

# CURRICULUM VITAE OF TOM CUCHTA

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## EDUCATION

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### Missouri University of Science and Technology

Rolla, MO

🎓 Ph.D. Mathematics

(2011 Fall–2015 Fall)

- Advisor: Dr. Martin Bohner
- Thesis: Discrete analogues of some classical special functions
- Award: Chancellor’s Fellowship

### Marshall University

Huntington, WV

🎓 M.A. Mathematics

(2009 Fall–2011 Spring)

🎓 B.S. Mathematics, 🎓 B.S. Applied Mathematics

(2006 Fall–2009 Spring)

- Advisor: Dr. Bonita Lawrence
- Thesis: Infinitesimal Time Scale Calculus

## POSITIONS

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### Fairmont State University

Fairmont, WV

(2016 Fall–present) Assistant Professor of Mathematics

### Missouri University of Science and Technology

Rolla, MO

(2016 Spring) Instructor

(2011 Fall–2015 Fall) Graduate Teaching Assistant

### Marshall University

Huntington, WV

(2011 Summer) Instructor

(2009 Fall–2011 Spring) Graduate Teaching Assistant

## GRANTS

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- (2022–2025) **Principal Investigator:** NSF Research Experience for Undergraduates grant (\$323,352) “*Discrete and Continuous Analysis in Appalachia*”
- (2022–2028) **Senior Personnel:** NSF S-STEM Track 1 Institutional Capacity Building grant (\$749,693) “*Bridging the STEM Gap in Appalachia: Engaging with students to iteratively improve faculty practices in support of student success*”
- (2019 Apr) Fairmont State University Foundation Grant Award
- (2018 Nov–2019 May) **Principal Investigator:** NASA Software Assurance Research Program grant “*Human Hazards in Cybersecurity*”
- (2017 Nov) Grant from NVIDIA Corporation for a Titan XP graphics processing unit
- (2017 Aug–2018 Jul) TMC<sup>2</sup> Technologies Undergraduate machine learning training grant

### WV NASA Space Grant Consortium Awards

- (under review) “*Matrix Matrix dynamic Gompertz equations*”
- (2021 Nov–2022 Jul) “*Periodic carrying capacity in Gompertz dynamic equations*”
- (2021 Mar–2021 Jul) “*Multi-valued Matrix Logarithm and Matrix Inverse Trigonometric Functions on Time Scales*”
- (2020 Nov–2021 Jul) “*Discrete Meijer G*”

### Undergraduate WV NASA Space Grant Consortium Awards Mentored

- (under review) Richard Williams “*Linear quadratic pursuit-evasion games on time scales*”
- (2021 Nov–2022 Jul) Jacob Branch “*Monodiffic extensions of discrete special functions*”
- (2020 Nov–2021 Jul) Rebecca Luketic “*Discrete Legendre polynomials*”
- (2020 Nov–2021 Jul) Dallas Freeman “*Discrete polylogarithm functions*”
- (2019 Nov–2020 Jul) Brooke Fincham “*Discrete fractional population models*”

## PEER-REVIEWED PUBLICATIONS

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- [1] Samer Assaf and Tom Cuchta. The rational sequence topology is partially metrizable. *Top. Proc.*, 2022. In press.
- [2] Ümit Aksoy, Tom Cuchta, Svetlin Georgiev, and Yeliz Yolcu Okur. A normal distribution on time scales with application. *Filomat*, 2022. In press.
- [3] Tom Cuchta, David Grow, and Nick Wintz. Discrete matrix hypergeometric functions. *J. Math. Anal. Appl.*, 518(2):126716, 2023.
- [4] Samer Assaf and Tom Cuchta. The half disc topology is partially metrizable. *Top. Proc.*, 61:139–144, 2023.
- [5] Tom Cuchta, David Grow, and Nick Wintz. Divergence criteria for matrix generalized hypergeometric series. *Proc. Am. Math. Soc.*, 150(3):1235–1240, 2022.
- [6] Tom Cuchta and Nick Wintz. Periodic functions related to the Gompertz difference equation. *Math. Biosci. Eng.*, 19(9):8774–8785, 2022.
- [7] Martin Bohner, Tom Cuchta, and Sabrina Streipert. Delay dynamic equations on isolated time scales and the relevance of one-periodic coefficients. *Math. Meth. Appl. Sci.*, 45(10):5821–5838, 2022.
- [8] Tom Cuchta and Rebecca Luketic. Discrete Hypergeometric Legendre Polynomials. *Mathematics*, 9(20):2546, 2021.
- [9] Tom Cuchta and Sabrina Streipert. A discrete SIS model of fractional order. *Int. J. Dyn. Syst. Differ. Equ.*, 11(3/4):275, 2021.
- [10] Tom Cuchta and Svetlin Georgiev. Analysis of the bilateral Laplace transform on time scales with applications. *Int. J. Dyn. Syst. Differ. Equ.*, 11(3/4):255, 2021.
- [11] Tom Cuchta, Robert Jon Niichel, and Sabrina Streipert. A Gompertz distribution for time scales. *Turk. J. Math.*, 45(1):185–200, 2021.
- [12] Tom Cuchta and Brooke Fincham. Some new Gompertz fractional difference equations. *Involve*, 13(4):705–719, 2020.
- [13] F. Ayça Çetinkaya and Tom Cuchta. Sturm-Liouville and Riccati conformable dynamic equations. *Adv. Dyn. Syst. Appl.*, 15(1):1–13, 2020.
- [14] Samer Assaf, Tom Cuchta, and Matt Insall. Binary metrics. *Topol. Appl.*, 274:107116, 2020.
- [15] Tom Cuchta, Michael Pavelites, and Randi Tinney. The Chebyshev Difference Equation. *Mathematics*, 8(1), 2020.
- [16] Tom Cuchta and Sabrina Streipert. Dynamic Gompertz model. *Appl. Math. Info. Sci.*, 14(1):1–9, 2020.
- [17] Tom Cuchta, David Grow, and Nick Wintz. A dynamic matrix exponential via a matrix cylinder transformation. *J. Math. Anal. Appl.*, 479(1):733–751, 2019.
- [18] Tom Cuchta et al. Human risk factors in cybersecurity. In *Proceedings of the 20th Annual SIG Conference on Information Technology Education, SIGITE '19*, pages 87–92, New York, NY, USA, 2019. ACM.
- [19] Martin Bohner and Tom Cuchta. The generalized hypergeometric difference equation. *Demonstr. Math.*, 51:62–75, 2018.
- [20] Martin Bohner and Tom Cuchta. The Bessel difference equation. *Proc. Am. Math. Soc.*, 145(4):1567–1580, 2017.
- [21] Abigail Bishop, Tom Cuchta, Kathryn Lokken, and Oliver Pechenik. The nilradical and non-nilradical graphs of commutative rings. *Int. J. Algebra*, 2(17-20):981–994, 2008.
- [22] Tom Cuchta, Kathryn Lokken, and William Young. Zero-divisor graphs of localizations and modular rings. *Rose-Hulman Undergraduate Math Journal*, 9(2), 2008.

## SUBMITTED MANUSCRIPTS

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- Tom Cuchta and Sabrina Streipert. Discrete fractional logistic.
- Tom Cuchta and Robert J. Niichel. Memoryless properties on time scales.
- Alexander Lyapun and Tom Cuchta. Sections of a generating series of a solution to a difference equation in a simplicial cone.
- Tom Cuchta, Rui Ferreria. The heat equation on time scales.
- Tom Cuchta, Dylan Poulsen, and Nick Wintz. Linear quadratic tracking with continuous conformable derivatives.
- Tom Cuchta, et al. Human Risk Factors in Cybersecurity: Experimental Assessment of an Academic Human Attack Surface.
- Tom Cuchta and Dallas Freeman. Discrete polylogarithm functions.

## TEACHING EXPERIENCE & PROFESSIONAL DEVELOPMENT

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Fairmont State University		(2016 Fall–2022 Fall)	
Course	# sections	Course	# sections
Undergraduate Research	6	Real Analysis	3
Complex Variables	1	Differential Equations	2
Linear Algebra	2	Calculus 3	4
Calculus 2	6	Mathematical Logic	5
Calculus 1	3	Applied Calculus 2	1
Intro to Programming	2	Trigonometry	9
Applied Statistics	3	College Algebra	2
College Algebra with Support	1	Applied Tech Math I	1
Pre-College Algebra	1		

Missouri S&T (2011 Fall–2016 Summer)	
Course	# sections
Linear Algebra	4
Differential Equations	1
Calculus 3	8
Calculus 1	2
“Problem Solving Workshop”	2
“Hit the Ground Running”	3

Marshall University (2009 Fall–2011 Summer)	
Course	# sections
Trigonometry	3
College Algebra	2
Finite Math	1
Basic Skills in Mathematics II	1

### Section NExT teaching workshops attended

- (2021 Sep) sustainability quantitative literacy course & teaching lower-level courses Triadelphia, WV (virtual)
- (2020 Sep) resampling in basic stats & activity-based learning online Slippy Rock, PA
- (2019 Sep) mastery based grading California, PA
- (2018 Sep) student issues and concerns & using the instructional practices guide Grove City, PA
- (2017 Sep) engagement and grading Pittsburgh, PA
- (2017 Apr) expository writing Wooster, OH
- (2016 Oct) teaching statistics Indiana, PA
- (2016 Sep) teaching math to liberal arts majors

## SERVICE

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### To profession

#### Peer Review

- (2022) 17 papers
- (2021) 13 papers
- (2020) 30 papers
- (2019) 15 papers
- (2018) 3 papers
- (2017) 4 papers
- (2016) 2 papers

#### Writer for Mathematical Reviews



- (2022) 5 reviews
- (2021) 6 reviews
- (2020) 6 reviews
- (2019) 6 reviews

#### Reviewer for







- Advances in Continuous and Discrete Models: Theory and Applications
- Advances in Difference Equations

- Advances in the Theory of Nonlinear Analysis and its Application
- AIMS Mathematics
- Analysis: International Mathematical Journal of Analysis and its Applications
- Axioms
- Computational and Applied Mathematics
- Differential Equations and Dynamical Systems
- Dynamics of Continuous, Discrete and Impulsive Systems Series A: Mathematical Analysis
- Filomat
- Fundamental Journal of Mathematics and Applications
- International Journal of Dynamical Systems and Differential Equations
- Journal of Classical Analysis
- Journal of Difference Equations and Applications
- Journal of Fixed Point Theory and Applications
- Journal of Inequalities and Special Functions
- Journal of Mathematics and Computer Science
- Journal of Mathematics and Statistics
- Journal of Nonlinear Sciences and Applications
- Journal of the Egyptian Mathematical Society
- Malaysian Journal of Mathematical Sciences
- Mathematical Biosciences and Engineering
- Mathematical Population Studies
- Mathematics
- Nonlinear Dynamics and Systems Theory
- Nonlinearity
- Numerical Methods for Partial Differential Equations
- Real Analysis Exchange
- Rocky Mountain Journal of Mathematics
- Symmetry
- Turkish Journal of Mathematics
- TWMS Journal of Applied and Engineering Mathematics

### **To Mathematical Association of America**

- (2022 Apr) Host organizer of Spring 2022 Allegheny Mountain Section conference (moved virtual)
- (2022 Spring) Nominating Committee (chair)
- (2021–present) Allegheny Mountain Colloquium (founder and chair)  
 <https://www.alleghenymtn.maa.org/colloquium>
- (2021, 2020 Springs) Nominating Committee
- (2018 Apr–present) Allegheny Mountain Section Director of E-Communications  
 Webmaster <https://www.alleghenymtn.maa.org/>
- (2018 Spring) Allegheny Mountain Section 2018 Teaching Award Committee

### **Other Service to profession**

- (2022 Nov) Review Panel for NSF Division of Mathematical Sciences
- (2022 Feb–present) Communications Editor for *Applied Mathematics in Science and Engineering*  
 <https://twitter.com/AppMathSciEng>
- (2016–present) Maintainer of an open source Python project on GitHub for time scale calculus  
 <https://github.com/tomcuchta/timescalecalculus>
- (2012–present) Maintainer of a solutions manual to Rainville's *Special Functions*  
 <https://github.com/tomcuchta/rainvillesfsolutions>
- **Owner and operator of...**
  - Time Scale Wiki  <http://timescalewiki.org>
  - Special Functions Wiki  <http://specialfunctionswiki.org>
  - Hyperspace Wiki  <http://hyperspacewiki.org>

### **To Fairmont State University**

#### **Undergraduate researchers mentored**

- Summer 2022 cohort of *Discrete and Continuous Analysis in Appalachia*
- (2022) Richard Williams (discrete fractional calculus of variations)
- (2021–2022) Jacob Branch (monodiffic functions)  
WV NASA Space Grant “*Monodiffic extensions of discrete special functions*”
- (2020–2021) Rebecca Luketic (discrete Legendre polynomials)  
WV NASA Space Grant “*Discrete Legendre polynomials*”
- (2020–2021) Dallas Freeman (discrete polylogarithms)  
WV NASA Space Grant: “*Discrete polylogarithm functions*”
- (2019–2020) Brooke Fincham (discrete fractional Gompertz models)  
WV NASA Space Grant “*Discrete fractional population models*”
- (2019) Michael Pavelites (discrete Chebyshev polynomials)
- (2019) Kristina Daniels, Caleb Lutjens, Sydney Maibach, Ryan Stephenson (NASA IV&V SARP grant)
- (2018–2019) Matthias Baur (timescalecalculus package)
- (2018) Randi Tinney (discrete Chebyshev polynomials)
- (2017–2018) Mattison Johnson, Dawn Sargent, Carl Wahler, Anna Westfall (TMC<sup>2</sup> Technologies grant)
- (2017–2018) Zack Linger (zeta functions on time scales)
- (2017) Treston Brown (discrete special functions)
- (2016) Antonietta Bonanno (educational methods in geometry; masters student from U. Calabria, Italy)

### **Wrote reference letters for . . .**

- (2022) 5 individuals
- (2021) 7 individuals
- (2020) 6 individuals
- (2019) 9 individuals
- (2018) 3 individuals
- (2017) 1 individual

### **Organized student trips**

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|---|---------------------|
| – (2020) Pi Mu Epsilon conference                   | Youngstown, OH      |
| – (2019) Marshall University differential analyzer  | Huntington, WV      |
| – (2019) Pi Mu Epsilon conference                   | Youngstown, OH      |
| – (2019) Miami University of Ohio Annual Conference | Oxford, OH          |
| – (2018) Allegheny Mountain MAA conference          | Erie, PA            |
| – (2018) Pi Mu Epsilon conference                   | Youngstown, OH      |
| – (2017) Ohio MAA conference                        | St. Clairsville, OH |
| – (2017) Marshall University differential analyzer  | Huntington, WV      |
| – (2017) Pi Mu Epsilon conference                   | Youngstown, OH      |

### **Faculty Senate**

- (2022 Fall, 2019 Fall–2021 Spring) Faculty Senate Executive Committee (Webmaster)  
🌐 <https://www.fairmontstate.edu/facstaffresources/fsusenate>
- (2022 Spring) Faculty Senate Committee on Committees (ex-officio, past chair)
- (2021, 2020 Springs) Faculty Senate Committee on Committees (chair)
- (2021 Spring) Executive Committee Provost Interviews and Faculty Forums
- (Fall 2020–present) Faculty Senate Bylaws Committee
- (2019, 2018 Springs) Faculty Senate Committee on Committees (member)
- (2018 Fall–2019 Spring) Faculty Senate Executive Committee (at large member)
- (2017 Spring–present) Senator for Department of Computer Science and Mathematics

### **Other Service to Fairmont State**

- (2021 Dec–2022 Sep) Host of Visiting Fulbright Scholar Alexander Lyapin (Siberian Federal University)
- (2022 Fall, 2017 Spring) Mathematics program advisory board committee
- (2021 Nov, 2019 Oct) Judge at Fairmont State honors quiz bowl
- (2021 Fall–present) Honors Council
- (2021 Spring) University website vendor procurement committee
- (2020 Fall–present) Operator of the 🌐 [csmath.fairmontstate.edu](https://csmath.fairmontstate.edu) server (not public-facing) providing WeBWork and RStudio for math classes
- (2018 Fall–present) Coordinator of calculus assessment
- (2018 Fall–present) Technology Committee
- (2017 Fall–present) Student Publications Board
- (2018 Fall–2020 Spring) Institutional Review Board
- (2016–present) Social media for mathematics program
- **Organized visiting lecturers for department seminars (2016–2019)**
  - (2019 Nov) Dr. Stephen Deterding, West Liberty University (West Liberty, WV)
  - (2018 Nov) Drs. Darrah, Sealy, Diamond, Milans; West Virginia University (Morgantown, WV)

- (2017 Nov) Dr. Matt Insall, Missouri University of Science & Technology (Rolla, MO)
- (2017 Nov) Mark Suder, NASA IV&V (Fairmont, WV)
- (2017 Mar) Dr. Bonita Lawrence, Marshall University (Huntington, WV)
- (2016 Nov) Dr. Annarosa Serpe, University of Calabria (Arcavacata, Italy)
- (2016 Nov) Dr. Patrick Juola, Duquense University (Pittsburgh, PA)

## Other service

- (2021 Jul) Volunteer judge at WVU Undergraduate Culminating Symposium
- (2019 Apr) Exam writer and grader for West Virginia Math Field Day
- (2018 Apr) Volunteer scorer at West Virginia Math Field Day

## CONFERENCE TALKS

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### Research Conferences

- (2023 Jan) *Special Session on Ecological and Evolutionary Dynamics in Life and Social Sciences* (**invited**)  
Joint Mathematics Meetings Boston, MA
- (2023 Jan) *Special Session on Advances in qualitative theory and applications to life sciences of differential, difference, and dynamic equations* (**invited**)  
Joint Mathematics Meetings Boston, MA
- (2023 Jan) *Special Session on Discrete and Hybrid Dynamical Systems: Time Scales and Fractional Approaches* (**invited**)  
Joint Mathematics Meetings Boston, MA
- (2022 Sep) Session: Hybrid phenomena in systems and control (**invited**)  
IFAC Symposium on System Structure and Control Montréal, QC
- (2022 May) Dynamic equations on time scales workshop (**invited**)  
Mathematical conference centre Będlewo, Poland
- (2022 Apr) Special Session on Analysis of and Recent Advances in Difference, Differential and Dynamic Equations with Applications (**invited**)  
Joint Mathematics Meetings (virtual)
- (2021 Aug) Dynamic equations on time scales workshop (**invited**)  
Mathematical conference centre Będlewo, Poland
- (2021 Jul) International Conference on Difference Equations and Applications  
University of Sarajevo (virtual)
- (2020 Aug) Dynamic equations on time scales workshop (**invited**)  
Mathematical conference centre Będlewo, Poland
- (2020 May) 95th Annual WV Academy of Sciences Meeting (**invited plenary speaker, cancelled**)  
Fairmont State University Fairmont, WV
- (2019 Sep) 47th Annual Math Conference: Differential Equations and Dynamical Systems and their Applications  
Miami University Oxford, OH
- (2019 Jul) International Conference on Differential & Difference Equations and Applications  
VIP Zurich Hotel Lisbon, Portugal
- (2019 Jun) Dynamic equations on time scales workshop (**invited plenary speaker**)  
Mathematical conference centre Będlewo, Poland
- (2019 Jan) MAA Contributed Paper Session on Mathematical Experiences and Projects in Business, Industry, and Government  
Joint Mathematics Meetings Baltimore, MD
- (2018 Aug) International Workshop on Nonlinear Dynamical Systems and Functional Analysis  
University of Brasília Brasília, Brazil.
- (2017 Jul) International Conference on Difference Equations and Applications  
West University of Timișoara Timișoara, Romania
- (2014 May) Conference on Partial Differential Equations  
Abbazia di Novacella Neustift, Italy

### Mathematical Association of America Conferences

- (2022 Apr) Allegheny Mountain MAA Meeting (virtual)

- (2021 Apr) Allegheny Mountain MAA Meeting (virtual)
- (2019 Apr) Allegheny Mountain MAA Meeting  
Shepherd University Shepherdstown, WV
- (2018 Apr) Allegheny Mountain MAA Meeting  
Penn State Erie Erie, PA
- (2017 Oct) Ohio MAA Meeting  
Ohio University Eastern St. Clairsville, OH
- (2017 Apr) Allegheny Mountain MAA Spring Meeting  
Duquense University Pittsburgh, PA
- (2016 Oct) Ohio MAA Fall Meeting  
College of Wooster Wooster, OH
- (2015 Mar) Missouri MAA Spring Meeting  
Missouri University of Science & Technology Rolla, MO

**Seminar and Colloquium Talks**

- (2022 Jul) First2 Immersion Program  
Fairmont State University Fairmont, WV
- (2019–2021) WVU Math Colloquium (3 talks)  
West Virginia University Morgantown, WV
- (2011–2016) Time Scales Seminar (17 talks)  
Missouri University of Science & Technology Rolla, MO
- (2011–2016) Analysis Seminar (7 talks)  
Missouri University of Science & Technology Rolla, MO
- (2011–2016) Topology and Hyperspaces Seminar (10 talks)  
Missouri University of Science & Technology Rolla, MO