

# PIETRO PAPARELLA

DIVISION OF ENGINEERING & MATHEMATICS ♦ 18115 CAMPUS WAY NE ♦ BOTHELL, WA 98011-8246

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## EDUCATION

- ♦ Ph.D., Mathematics, Washington State University, Pullman, WA Jul 2013  
Thesis: *Matrix roots of nonnegative and eventually nonnegative matrices*  
Thesis advisors: Judith J. McDonald, Michael J. Tsatsomeros
- ♦ M.S., Mathematics, Washington State University, Pullman, WA Aug 2003  
Thesis: *The numerical range of a matrix and nonnegative matrices*  
Thesis advisor: Michael J. Tsatsomeros
- ♦ B.S., Mathematics, Gonzaga University, Spokane, WA May 2001

## SELECTED PROFESSIONAL EXPERIENCE

- ♦ Associate Professor, University of Washington Bothell, Bothell, WA Sep 2020–present
  - ♦ REU Faculty Advisor Jun 2022–Aug 2022
- ♦ Assistant Professor, University of Washington Bothell, Bothell, WA Sep 2015–Sep 2020
  - ♦ REU Faculty Advisor Jun 2017–Aug 2017
- ♦ Visiting Assistant Professor, William & Mary, Williamsburg, VA Aug 2013–May 2015
  - ♦ REU Faculty Advisor Jun 2014–Jul 2014

## RESEARCH

- A bold-faced name indicates that the author was an undergraduate student at the time the research was conducted.
- An italicized name indicates that the author was a high school student at the time the research was conducted.
- *Erdős Number: 3*: (Erdős & Cameron, Cameron & Johnson, Johnson & Paparella)

## Manuscripts

### *In Preparation*

39. P. Paparella. A matricial view of Siebeck's theorem.
38. A. L. Nickerson and P. Paparella. Symmetric lists and the symmetric nonnegative inverse eigenvalue problem.
37. C. R. Johnson and P. Paparella. Perron similarities and the nonnegative inverse eigenvalue problem.
36. P. Paparella. An eigenvalue inclusion region for doubly stochastic matrices.
35. P. Paparella. On the nilpotency of the Collatz matrix.
34. **D. N. Munger**, A. L. Nickerson, and P. Paparella. Demystifying the Karpelevič theorem.

To Appear

33. **D. N. Munger** and P. Paparella. The converse of the Cowling–Obrechhoff–Thron theorem. *Involve*

Published

32. *M. Martinez* and P. Paparella. The group of monomial matrices. *Mathematics Exchange*, 17(1), 34–38, 2023.
31. **B. J. Clark** and P. Paparella. Polynomials that preserve nonnegative matrices of order two. *Mathematics Exchange*, 16(1), 58–65, 2022.
30. **A. L. Nickerson** and P. Paparella. Jordan chains of  $h$ -cyclic matrices, II. *Electron. J. Linear Algebra*, 38, 486–493, 2022.
29. **J. M. Dockter**, P. Paparella, **R. L. Perry**, and **J. D Ta**. Kronecker products of Perron similarities. *Electron. J. Linear Algebra*, 38, 114–122, 2022.
28. **B. J. Clark** and P. Paparella. Polynomials that preserve nonnegative matrices. *Linear Algebra Appl.*, 637:110–118, 2022.
27. J. J. McDonald and P. Paparella. A short and elementary proof of Brauer’s theorem. *The Teaching of Mathematics*, 24, 85–86, 2021.
26. P. Paparella, **L. J. Ramirez**, and **Y.-F. Wang**. A proof of the elliptical range theorem via Kippenhahn’s theorem. *Missouri J. Math. Sci.*, 33(2), 181–185, 2021.
25. P. Paparella. Perron numbers that satisfy Fermat’s equation. *Notes on Number Theory and Discrete Mathematics*, 27(3), 119–122, 2021.
24. C. R. Johnson and P. Paparella. Matricial Proofs of Some Classical Results about Critical Point Location. *Amer. Math. Monthly*, 127(1):45–53, 2020.
23. P. Paparella. Frobenius normal forms of doubly stochastic matrices. *Spec. Matrices*, 7:213–217, 2019. Note: Special Issue Dedicated to Charles R. Johnson.
22. P. Paparella. Eisenstein’s criterion, Fermat’s last theorem, and a conjecture on powerful numbers. *Notes on Number Theory and Discrete Mathematics*, 25(2):22–29, 2019.
21. P. Paparella and **G. K. Taylor**. The volume of the trace-nonnegative polytope via the Irwin-Hall distribution. *Minnesota Journal of Undergraduate Mathematics*, 4(1), 2019.
20. P. Paparella and **A. R. Thrall**. Realizing Suleĭmanova spectra via permutative matrices, II. *Linear Algebra Appl.*, 566(1):183–198, 2019.
19. C. R. Johnson, C. Marijuán, P. Paparella, and M. Pisonero. The NIEP, *Operator theory, operator algebras, and matrix theory*, 199–220, Oper. Theory Adv. Appl., 267, Birkhäuser/Springer, Cham, 2018.
18. **S. L. Hoover**, **D. A. McCormick**, P. Paparella, and **A. R. Thrall**. On the realizability of the critical points of a realizable list. *Linear Algebra App.*, 555:301–313, 2018.
17. P. Paparella. A short and elementary proof of the two-sidedness of the matrix-inverse. *College Math. J.*, 48(5):366–367, 2017.
16. P. Paparella. Spectrally Perron polynomials and the Cauchy-Ostrovsky theorem. *Special Matrices*, 5(1):123–126, 2017.
15. C. R. Johnson and P. Paparella. Row cones, Perron similarities, and nonnegative spectra. *Linear Multilinear Algebra*, 65(10):2124–2130, 2017.
14. C. R. Johnson and P. Paparella. A matricial view of the Karpelevič theorem. *Linear Algebra Appl.*, 520:1–15, 2017.

13. **X. Han**, C. R. Johnson, and P. Paparella. The critical exponent for generalized doubly nonnegative matrices. *Linear Multilinear Algebra*, 65(5):1035-1044, 2017.
12. P. Paparella. Realizing Suleĭmanova-type spectra via permutative matrices. *Electron. J. Linear Algebra*, 31, 306-312, 2016.
11. J. J. McDonald and P. Paparella. Jordan chains of  $h$ -cyclic matrices. *Linear Algebra Appl.*, 498:145–159, 2016.
10. J. J. McDonald and P. Paparella. Matrix roots of imprimitive irreducible nonnegative matrices. *Linear Algebra Appl.*, 498:244–261, 2016.
9. C. R. Johnson and P. Paparella. Perron spectratopes and the real nonnegative inverse eigenvalue problem. *Linear Algebra Appl.*, 493:281–300, 2016.
8. P. Paparella. Matrix functions that preserve the strong Perron-Frobenius property. *Electron. J. Linear Algebra*, 30, 271–278, 2015.
7. J. J. McDonald, P. Paparella, and M. J. Tsatsomeros. Matrix roots of eventually positive matrices. *Linear Algebra Appl.*, 456:122–137, 2014.
6. P. Paparella. Complete residue systems: a primer and an application, *Advances in Algebra*, 6(1):21–25, 2013.

#### Theses

5. P. Paparella. *Matrix roots of nonnegative and eventually nonnegative matrices*. ProQuest LLC, Ann Arbor, MI, 2013. Thesis (Ph.D.)—Washington State University.
4. P. Paparella. The numerical range of a matrix and nonnegative matrices, unpublished master's thesis, 2003, Washington State University, Pullman, WA.

#### Unpublished Reports

3. B. J. Clark and P. Paparella. Polynomials that preserve nonnegative monomial matrices. arXiv:2401.01471
2. **M. J. Fyfe**, **Y. Hernandez**, P. Paparella, and **M. Rajbhandari**. Matrices whose field of values is inscribed in a polygon, 2023. arXiv:2303.06772
1. P. Paparella. A note on the Lovász–Schrijver semidefinite programming relaxation for binary integer programs, 2012. arXiv:1208.2263.

#### Editorship

1. Guest Editor, *Special Matrices*, Special Issue Dedicated to Charles R. Johnson.

#### Engineering Capstone Projects

2. Industry Sponsor, ME & EE, *Smart Asthma Inhaler* 2021–2022
1. Industry Sponsor, ME & EE, *Smart Asthma Inhaler* 2020–2021

#### AMS Mathematical Reviews

12. MR4616572 C. Marijuán, M. Pisonero. A note for the SNIEP in size 5.
11. MR3917625 R. Soto, A. I. Julio, and M. Collao. Brauer's theorem and nonnegative matrices with prescribed diagonal entries.
10. MR3880866 M. Robbiano. Guo's index for some classes of matrices.

9. MR3839402 R. Sanjhira and B. I. Dave. Generalized Konhauser matrix polynomial and its properties.
8. MR3797934 E. Andrade, C. Manzaneda, and M. Robbiano. Realizable lists on a class of nonnegative matrices.
7. MR3857220 R. Słowik. Expressing infinite matrices as sums of idempotents.
6. MR3652846 R. Loewy and O. Spector. A necessary condition for the spectrum of nonnegative symmetric  $5 \times 5$  matrices.
5. MR3606259 F. Shakeri and R. Alizadeh. Nonnegative and eventually positive matrices.
4. MR3542989 M. Adm and J. Garloff. Total nonnegativity of the extended Perron complement.
3. MR3461407 D. Zhou, Q. Cai, and X. Chen. A note on the rank inequality for diagonally magic matrices.
2. MR3378894 R. L. Soto, A. I. Julio, and M. Salas. Nonnegative persymmetric matrices with prescribed elementary divisors.
1. MR3298054 L. Wang, J. Liu, and S. Chu. Properties for the Perron complement of three known subclasses of H-matrices.

#### zbMATH Reviews

1. DE07451378X Kirkland, Stephen; Šmigoc, Helena. Stochastic matrices realising the boundary of the Karpelevič region.

#### GRANTS, HONORS, AND AWARDS

##### University of Washington Bothell

###### *Pending*

- ✧ Nominee/Finalist for the 2024 UWB Distinguished Research, Scholarship, & Creative Activities Award
- ✧ Nominee/Finalist for the 2024 UWB Distinguished Teaching Award

###### *Funded/Awarded*

- ✧ *Complex Perron similarities and polynomials that preserve nonnegative matrices*, UWB Scholarship, Research, and Creative Practice (SRCP) Seed Grant, \$6,865, 2022.
- ✧ *Complex Perron similarities and polynomials that preserve nonnegative matrices*, UWB Scholarship, Research, and Creative Practice (SRCP) Seed Grant, \$6,865, 2021.
- ✧ *Smart Asthma Inhaler*, First-place (\$5,000), Amazon Catalyst–Everett, 2020.
- ✧ *Visiting scholar*, Shri Gopal Rajgarhia International Programme at IIT–Kharagpur, **declined**, 2019.
- ✧ *Novel directions in nonnegative matrices and matrix analysis*, UW Royalty Research Fund, \$39,996, 2019.
- ✧ *LAA Early Career Speaker* (\$500), 2019 ILAS Meeting for the invited mini-symposium “Nonnegative inverse spectral problems”.

*Unfunded*

- ✧ *AMS Centennial Fellowship*, \$50,000, **unfunded**, 2022.
- ✧ *UWB/CC Library Digital Scholarship Faculty Fellows Award*, **unfunded**, 2021.
- ✧ *RUI: Opportunities in Matrix Analysis and Nonnegative Matrices*, NSF, \$264,277, **unfunded**, 2020.
- ✧ *RUI: Nonnegative Matrices and the Field of Values*, NSF, \$358,733, **unfunded**, 2019.
- ✧ *CAREER: Novel directions in nonnegative matrices, matrix analysis, and the geometry of polynomials*, NSF, \$427,660, **unfunded**, 2018.
- ✧ *Novel Directions in the Nonnegative Inverse Eigenvalue Problem*, UW Royalty Research Fund, \$35,146, **unfunded**, 2018.
- ✧ *CAREER: Novel Directions in the Nonnegative Inverse Eigenvalue Problem*, NSF, \$757,373, **unfunded**, 2017.
- ✧ *Perron spectratopes and the nonnegative inverse eigenvalue problem*, UW Royalty Research Fund, \$39,425, **unfunded**, 2017.
- ✧ *AMS-Simons Travel Grant*, \$4,000, **unfunded**, 2017.
- ✧ *Perron spectratopes and the nonnegative inverse eigenvalue problem*, UW Royalty Research Fund, \$38,709, **unfunded**, 2016.
- ✧ *Targeted Grants in Mathematics and Physical Sciences*, Simons Foundation, \$524,681, **unfunded**, 2016.
- ✧ *Perron spectratopes, permutative matrices, and the nonnegative inverse eigenvalue problem*, Young Investigator's Grant, NSA, \$40,000, **unfunded**, 2015.

**College of William and Mary**

- ✧ Class of 2016 Section NExT Fellow, *MD-DC-VA Section of Mathematical Association of America*.
- ✧ Faculty International Conference Travel Grant (\$500), *W&M Reves Center for International Studies*, 2014.

**Washington State University**

- ✧ Registration Grant (\$100), *WSU Graduate & Professional Student Association*, 2013.
- ✧ Travel Grant (\$450), *WSU Graduate & Professional Student Association*, 2013.
- ✧ Graduate Student Travel Grant (\$250), *American Mathematical Society*, 2012.

**MEDIA COVERAGE**

1. Podsada, J. Amazon innovation contest rewards Snohomish County inventors, *Everett Herald*, 11-November-2020. Retrieved from <https://www.heraldnet.com/>.

**TEACHING****Courses Taught***University of Washington Bothell*

Table 1 contains course-evaluation metrics for courses taught at the University of Washington Bothell.

The *overall summative rating (OSR)* is the median score of the four global summative items and is presented to provide an overall index of a class's quality on a scale from 0 (Very Poor) to 5 (Excellent). The

*decile rank* is a normative comparison of the OSR score to all classes at the University of Washington Bothell on a scale from zero (lowest 10% of all scores) to nine (top 10% of all scores). Because average ratings tend to be high, a rating of "good" or "average" may have a low decile rank.

The *challenge and engagement Index (CEI)* combines student responses to several IASystem items relating to how academically challenging students found the course to be and how engaged they were on a scale from 1 (Lowest) to 7 (Highest).

The topics for the special topics courses are as follows: Matrix Methods in Data Mining and Pattern Recognition (Summer 2018), Advanced Linear Algebra (Summer 2017), Numerical Linear Algebra (Spring 2017), and Advanced Matrix Theory (Spring 2016).

<i>Term</i>	<i>#</i>	<i>Name</i>	<i>Responses</i>	<i>OSR (CD)</i>	<i>CEI</i>
WI-24	402-A	Abstract Algebra I		pending	
WI-24	300-A	Foundations of Modern Math.		pending	
AU-23	208-A	Matrix Algebra with Appl.	13/37	4.7 (8)	4.9
SU-23	403-A	Abstract Algebra II <sup>‡</sup>	10/12	4.6 (7)	5.7
SP-23	427-A	Complex Analysis <sup>‡</sup>	18/20	4.4 (6)	4.2
SP-23	402-A	Abstract Algebra I <sup>‡</sup>	14/18	4.1 (5)	5.6
WI-23	402-B	Abstract Algebra I <sup>‡</sup>	4/7	4.6 (7)	5.0
WI-23	402-A	Abstract Algebra I <sup>‡</sup>	18/21	4.7 (8)	4.8
AU-22	409-A	Advanced Linear Algebra <sup>‡</sup>	18/19	4.5 (6)	5.1
SU-22	409-A	Advanced Linear Algebra <sup>‡</sup>	15/19	4.4 (6)	4.9
SP-22	403-A	Abstract Algebra II <sup>‡</sup>	23/24	4.3 (5)	5.5
WI-22	402-B	Abstract Algebra I <sup>†</sup>	18/21	4.7 (7)	5.2
WI-22	402-A	Abstract Algebra I <sup>†</sup>	14/16	4.2 (5)	4.2
AU-21		Sabbatical			
SU-21	308-A	Matrix Algebra with Appl. <sup>†</sup>	11/18	5.0 (9)	5.7
WI-21	409-B	Advanced Linear Algebra <sup>†</sup>	18/20	4.7 (8)	5.8
WI-21	409-A	Advanced Linear Algebra <sup>†</sup>	22/25	4.5 (6)	5.7
WI-21	402-A	Abstract Algebra I <sup>†</sup>	24/24	4.3 (5)	5.6
AU-20	402-B	Abstract Algebra I <sup>†</sup>	20/20	4.4 (6)	5.4
AU-20	402-A	Abstract Algebra I <sup>†</sup>	15/18	4.2 (4)	5.8
SU-20	308-A	Matrix Algebra with Appl. <sup>†</sup>	21/26	4.3 (5)	4.7
SP-20	424-A	Real Analysis I <sup>†</sup>	24/27	4.4 (6)	6.1
WI-20	403-A	Abstract Algebra II	20/25	4.7 (8)	5.1
WI-20	125-A	Calculus II <sup>†</sup>	22/33	3.6 (2)	5.2
AU-19	402-B	Abstract Algebra I	13/21	4.8 (8)	5.7
AU-19	402-A	Abstract Algebra I	21/24	4.4 (6)	5.6
SP-19	308-B	Matrix Algebra with Appl.	19/37	4.7 (8)	4.6
SP-19	308-A	Matrix Algebra with Appl.	21/36	4.7 (8)	4.2
WI-19	409-A	Advanced Linear Algebra	18/29	4.6 (7)	5.0
AU-18	402-B	Abstract Algebra I	12/23	4.6 (7)	5.2
AU-18	402-A	Abstract Algebra I	12/24	4.5 (6)	5.7
SU-18	493-A	Special Topics in Math.	6/15	4.0 (4)	4.5
SP-18	308-B	Matrix Algebra with Appl.	24/39	4.6 (7)	4.6
SP-18	308-A	Matrix Algebra with Appl.	19/40	4.8 (8)	4.2
WI-18	403-A	Abstract Algebra II	9/16	4.6 (7)	5.6
AU-17	402-B	Abstract Algebra I	15/20	4.1 (4)	5.6
AU-17	402-A	Abstract Algebra I	13/22	4.6 (7)	5.7
SU-17	493-A	Special Topics in Math.	6/14	4.8 (9)	5.5
SP-17	493-A	Special Topics in Math.	14/29	4.6 (8)	4.7
WI-17	427-A	Complex Analysis	17/24	4.6 (8)	4.4
AU-16	300-B	Foundations of Modern Math.	12/20	4.7 (9)	5.4
AU-16	300-A	Foundations of Modern Math.	10/14	4.9 (9)	5.7
SU-16	125-A	Calculus II	11/25	4.3 (5)	5.2

SP-16	493-A	Special Topics in Math.	21/24	4.4 (6)	5.4
WI-16	300-B	Foundations of Modern Math.	14/17	4.5 (6)	5.8
AU-15	308-B	Matrix Algebra with Appl.	22/35	4.6 (7)	4.8
AU-15	308-A	Matrix Algebra with Appl.	23/40	4.5 (6)	5.2
Weighted Average (rounded)				4.5 (6.5)	5.2

Table 1: Student course-evaluation scores at UWB. Courses marked with a dagger (†) were offered online (synchronously) due to the COVID-19 pandemic. Courses marked with a double-dagger (‡) were offered using the *hyflex* (offered in-person and remotely via Zoom) model.

#### College of William and Mary

Table 2 contains course evaluation metrics for courses taught at the College of William and Mary. Note that ‘OTE’ stands for ‘overall teaching effectiveness’ and is the average score for the question “How would you rate this instructor’s overall teaching effectiveness?” on a scale from 1 (Poor) to 5 (Excellent).

<i>Term</i>	<i>#</i>	<i>Name</i>	<i>Responses</i>	<i>OTE*</i>
SP-15	307-02	Abstract Algebra	15/19	4.73
SP-15	307-01	Abstract Algebra	16/24	4.13
SP-15	211-03	Linear Algebra	23/35	4.43
FA-14	307-01	Abstract Algebra	21/27	4.38
FA-14	111-07	Calculus I	26/32	4.50
FA-14	111-05	Calculus I	21/31	4.29
SU-14	211-01	Linear Algebra	02/11	5.00
SP-14	307-01	Abstract Algebra	17/29	4.41
SP-14	211-01	Linear Algebra	22/38	4.36
FA-13	211-04	Linear Algebra	26/40	4.58
FA-13	211-03	Linear Algebra	35/42	4.27
FA-13	211-02	Linear Algebra	23/36	4.61
Weighted Average				4.44

Table 2: Student course-evaluation scores at the College of William and Mary.

#### Undergraduate Supervision

##### University of Washington Bothell

Table 3 contains the names of students for which I served as a supervisor for an independent study (IS) or undergraduate research (UR) project.

<i>Term</i>	<i>#</i>	<i>Student</i>	<i>IS/UR</i>	<i>Credits</i>
SP-23	499	Devon N. Munger	UR	3
SP-23	498	Martin F. Martinez	IS	5
WI-23	499	Devon N. Munger	UR	2
SU-21	499	Janelle M. Dockter	UR	3
SU-21	499	Robert L. Perry	UR	2
SU-21	499	Jonathan D Ta	UR	2
SP-21	498	Janelle M. Dockter	IS	2
SP-21	498	Rebecca Lee	IS	2
SP-21	498	Robert L. Perry	IS	2
SP-21	498	Jonathan D Ta	IS	2
SP-21	499	Andrew L. Nickerson	UR	2
AU-20	499	Yining Liu (UW Seattle)	UR	2
AU-20	499	Sela Navot (UW Seattle)	UR	2
AU-20	499	Yinxi Pan (UW Seattle)	UR	2

AU-20	499	Andrew L. Nickerson	UR	4
SU-20	499	Colleen E. Ames	UR	3
SU-20	499	Jonathan C. Kriewall	UR	5
SP-20	498	Andrew L. Nickerson	IS	2
SU-19	499	Colleen E. Ames	IS	2
SP-19	498	Nicole M. Joseph	IS	2
SP-19	498	Kalen Mills	IS	2
SP-19	498	Kiefer K. Sheldon	IS	2
SP-19	498	Tamara Trbojevic	IS	2
SP-19	498	Nicole M. Joseph	IS	2
SP-19	499	Jon Kim (UW Seattle)	UR	2
SP-19	499	Jiawei Wang (UW Seattle)	UR	2
SU-18	499	Carl Gueck	UR	5
SP-18	498	Faris K. Sakalla	IS	1
SP-18	498	Amber R. Thrall	IS	3
SP-18	499	Benjamin J. Clark	UR	5
SP-18	499	Luis J. Ramirez	UR	2
SP-18	499	Zeyu Shen	UR	5
SP-18	499	Yen-Fen Wang	UR	2
AU-17	499	Amber R. Thrall	UR	2
WI-17	499	Amber R. Thrall	UR	2

Table 3: IS/UR credits for UWB and UW Seattle students.

*College of William and Mary*

- ✧ Monroe Scholar summer research project advisor 2015  
Student: Ciera N. Street  
Title: *Women and Mathematics: The Effect of Teaching Practices on Female Mathematical Confidence.*
- ✧ Honors-thesis committee 2015  
Student: Brandon Kriesten  
Title: *A Study of the Cosmic Ray Rate in the CHIPS-M Prototype Detector*

**Graduate Supervision**

- ✧ Master's Supervisory Committee (Tamara Trbojevic, WSU) Sep 2022–Nov 2023
- ✧ Doctoral Supervisory Committee (Gerandy Brito, UW Seattle) Summer 2017

**Notable Undergraduate Students Supervised***University of Washington Bothell*

<i>Name</i>	<i>Award</i>	<i>Current position</i>
Andrew L. Nickerson	—	MS candidate, Western Washington University
Colleen E. Ames	—	PhD candidate, University of Pittsburgh
Jonathan D Ta	—	MS candidate, University of Michigan
Janelle M. Dockter	—	PhD candidate, Washington State University
Tamara Trbojevic	—	Boeing
Benjamin T. Clark	UWB Founders Fellow	PhD candidate, Washington State University
Amber R. Thrall	Mary Gates Scholar	PhD candidate, Washington State University



College of William and Mary

<i>Name</i>	<i>Award</i>	<i>Current position</i>
Gregory K. Taylor	–	PhD, University of Illinois-Chicago
Ciera N. Street	Monroe Scholar	Assistant professor, Cal Poly San Luis Obispo

### Curriculum Development

- ✧ Course coordinator for STMath 308 Sep 2017–Jun 2020
- ✧ STMath 330: Financial Mathematics, in support of the Minor in Actuarial Science program.
- ✧ STMath 409: Advanced Linear Algebra, in support of the Bachelor of Science in Mathematics program

### PRESENTATIONS

#### Invited

14. *The converse of the Cowling–Obrechhoff–Thron theorem*, ILAS Special Session on Spectral and combinatorial problems for nonnegative matrices and their generalizations, Joint Mathematics Meetings, San Francisco, CA, January 2024.
13. *Demystifying the Karpelevič theorem*, ILAS Special Session on Linear Algebra, Matrix theory, and its Applications, Joint Mathematics Meetings, San Francisco, CA, January 2024.
12. *The inverse eigenvalue problem for  $P$  and  $P_0$  matrices*, Special session on Algebra/Linear Algebra at the 2023 Meeting of the PNW Section of the MAA, George Fox University, Newberg, OR, March 2023.
11. *Perron similarities and the nonnegative inverse eigenvalue problem*, Special Session on Eigenvalues, Nonnegative Matrices and Applications (#SS 45A) at the Joint Mathematics Meeting, AMS, virtual meeting, January, 2021.
10. *Perron similarities and the nonnegative inverse eigenvalue problem<sup>1</sup>*, invited mini-symposium *Nonnegative Inverse Spectral Problems* at the 2019 International Linear Algebra Society Meeting, Rio de Janeiro, Brazil, July, 2019.
9. *Matricial Proofs of Some Classical Results about Critical Point Location*, session entitled *Matrix Theory and its Applications* at the 2019 Canadian Mathematical Society Summer Meeting, Regina (SK), Canada, June 2019.
8. *A take-home format for upper-level undergraduate mathematics courses*, special session entitled *Aligning practice and assessment with course learning goals* at the 2019 Meeting of PNW Section of the MAA, University of Portland, Portland, OR, April 2019.
7. *A take-home format for upper-level undergraduate mathematics courses*, 2018 Meeting of the PNW Section of the MAA, Seattle University, Seattle, WA, April 2018.
6. *A matricial description of the Karpelevič theorem*, 2017 American Mathematical Society Spring Central Sectional Meeting special session *Theory and Applications of Linear Algebra*, Pullman, WA, April, 2017.
5. *Perron spectratopes and the nonnegative inverse eigenvalue problem*, 2016 International Linear Algebra Society Meeting contributed mini-symposium *Combinatorial Matrix Theory*, Leuven, Belgium, July, 2016.
4. *The theory of nonnegative matrices*, Pacific Lutheran University Mathematics Seminar, Tacoma, WA, April, 2016.

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<sup>1</sup>LAA Early Career Speaker.

3. *Matrix roots of positive and eventually positive matrices*, William & Mary's Mathematics Colloquium, Williamsburg, VA, September, 2013.
2. *Matrix roots of positive and eventually positive matrices*, 2013 American Mathematical Society Spring Central Sectional Meeting special session Generalizations of Nonnegative Matrices and their Sign Patterns", Ames, IA, April, 2013.
1. *The Numerical Range of a Matrix and Nonnegative Matrices*. Washington State University Department of Mathematics Algebra Seminar, Pullman, WA, March, 2005.

### Contributed

12. *Mathematics is not like an art—it is an art*, UWB STEM Day, University of Washington Bothell, Bothell, WA, February 2019.
11. *On the realizability of the critical points of a realizable list*, 2018 Western Canada Linear Algebra Meeting, Pullman, WA, May 2018.
10. *Eisenstein's criterion, Fermat's last theorem, and a conjecture on powerful numbers*, 2018 Meeting of the PNW Section of the MAA, Seattle University, Seattle, WA, April 2018.
9. *A new proof of the Gauss–Lucas, Siebeck, and Bôcher–Grace theorems*, Joint Mathematics Meetings, San Diego, CA, January 2018.
8. *Eisenstein's criterion, Fermat's last theorem, and a conjecture on powerful numbers*, Joint Mathematics Meetings, San Diego, CA, January 2018.
7. *A matricial description of the Karpelevič theorem*, 2017 International Linear Algebra Society Meeting contributed mini-symposium "The Nonnegative Inverse Eigenvalue Problem", Ames, IA, July 2017.
6. *Mathematics is not like an art—it is an art*, University Beyond Bars, Monroe Correctional Facility, Monroe, WA, July, 2016.
5. *Perron spectratopes and the nonnegative inverse eigenvalue problem*, University of Washington Bothell Mathematics Society, Bothell, WA, April, 2016.
4. *Perron spectratopes and the nonnegative inverse eigenvalue problem*, poster presented at the 4<sup>th</sup> Annual University of Washington Bothell Undergraduate Research and Creative Practice Fair, Bothell, WA, October, 2015.
3. *Careers in the Mathematical Sciences, Focusing on the Future*, Center for Gifted Education, The College of William & Mary, Williamsburg, VA, February 2015.
2. *Matrix roots of irreducible imprimitive nonnegative matrices*, Western Canada Linear Algebra Meeting, Regina, SK, Canada, May 2014.
1. *Matrix roots of positive and eventually positive matrices*, 2013 International Linear Algebra Society Meeting contributed mini-symposium "Linear and Nonlinear Perron-Frobenius Theory", Providence, RI, June, 2013.

### INSTITUTIONAL SERVICE

#### University of Washington

- ✧ Faculty Senate Chair's Cabinet for Robin L. Angotti Sep 2020–Jun 2021
- ✧ Adjudication Panel Sep 2018–present
- ✧ Faculty Council on Race, Equity, and Justice Sep 2016–Jun 2022

**University of Washington Bothell**

- ✧ Campus Council on Academic Standards & Curriculum Sep 2023–present
  - ◆ Chair, School of STEM Council on Curriculum and Learning
- ✧ Mathematics Program DEI Action Plan Working Group Oct 2022–Jun 2023
- ✧ Promotion-and-tenure Committee—Andrew Abian 2022
- ✧ Annual Merit Review Committee—Assistant Professors 2022
- ✧ Chair, Engineering and Mathematics Curriculum Committee Sep 2020–Jun 2021
  - ◆ School of STEM Council on Curriculum and Learning Sep 2020–Jun 2021
- ✧ Search-committee, Asst. Dir. of Residential Life and Student Conduct Nov 2018–Dec 2018
- ✧ Actuarial Science Minor Committee Nov 2017–Feb 2018
- ✧ Mathematics Admissions & Petitions Committee Oct 2017–Sep 2020
- ✧ Engineering and Mathematics Curriculum Committee Sep 2016–Jun 2023
- ✧ University Disciplinary Committee Sep 2016–Sep 2017
- ✧ Applied/Computational Option Committee Sep 2015–Sep 2016

**College of William and Mary**

- ✧ Freshman-sophomore advisor 2014–2015  
Students: William W. Douglas, Yiyang Liu, Dalton Ruggieri, and Yi Zhang
- ✧ Mathematics-major advisor 2013–2015  
Students: Mitchell A. Croom, Nicholas M. Hoffman, John P. Marken, Gregory A. Mascialino, Paul A. Naanou, Jeremiah J. O'Donnell, and Nathan C. Schaaf

**PROFESSIONAL ASSOCIATIONS**

- ✧ American Mathematical Society (AMS)
- ✧ International Linear Algebra Society (ILAS)
- ✧ Mathematical Association of America (MAA)

**PROFESSIONAL SERVICE**

- ✧ Session Organizer, *ILAS Special Session on Spectral and combinatorial problems for nonnegative matrices and their generalizations*, Joint Mathematics Meetings, San Francisco, CA, January 2024
- ✧ Session Organizer, *Algebra/Linear Algebra*, 2023 Meeting of the PNW Section of the MAA, George Fox University, Newberg, OR, March 2023
- ✧ Co-organizer, invited mini-symposium *Spectral properties of non-negative matrices*, 2022 Meeting of the International Linear Algebra Society, Galway, Ireland, June 2022
- ✧ Managing Editor for ILAS-NET and ILAS Information Center (IIC) Jan 2022–Dec 2023
- ✧ Assistant Managing Editor for ILAS-NET and ILAS Information Center (IIC) Sep 2020–Dec 2021

- ✧ Session Organizer, *Junior Faculty Research*, 2018 Meeting of the PNW Section of the MAA, Seattle University, Seattle, WA, April 2018
- ✧ Co-organizer, contributed mini-symposium *The Nonnegative Inverse Eigenvalue Problem*, 2017 Meeting of the International Linear Algebra Society, Ames, IA, July 2017
- ✧ Journal referee by subject:
  - Analysis
    - Journal of Mathematical Analysis and Applications
  - Linear Algebra/Matrix Theory
    - The Electronic Journal of Linear Algebra
    - Linear Algebra and its Applications
    - Linear and Multilinear Algebra
    - Operator Theory: Advances and Applications
    - Operators and Matrices
    - Special Matrices
  - Computational and Applied Mathematics
    - Applied Mathematics and Computation
    - Discrete Applied Mathematics
    - Journal of Computational and Applied Mathematics
    - Journal of Statistical Computation and Simulation
    - Numerical Linear Algebra and its Applications
    - Numerische Mathematik
  - General mathematics
    - The American Mathematical Monthly
    - Bulletin of the Iranian Mathematical Society
    - College Mathematics Journal
    - Journal of Inequalities and Applications
    - Punjab University Journal of Mathematics
    - Rose-Hulman Undergraduate Mathematics Journal

## OUTREACH

### University of Washington Bothell

- ✧ Study Hall Tutor, Washington State Reformatory, Monroe Correctional Complex, Monroe, WA, 24-Aug-2019
- ✧ Substitute instructor, Washington State Reformatory, Monroe Correctional Complex, Monroe, WA, 5-Dec-2018
- ✧ Study Hall Tutor, Washington State Reformatory, Monroe Correctional Complex, Monroe, WA, 13-Oct-2018, 20-Oct-2018
- ✧ Study Hall Tutor, Minimum Security Unit, Monroe Correctional Complex, Monroe, WA, 17-Jun-2017
- ✧ Arts & Lecture Series Sponsor, Washington State Reformatory, Monroe Correctional Complex, Monroe, WA, 17-June-2017

## COMPUTER LANGUAGES & PROGRAMS

- ✧ Languages: MATLAB, AMPL, C, Message Passing Interface
- ✧ Applications: MATLAB, CPLEX, Gurobi, L<sup>A</sup>T<sub>E</sub>X, Excel, Word, Mathematica, Maple
- ✧ Operating Systems: Windows

## LANGUAGES

- ✧ English (native)
- ✧ Italian (limited working proficiency)
- ✧ Spanish (limited working proficiency)

## PERSONAL DATA

- ✧ Place of birth: Los Angeles, CA
- ✧ Citizenship: United States