownik), Canad. Math. Bull. **57** (2014), no. 3, 463–476.
- *Kirkman equiangular tight frames and codes* (with M. Fickus and D. G. Mixon), IEEE Trans. Inform. Theory **60** (2014), no. 1, 170–181.
- *The Schur–Horn Theorem for operators with finite spectrum* (with M. Bownik), Trans. Amer. Math. Soc. **367** (2015), no. 7, 5099–5140.
- *Group-theoretic constructions of erasure-robust frames* (with M. Fickus, D. G. Mixon, and J. Peterson), Linear Algebra Appl. **479** (2015), 131–154.
- *Diagonals of self–adjoint operators with finite spectrum* (with M. Bownik), Bull. Pol. Acad. Sci. Math **63** (2015), 249–260.
- *Equiangular Tight Frames from Hyperovals* (with M. Fickus and D. G. Mixon), IEEE Trans. Inform. Theory **62** (2016), no. 9, 5225–5236.
- *Thompson's theorem for compact operators and diagonals of unitary operators* (with J. Loreaux and G. Weiss), Indiana Univ. Math. J. **67** (2018), no. 1, 1–27.
- *Equiangular tight frames with centroidal symmetry* (with M. Fickus, D. G. Mixon, J. Peterson, and C. E. Watson), Appl. Comput. Harmon. Anal. **44** (2018), no. 2, 476–496.
- *The Schur–Horn theorem for unbounded operators with discrete spectrum* (with M. Bownik and B. Siudeja), Bull. London Math. Soc. **49** (2017), no. 1, 148–164.
- *Tremain equiangular tight frames* (with M. Fickus, D. G. Mixon, and J. Peterson), J. Combin. Theory Ser. A. **153** (2018), 54–66.
- *Packings in real projective spaces* (M. Fickus, D. G. Mixon) SIAM J. Appl. Algebra Geometry. **2** (2018) No. 3, 377–409.
- *Equiangular tight frames that contain regular simplices* (with M. Fickus, E. J. King, and D. G. Mixon), Linear Algebra Appl. **555** (2018), 98–138.
- *Equiangular tight frames from group divisible designs* (with M. Fickus), Des. Codes Cryptogr. **87** (2019), no. 7, 1673–1697.
- *Polyphase equiangular tight frames and abelian generalized quadrangles* (with M. Fickus, D. G. Mixon, J. Peterson, and C. E. Watson), Appl. Comput. Harmon. Anal. **47** (2019), no. 3, 628–661.
- *Hadamard equiangular tight frames* (with M. Fickus, D. G. Mixon, and J. D. Peterson), Appl. Comput. Harmon. Anal. (to appear)

- *Optimal line packings from nonabelian groups* (with J. W. Iverson and D. G. Mixon), Discrete Comput. Geom. (to appear)
- *Optimal line packings from finite group actions* (with J. W. Iverson and D. G. Mixon), preprint. (submitted)

Book Chapters

- *Spectra of frame operators with prescribed frame norms,* (with M. Bownik), Harmonic Analysis and Partial Differential Equations, Contemp. Math., **612** (2014), 65–80.
- *Existence of frames with prescribed norms and frame operator* (with M. Bownik) Excursions in harmonic analysis. Vol. 4 (2015), 103–117
- *Phase retrieval and norm retrieval,* (with Saeid Bahmanpour, J. Cahill, P. G. Casazza, and L. M. Woodland) Trends in harmonic analysis and its applications, Contemp. Math., **650** (2015), 3–14.

Conference Proceedings

- *A construction of unimodular equiangular tight frames from resolvable Steiner systems,* Proc. SPIE, **8858** (2013), 88581Q-1.
- *Steiner equiangular tight frames redux* (with M. Fickus, D. G. Mixon and J. Peterson), Proc. Sampl. Theory Appl. (2015) 347-351.
- *Quasi-symmetric designs and equiangular tight frames* (with M. Fickus, D. G. Mixon and J. Peterson), Proc. SPIE, **9597** (2015), 95970F.
- *Game of Sloanes: best known packings in complex projective space* (with E. J. King and D. G. Mixon), Proc. SPIE **11138** (2019), 111381F
- *An infinite family of two-distance tight frames* (with N. P. Brown), Proc. SPIE **11138** (2019), 111381D

Funding

- (2018-2021) National Science Foundation, Division of Mathematical Sciences Grant 1830066, Program on Algorithms for Threat Detection, ATD: Collaborative Research: Theory and Algorithms for Real-Time Threat Detection from Massive Data Streams, $98,222 . I am the Co-PI. The PI is Dr. Dustin G. Mixon of the Ohio State University.

Awards

- **Outstanding Graduating Senior in Mathematics for 2003.** Awarded by Western Washington University to the most outstanding senior graduating with a degree in mathematics each year.
- **Johnson Research Fellowship.** Awarded by the University of Oregon Mathematics Department to support study at the Polish Academy of Sciences.
- **Borsting Graduate Student Award for 2010.** Awarded by the University of Oregon Mathematics Department to the graduate student who demonstrates exceptional scholastic achievement.
- **D. K. Harrison Memorial Award for 2011.** Awarded by the University of Oregon Mathematics Department to the graduate student who demonstrates exceptional achievement in research.

Teaching Experience

Western Washington University:
For each of the following courses, I was the instructor under the supervision of a faculty course coordinator at Western Washington University. I was in charge of preparing and presenting the material, as well as writing quizzes with the other instructors under the same coordinator.

- **Math 102: Functions and Algebraic Methods**,
  Linear and quadratic equations, polynomials, rational functions, radicals.
  Winter 2004, Spring 2004, Fall 2004, Winter 2005, Spring 2005.
- **Math 114: Precalculus I**,
  Functions, graphs of functions, data analysis.
  Fall 2003.

University of Oregon:
For each of the following courses, I was the sole instructor as a Graduate Teaching Fellow at the University of Oregon. I was in charge of planning the course, preparing and presenting the material, as well as writing and grading all quizzes and exams.

- **Math 111: College Algebra**,
  Functions, polynomials, exponential functions, logarithms.
  Fall 2005, Winter 2006, Fall 2006, Winter 2007, Spring 2007, Summer 2007, Winter 2008 and Fall 2009.
- **Math 107: University Math III,**
  Concepts of calculus for non-science majors.
  Summer 2006.
- **Math 242: Calculus for Business and Social Sciences II**,
  Integral calculus for business and social science majors.
  Summer 2008 and Summer 2010.
- **Math 251: Calculus I**,
  Differential calculus;
  Summer 2008, Fall 2011, and Winter 2011.
- **Math 252: Calculus II**,
  Integral Calculus.
  Winter 2009.
- **Math 253: Calculus III**,
  Sequences, series, Taylor series.
  Summer 2009 and Spring 2010.
- **Math 256: Differential Equations**,
  Introduction to differential equations.
  Summer 2011.
- **Math 342: Linear Algebra II**,
  Second quarter course in linear algebra.
  Spring 2011.

University of Cincinnati:

- **Math 1061: Calculus I**,
  First semester course in calculus.
  Fall 2015, Fall 2016.
- **Math 1062: Calculus II**,
  Second semester course in calculus.
  Spring 2016, Spring 2017.

South Dakota State University:

- **Math 250: Math for Computer Science**,
  An introduction to logic, proofs, and linear algebra for computer science majors.
  Fall 2017, Fall 2018.
- **Math 751: Applied Functional Analysis**,
  Introduction to functional analysis and applications for graduate students.
  Fall 2017.
- **Math 425: Real Analysis**,
  Introduction to real analysis for undergraduates.
  Fall 2018, Fall 2019.
- **Math 515: Advanced Linear Algebra**,
  Graduate course in linear algebra with applications to data science.
  Fall 2019.

Conferences organized

- Special Session on Frame Theory at the AMS Spring Southeastern Sectional Meeting, College of Charleston. March 10-12, 2017. (co-organized with D. G. Mixon and J. Solazzo)
- Special Session on Recent Advances in Packing at the AMS Spring Central Sectional Meeting. Ohio State University, March 16-18, 2018. (co-organized with D. G. Mixon and J. W. Iverson)
- Special session on frame theory at the 13th International Conference on Sampling Theory and Applications (SampTA 2019). University of Bordeaux. July 8, 2019 (co-organized with D. G. Mixon)

Invited Presentations

- "The Schur–Horn Theorem for Operators with Three Point Spectrum," Louisiana State University Workshop in Analysis and Geometry, January 2011.
- "Existence of frames with prescribed norms and frame operator," Texas A&M University Operator Algebras, Frames, and Undergraduate Research: A Conference in Honor of the 70th Birthday of David R. Larson, July 2012.
- "Spectra of frame operators with prescribed frame norms," University of Colorado AMS Sectional Meeting, April 2013.
- "The Schur–Horn theorem for operators with finite spectrum," University of California, Berkeley Great Plains Operator Theory Symposium, May 2013.
- "Unimodular equiangular tight frames from resolvable Steiner systems," San Diego, CA SPIE Optics + Photonics, August 2013.

- "Kirkman equiangular tight frames," Washington University
  AMS Special Session on Wavelets, Frames, and Related Expansions, October 2013.
- "Two new constructions of equiangular tight frames," Michigan State University
  AMS Special Session on Frames, Wavelets and Their Applications, March 2015.
- "Infinite dimensional Schur–Horn theorems," Oregon State University
  Analysis Seminar, April 2015.
- "Infinite dimensional Schur–Horn type theorems," University of Cincinnati
  Functional Analysis Semiar, April 2015.
- "Complex equiangular tight frames," Universität Bremen
  Workshop on Frames and Algebraic & Combinatorial Geometry, July 2015.
- "Tremain equiangular tight frames," San Diego, CA
  SPIE Optics + Photonics, August 2015.
- "Thompson's theorem," University of Cincinnati
  Functional Analysis Seminar, September 2015.
- "Tremain equiangular tight frames and strongly regular graphs", University of North Dakota
  AMS Special Session on Frames, Wavelets and Gabor Systems, April 2016.
- "Equiangular tight frames from association schemes," Vanderbilt Univeristy
  Computational Analysis Seminar, October 2016.
- "Equiangular tight frames from association schemes," Georgia Institute of Technology
  Analysis Seminar, November 2016.
- "Equiangular tight frames from association schemes," Joint Mathematics Meetings
  AMS Special Session on Lie Group Representations, Discretization, and Gelfand Pairs, January 2017.
- "Equiangular tight frames from association schemes," Portland State University
  AMS Special Session on Wavelets, Frames, and Related Expansions, April 2018.
- "Equiangular tight frames from group divisible designs," Vanderbilt University
  7th International Conference on Computational Harmonic Analysis, May 2018.
- "Equiangular tight frames from group divisible designs," Vanderbilt University Sixteenth International Conference on Approximation Theory, May 2019
- "Equiangular tight frames from nonabeilan groups," Bern, Switzerland
  SIAM Conference on Applied Algebraic Geometry, July 2019.
- "Equiangular tight frames from association schemes," University of Wisconsin-Madison
  AMS Special Session on Association Schemes and Related Topics - in Celebration of J.D.H. Smith's 70th Birthday, September 2019.
- "Diagonals of opreators in finite and infinite dimensions," University of Nebraska-Lincoln
  Math Department Colloquium, October 2019
- "Harmonic equiangular tight frames and their combinatorial generalizations," Joint Math Meetings
  AMS Special Session on Group Actions in Harmonic Analysis, January 2020.

References

Marcin Bownik (Ph.D. Advisor)
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