








Nicholas J. Wintz

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Summary

My primary research focuses on optimal control and estimation in continuous and discrete time. I am also interested in differential and difference equations, dynamic equations on time scales, boundary value problems, statistical analysis, programming languages, systems theory, financial mathematics, tracking, game theory, mathematical modeling, and more.

Education

-  Ph.D. in Mathematics, 2009, Missouri University of Science and Technology (formerly University of Missouri-Rolla), Rolla, MO
Dissertation title: ‘The Kalman Filter on Time Scales’
Advisor: Martin J. Bohner
-  M.A. in Mathematics, 2004, Marshall University, Huntington, WV
Thesis title: ‘Eigenvalue comparisons for an impulsive boundary value problem with Sturm-Liouville boundary conditions’
Advisor: Bonita A. Lawrence
-  B.S. in Mathematics, 2002, Marshall University, Huntington, WV
Minor: Economics

Experience

-  Department of Mathematics, Computer Science, and Information Technology, Lindenwood University
209 S. Kingshighway, St. Charles, MO 63301
 - Fall 2015 - Present: Associate Professor
 - Fall 2011 - Spring 2015: Assistant Professor
-  Department of Mathematics and Statistics, Missouri University of Science and Technology
400 W. 12th St., Rolla, MO 65409-0020
 - Fall 2009 - Spring 2011: Lecturer
 - Fall 2004 - Spring 2009: Graduate Teaching Assistant - instructor of record
-  Department of Mathematics and Statistics, Marshall University
One John Marshall Drive, Huntington, WV 25755
 - Fall 2003 - Spring 2004: Graduate Research Assistant
 - “Eigenvalue comparisons for an impulsive boundary value problem with Sturm-Liouville boundary conditions,” supervised by Dr. Bonita A. Lawrence.
 - “The Winning Probability and A Priori Relative Ranking in the Game of Soccer,” supervised by Dr. Alfred A. Akinsete.

- Fall 2002 - Spring 2004: Graduate Teaching Assistant - instructor of record

Courses Taught

- Lindenwood University: ‘Advanced Calculus,’ ‘Basic Statistics,’ ‘Business Calculus and Applications,’ ‘Calculus I–III,’ ‘College Algebra,’ ‘Complex Variables,’ ‘Difference Equations,’ ‘Differential Equations,’ ‘Interest Theory,’ ‘Introduction to Contemporary Mathematics,’ ‘Linear Algebra I & II,’ ‘Mathematics in Pop Culture,’ ‘Operations Research,’ ‘Pre-calculus: Elementary Functions,’ ‘Probability and Mathematical Statistics I & II,’ ‘Quantitative Methods for Business,’ ‘Regression Analysis,’ ‘Time Series,’ and ‘Undergraduate Research.’
- Missouri University of Science and Technology: ‘College Algebra,’ ‘Trigonometry,’ ‘Calculus with Analytic Geometry III’ and ‘Elementary Differential Equations.’
- Marshall University: ‘College Algebra,’ ‘Concepts and Applications,’ and ‘Calculus for Business.’

Awards

1. “Scholar of the Year,” Lindenwood University, 2021-22.
2. Nomination, “President’s Scholar-Teacher Award,” Lindenwood University, 2020-21.
3. Nomination, “Scholar of the Year,” Lindenwood University, 2019-20.
4. Nomination, “Scholar of the Year,” Lindenwood University, 2018-19.
5. Honorable Mention, “GTA Teaching Excellence Award,” Missouri S&T, 2008-09.
6. Honorable Mention, “GTA Teaching Excellence Award,” Missouri S&T, 2007-08.

Peer-Reviewed Publications

1. T. Cuchta, D. Poulsen, and N. Wintz. Linear quadratic tracking with continuous conformable derivatives. *Eur. J. Control*, 72:100808, 2023.
2. T. Cuchta, D. Grow, and N. Wintz. Discrete matrix hypergeometric functions. *J. Math. Anal. Appl.*, 518(2):126716, 2023.
3. T. Cuchta and N. Wintz. Periodic functions related to the Gompertz difference equation. *Math. Biosci. Eng.*, 19(9):8774–8785, 2022.
4. T. Cuchta, D. Grow, and N. Wintz. Divergence criteria for matrix generalized hypergeometric series. *Proc. Am. Math. Soc.*, 150(3):1235–1240, 2022.
5. D. Grow and N. Wintz. Bilinear state systems on an unbounded time scale. *Applied Mathematics and Computation*, 397:125917, 2021.
6. T. Cuchta, D. Grow, and N. Wintz. A dynamic matrix exponential via a matrix cylinder transformation. *J. Math. Anal. Appl.*, 479(1):733–751, 2019.
7. D. Poulsen and N. Wintz. The Kalman filter on stochastic time scales. *Nonlinear Anal. Hybrid Syst.*, 33:151-161, 2019.
8. M. Bohner and N. Wintz. The Kalman filter for linear systems on time scales. *J. Math. Anal. Appl.*, 406(2):419-436, 2013.
9. M. Bohner and N. Wintz. Controllability and observability of time-invariant linear dynamic systems. *Math. Bohem.*, 137(2):149-163, 2012.

10. M. Bohner and N. Wintz. The linear quadratic tracker on time scales. *Int. J. Dyn. Syst. Differ. Equ.*, 3(4):423-447, 2011.
11. M. Bohner and N. Wintz. The linear quadratic regulator on time scales. *Int. J. Difference Equ.*, 5(2):149-174, 2010.
12. N. Wintz. The Kalman filter on time scales. PhD dissertation, 2009.
13. B.A. Lawrence and N. Wintz. Eigenvalue comparisons for an impulsive boundary value problem with Sturm-Liouville boundary conditions. *Comm. Appl. Nonlinear Anal.* 12, 4 (2005), 37-45.

Book Chapters

1. T. Cuchta and N. Wintz. ‘Foundations of Linear Control Theory on Time Scales.’ In Ravi P. Agarwal et. al. *Dynamic Equations on Time Scales and Applications*, CRC Press, Taylor & Francis Group. In press.

Conference Proceedings

1. D. Barnes, D. Castillo, and N. Wintz, “Overdetermined control systems on time scales,” NASA-Missouri Space Grant Consortium, 36, 2023.

Submitted Work

1. F.A. Çetinkaya, T. Cuchta, and N. Wintz. Solutions of dynamic Sturm–Liouville conformable initial and boundary value problems.

Current Scholarship

- Bilinear control systems on time scales (joint work with Dr. David E. Grow, Missouri S&T). Work includes establishing controllability and observability criterion for bilinear systems on time scales.
- Discrete special functions joint work with Dr. David E. Grow and Dr. Tom Cuchta, Fairmont State University).
 - Solutions of the second kind for discrete Bessel equations - writing stages.
- Matrix special functions (joint work with Dr. Tom Cuchta).
 - Multi-valued matrix logarithm - development/writing stages.
 - Discrete matrix gompertz model - early stages.
- Applications with α -conformable fractional derivatives. These are joint projects with Dr. Tom Cuchta, Dr. Dylan Poulsen (Washington College), and/or Dr. Özkan Özturk (Texas Tech University).
 - Heart rate controllers with continuous conformable fractional derivatives - early/simulation stages.
- Completion of REU projects - each in the writing stages.
 - Applications in Kalman filtering on stochastic time scales (with Habeeba Elwalily and Davis Funk)
 - Linear quadratic pursuit-evasion games on time scales (with Davis Funk and Richard Williams)
 - The Kalman filter on time scales with exponential weighting (with Salvador Ochoa Zavalza)

- Maximum likelihood estimation on time scales (with Scott Ferrell, Connor Jokerst, Salvador Ochoa Zavalza, and Dr. Bob Niichel)
- The conformable Kalman filter (Nathan Murarik, Gino Rotellini, and Tatiana Sosnovsky)

Undergraduate Research

1. Fall 2023(PRIDE): Drew Barnes, Micah Duffield, and Abigail Waters, “The conformable linear quadratic tracker with multiple delays.”
2. Summer 2023(DCAA): Nathan Murarik (Pennsylvania State University), Gino Rotellini (Pennsylvania Western University), and Tatiana Sosnovsky (California State Polytechnic University), “The conformable Kalman filter.”
3. Spring 2023(MO-NASA): Drew Barnes and Danian Castillo, “Over-determined control systems on time scales.”
4. Summer 2022(DCAA): Scott Ferrell (Shawnee State University), Connor Jokerst (Lindenwood University), and Salvador Ochoa Zavalza, “Maximum likelihood estimation on time scales.” Advised jointly with Dr. Bob Niichel (Fairmont State University).
5. Summer 2022(DCAA): Salvador Ochoa Zavalza (Sonoma State University), “The Kalman filter on time scales with exponential weighting.”
6. Summer 2022(DCAA): Davis Funk and Richard Williams (Fairmont State University), “Linear quadratic pursuit-evasion games on time scales.”
7. Summer 2022(DCAA): Habeeba Elwalily (Middlesex County College) and Davis Funk (West Virginia University), “Applications in Kalman filtering on stochastic time scales.”
8. Spring 2022: Darrell Charles, “Survival analysis for vehicles in the U.S., 1990-2020,” preview.
9. Spring 2022: Jordina Mariné Mariné, “The discrete and continuous heat equations.”
10. Spring 2021: Dana Minakova, “Stochastic volatility.”
11. Spring 2021: Luke Coffman, “Optimal control for bilinear systems,” (High school student).
12. Spring 2020: Rachel Dickhens, “A time series forecast of coal emissions.”
13. Spring 2020: Alisher Abdullaev, “Applying a long short-term memory (LSTM) network to time series forecasting.”
14. Spring 2019: Harrison Yorke, “Fish tracking using the Kalman filter.”
15. Spring 2019: Marouen Helali, “Shor’s algorithm: quantum application in cryptography.” Alpha Chi “People’s Choice” Award at the 2019 Lindenwood Student Research Conference.
16. Spring 2018: Takaaki Komatsu, “Discrete-time model for humans vs zombies dynamics at Lindenwood University.”
17. Spring 2017: Tayler Monaco, “The effect of multiple players in a game of blackjack.”
18. Spring 2017: Joy Kanangiser, “Estimating stochastic volatility models using moving average.”
19. Spring 2017: Colin Cernik, “Modelling optimal running velocity.” Alpha Chi “People’s Choice” Award at the 2017 Lindenwood Student Research Conference.

20. Spring 2016: Victoria Francis, “Estimating wrestling motion estimation using the extended Kalman filter.” First Place (School of Sciences) in the 2016 Lindenwood Student Research Conference (SRC) and the Alpha Chi “People’s Choice” Award.
21. Spring 2015: Sina Schack, “The PID controlled Artificial Pancreas: Modeling and Simulation of the Glucose-Insulin Metabolism,” (Biochemistry major).
22. Spring 2015: Micah Losee, “A predator-prey model for the moose and wolf populations of Isle Royale.”
23. August 2014: Samantha Brady and Mark Schroeder, the Differential Analyzer at Marshall University.
Host: Dr. Bonita A. Lawrence
The students spent half of a week learning how the differential analyzer works and solving linear differential equations on the machine.
 - Dr. Lawrence returned to Lindenwood University to talk to our students about building their own differential analyzer.
 - Marshall University’s Department of Mathematics provided partial funding for food/housing for our students during their stay.
24. Spring 2014: Zach Stuart, “An application of the linear quadratic tracking problem to economic stabilization policy updated.”
25. Spring 2014: Mark Schroeder, “Evaluating enzyme kinetics using numerical methods,” (Biochemistry major).
26. Spring 2013: Aaron Wood, “The discrete-time Kalman filter.”
First Place (School of Sciences) in the 2013 Lindenwood Student Research Symposium and Exposition (SRSE).
27. Spring 2010: Abigail Asher, “Using Runge-Kutta methods to solve 1st order chemical engineering models,” (Missouri S&T).

Grants

- Principal Investigator, NASA-Missouri Space Grant Consortium Proposal: Conformable linear regulator problems with sporadic controls, 2023-24 (\$9,118 - 12 months **funded**).
- Principal Investigator, Preparation for Industrial Careers in Mathematical Sciences (PIC Math, MAA), Spring 2024 (\$3,000 - **funded**).
- Principal Investigator, President’s Research, Innovation, and Development Toward Excellence (PRIDE) Fund: Conformable linear quadratic tracker with multiple delays, 2023 (\$2,240 - **funded**).
- Principal Investigator, NASA-Missouri Space Grant Consortium Proposal: Singular over-determined systems on time scales, 2022-23 (\$11,759 - 12 months - **funded**).
- Senior Personnel, REU Proposal: Discrete and Continuous Analysis in Appalachia. NSF Grant Proposal, 2021-22 (\$323,352 - 40 months - **funded**).
- Senior Personnel, REU Proposal: Discrete and Continuous Analysis in Appalachia. NSF Grant Proposal, 2020-21 (\$323,979 - 38 months - rejected).

Talks Presented

1. Joint Mathematics Meetings, Boston, MA, 2023-01-06.
2. Dynamic Equations on Time Scales Workshop, Banach Center, Będlewo, Poland (Online), 2022-05-26.
3. Dynamic Equations on Time Scales Workshop, Banach Center, Będlewo, Poland (Online), 2021-08-28.
4. Earl P. Lazerson Mathematical Symposium Lecture, Southern Illinois University Edwardsville (Online), 2020-11-19.
5. 13th International Symposium on Biomathematics and Ecology Education and Research (BEER), Illinois State University (Online), 2020-11.
6. 2019 Missouri Section of the Mathematical Association of America, Lindenwood University, St. Charles, MO, 2019-04-06.
7. Lecture on Control Theory on Time Scales, Dr. Jag Sarangapani's EE 6310 Optimal Control and Estimation course, Missouri University of Science and Technology, Rolla, MO, 2015-05-07.
8. Special Session on "Advances in Difference, Differential, and Dynamic Equations with Applications," AMS Central Sectional Meeting #1094, Washington University, St. Louis, MO, 2013-10-19 (Invited Speaker).
9. International Symposium on Biomathematics and Ecology: Education and Research, St Louis, MO, 2012-11-09/11.
10. Fall 2009 Central Sectional Meeting of the American Mathematical Society, Baylor University, Waco, TX, 2009-10-16/18.
11. Recent Developments in Dynamic Equations on Time Scales, University of Wyoming, Laramie, WY, 2009-06-08/19 (Invited Speaker).
12. The First International Workshop on Dynamic Equations on Time Scales, Istanbul, Turkey, 2005-06/07-01.
13. 24th Annual Western Kentucky University Mathematics Symposium, Bowling Green, Kentucky, 2004-11-19/20.

Conferences Attended

1. Missouri-NASA Space Grant Consortium, Rolla, MO, 2023-04-21/22.
2. The Allegheny Mountain Colloquium (Mathematical Association of America), Online, 2022-01-31.
3. The Allegheny Mountain Colloquium (Mathematical Association of America), Online, 2022-11-08.
4. The Allegheny Mountain Colloquium (Mathematical Association of America), Online, 2022-09-12.
5. The Allegheny Mountain Colloquium (Mathematical Association of America), Online, 2022-02-07.
6. The Missouri section of the Mathematical Association of America (MAA-MO), Online, 2021-03-26.
7. Battling Emerging & Re-emerging Epidemics & Designing Mitigating Strategies: Webinar Series, Center for Collaborative Studies in Mathematical Biology, Intercollegiate Biomathematics Alliance, Fall 2020.
8. Seventh Conference on Function Spaces, Southern Illinois University Edwardsville, Edwardsville, IL, 2014-05-20/24.

9. ICDEA2006, Eleventh International Conference on Difference Equations and Applications, Kyoto, Japan, 2006-07-24/28.

Seminars Presented

1. The Kalman filter on stochastic time scales, Mathematics and Statistics Colloquium, Missouri S&T, 2019-05-03.
2. The linear quadratic tracker on time scales, MIT Lincoln Laboratory, 2010-06-30.
3. The linear quadratic minimum time problem on time scales, Time Scales Seminar, Missouri S&T, 2009-09-02.
4. Some scalar dynamic tracking problems, Time Scales Seminar, Missouri S&T, 2009-03-04.
5. Some scalar dynamic control problems, Time Scales Seminar, Missouri S&T, 2009-02-25.
6. Regulator as a function with final state fixed (Part II), Time Scales Seminar, Missouri S&T, 2008-11-12.
7. Regulator as a function with final state fixed, Time Scales Seminar, Missouri S&T, 2008-11-05.
8. Derivation of the Kalman filter using the Wiener-Hopf equation, Time Scales Seminar, Missouri S&T, 2008-10-15.
9. The tracking problem on time scales (Part II), Time Scales Seminar, Missouri S&T, 2008-09-17.
10. The tracking problem on time scales, Time Scales Seminar, Missouri S&T, 2008-09-19.
11. Free final state and closed loop control for dynamic equations, Time Scales Seminar, Missouri S&T, 2008-04-23.
12. An Introduction to Time Scales, Kappa Mu Epsilon, Missouri S&T, 2008-04-01.
13. The linear quadratic regulator on time scales, Student Research Seminar, Missouri S&T, 2008-02-18.
14. The linear quadratic regulator on time scales, Time Scales Seminar, Missouri S&T, 2008-02-13.
15. Derivation of the steady state Kalman filter, Time Scales Seminar, UMR, 2007-10-17.
16. Derivation of the Kalman filter, Time Scales Seminar, UMR, 2007-08-29.
17. Error covariance, Time Scales Seminar, UMR, 2007-03-22.
18. Propagation of means and covariances in linear stochastic systems on time scales, Time Scales Seminar, UMR, 2007-02-22.
19. Linear stochastic systems on time scales, Time Scales Seminar, UMR, 2007-002-15.
20. Controllability, reachability, and observability for time-invariant and time-variant dynamic control problems, Time Scales Seminar, UMR, 2006-11-16.
21. Observability for dynamic control problems, Time Scales Seminar, UMR, 2006-09-21.
22. Controllability for dynamic control problems, Time Scales Seminar, UMR, 2006-09-14.
23. An Introduction to Game Theory, Graduate Student Seminar, UMR, 2006-05-01.
24. Linear systems on time scales (Part IV), Time Scales Seminar, UMR, 2006-04-11.
25. Linear systems on time scales (Part III), Time Scales Seminar, UMR, 2006-04-04.
26. Linear systems on time scales (Part II), Time Scales Seminar, UMR, 2006-03-23.

27. Linear systems on time scales, Time Scales Seminar, UMR, 2006-03-21.
28. An introduction to discrete differential games, Time Scales Seminar, UMR, 2006-01-31.
29. Eigenvalue comparisons for an impulsive boundary value problem with Sturm-Liouville boundary conditions, Analysis Seminar, UMR, 2004-10-27.

Talks Organized

1. Dr. Bonita A. Lawrence, "The Marshall Differential Analyzer Project: Solutions of Dynamic Equations Using Mechanical Integration," Lindenwood University, 2018-11-02.
2. Dr. David E. Grow (Missouri S&T), "Fourier series of Lipschitz continuous functions," Lindenwood University, 2017-04-11.
3. Dr. Bonita A. Lawrence, Alex Amorim and Chad Lott, "The Marshall Differential Analyzer Project: A Physical Model of Differential Equations and their Solutions," Lindenwood University, 2015-04-10.
4. Dr. Bonita A. Lawrence and Molly Peterson, "The Marshall Differential Analyzer Project: Solutions of Dynamic Equations Using Mechanical Integration," Lindenwood University, 2013-11-07.
5. Dr. Bonita A. Lawrence (Marshall University) and Richard P. Merritt, "Solutions To Differential Equations Created By Mechanical Integration," Missouri S&T, 2010-10-22.

Journals Reviewed

1. Advances in Computational Science and Engineering
2. Advances in Difference Equations
3. ANZIAM Journal
4. Control & Cybernetics
5. Differential Equations and Dynamical Systems
6. Discrete Dynamics in Nature and Society
7. IEEE Transactions on Automatic Control
8. Information Sciences
9. International Journal of Mathematics and Mathematical Sciences
10. Journal of Abstract Differential Equations and Applications
11. Journal of Applied Mathematics
12. Journal of the Franklin Institute
13. Journal of Inequalities and Applications
14. Mathematics of Control, Signals, and Systems
15. Nonautonomous Dynamical Systems
16. Nonlinear Analysis: Theory, Methods & Applications
17. Nonlinear Dynamics and Systems Theory
18. Search Theory: A Game Theoretic Perspective
19. Turkish Journal of Mathematics

Professional Affiliations

- Member, American Mathematical Society (AMS)
- Member, International Society of Difference Equations (ISDE)

Department and College Service

- Spring 2020: Course Developer, Operations Research (MTH 39012)
 - Course Description: This course serves as an introduction to theory and applications of linear programming. Topics include the simplex method, duality theory, sensitivity analysis, introduction to integer programming, the transportation problem, network flows, among others.
- Fall 2019: Course Developer, Mathematics in Pop Culture (UNIV 1010016)
 - Course Description: This course is a one-hour subject-area seminar and orientation course required of all first-time freshmen. Students will be introduced to special topics of their choice based on personal interest, declared major or academic interest while also orientating to the university environment. This special topics seminar course will provoke critical thinking, problem solving, and interaction. Course is required of all first-time freshmen or transfer students without an equivalent course previously completed from another college or university. May not be retaken for a higher grade. Lab fee required.
- Spring 2019: Course Developer, Time Series (MTH 39002)
 - Course Description: This course offers an introduction to time series and their applications. Topics include stationarity, autocorrelation functions, autoregressive (integrated) moving average models, partial autocorrelation functions, forecasting, seasonal models, frequency domain results, discrete Fourier transform, and more. Prerequisite: C or better in MTH 24100.
- Fall 2018: Course Developer, Algebra and Trigonometry (MTH 15300)
 - Course Description: This combined course serves as a review of college algebra as well as preparation for the calculus sequence. Topics include polynomial and rational functions and inequalities, systems of equations, exponential and logarithmic functions, trigonometric functions, inverse trigonometric functions, as well as their applications. A graphing calculator is required. Offered every semester. Prerequisite: C or better in MTH 11100 or passing the placement test.
- Fall 2018: Course Developer, Complex Variables (MTH 36500)
 - Course Description: This course offers an introduction to the theory of complex variables and their applications. Topics include the algebra and geometry of complex numbers, Cartesian and polar representation, differentiability of complex functions, analytic functions, the elementary functions, contour integrals, the Cauchy integral formula, power series expansions, residue theorem and more. Prerequisite: C or better in MTH 30300 or consent from the instructor.
- Fall 2017 - Spring 2019: Co-Advisor, Mathematics Club.
- Fall 2017 - Spring 2018: New Math Faculty Mentor.

- I oversaw our two mathematics instructors to ensure they become acquainted with the processes and culture of the university.
- Fall 2016 - Spring 2022: Advisor, Pi Mu Epsilon
 - Pi Mu Epsilon was founded in 1914 at Syracuse University and is the nation's most prestigious mathematics honors society. It currently has over 370 chapters nationwide, including Lindenwood University (Missouri Zeta). The sole purpose of the society is the promotion of mathematical understanding as well as recognize student contributions to the field. Acceptance into the society is by invitation only and is based on a student's outstanding academic record in mathematics.
- Spring 2016 - Spring 2017: MTH 12100 Coordinator
 - Coordinated MTH 12100 with instructors. Ensured course objectives are met. Updated online materials in Canvas.
- Fall 2015: Course Developer, Business Calculus and Applications (MTH 17500)
 - Course Description: This course is an introductory course in calculus, with an emphasis in business applications. Topics include a review of exponential and logarithmic functions, interest, linear programming, limits, continuity, differentiation and integration. A graphing calculator is required. Prerequisites: C or better in MTH 15100 or passing the placement test.
- Fall 2015: Course Developer, Undergraduate Research (MTH 38900)
 - Course Description: This course provides undergraduates with an opportunity to perform research in pure or applied mathematics. Under the supervision of a faculty member, a student will independently study a chosen area of mathematics. Students are expected to explore significant problems in their topic, draw conclusions, and, if applicable, identify real world applications to their work. Prerequisite: Permission of the instructor.
- Spring 2015: Member, Calculus Sequence Revamp Committee
 - Helped the Department of Mathematics revamp the calculus sequence to include the transcendental functions. I was responsible for rearranging material in MTH 27100 and MTH 27200.
- Spring 2015: Editor, Math Course Descriptions
 - Helped the Department of Mathematics revamp the course descriptions and schedules for several offered courses.
- Fall 2013 - Present: Member, MTH 27100 Assessment Committee
 - Duties: Compare assessment results with the other Calculus I instructor. Based on the results, I alter the content of Calculus I to help better prepare students for Calculus II.
- Spring 2013 - Fall 2013: Course Developer, Introduction to Contemporary Mathematics (the online version, MTH 12100 OL1)
 - Course Description: This course is an introductory course on how mathematics is used today. Students will study consumer mathematics plus additional topics selected from apportionment, fair divisions, geometry, growth and decay, numbers systems for encoding information, probability and counting techniques, routes and network, scheduling, statistics, voting systems. Offered every semester. Prerequisites: C or better in MTH 05100 or MTH 11000 or passing the placement test.

- Duties: Choose a new textbook for both the traditional and online sections, developed a new syllabus, online lecture slides, online homework and course schedule. I updated homework problems and provide assistance to the adjunct(s) teaching the online and traditional sections.
- Fall 2012 - Spring 2013: Reviewer, Strategic Plan
 - Duties: I compiled and revised the strategic plan for the Division of MCPE (2013-14 school year).
- Fall 2012: Faculty Contributor, EDGE Booklet.
 - Duties: Contributed an article to the EDGE booklet for the School of Sciences ('Latest Equipment is Hallmark of Sciences Programs'). The article contained a write on the GC/MS in the Chemistry Department and another on Mathematica/Wolfram Alpha.
- Fall 2012: Course Developer, Difference Equations (MTH 390XX)
 - Course Description: A special topics course covering basic difference calculus, linear homogeneous and nonhomogeneous difference equations, the z-Transform, special nonlinear difference equations, linear systems, among other topics.
- Spring 2012 - Spring 2015: Organizer, The Mathematics Problem of the Week
 - Duties: I picked and graded problems for the weekly competition, posted solutions, and ensured the winner receives their award. The winner was awarded a \$100 gift certificate to the Spirit Shoppe. Their name is also engraved on a plaque.
 - The Department of Mathematics used the competition as a means to advertise special topics and upper level courses.
 - Previous Winners:
 1. Spring 2012: Aaron Wood
 2. Fall 2012: Aaron Wood
 3. Spring 2013: Aaron Wood
 4. Fall 2013: Alex Brown
 5. Spring 2014: Micah Losee
 6. Fall 2014: Alex Brown
- Spring 2012: Member, MTH 14100 Textbook Committee
 - Duties: Compared and selected a textbook for Basic Statistics.
- Fall 2011 - Present: Advisor
 - Duties: Advised undergraduate students in the mathematics, computer science, and pre-engineering program. I have also advised and assisted incoming freshmen in registering for classes.
 - I have written letters of recommendation for students in the School of Science.
 - I have posted information for undergraduate students on Research Experiences for Undergraduates (REU) programs, conferences, and graduate studies.
 - I have posted posters advertising student work, including undergraduate research, REU projects and capstone projects.

University Service

- Fall 2022 - Present: Member, University of Mosul Partnership Team
- Spring 2022 - Spring 2023: Member, Graduate Attribute Alignment and Assessment Committee
- Fall 2021 - Spring 2022: Member, University Curriculum Committee
 - Representative for the College of Science, Technology, and Health.
- Summer 2021: Member, Dual Credit/Early College Start Task Force
 - Reviewed the opportunities/limitations of the dual credit/early college start programs at Lindenwood.
- Spring 2021 - Present: Science Editor, The Confluence Editorial Review Board
- Fall 2018 - Spring 2019: Member, New Program Task Force
 - Assisted the administration in revising the processes of creating and advertising new academic programs.
- Summer 2018: Member, Employee Guidebook Task Force
 - Assisted the administration in reviewing and editing the 2018-19 Employee Guidebook.
- Spring 2018 - Summer 2020: Member, Course Evaluation Task Force
 - Currently working on revising the faculty evaluation process to improve reliability, response rate, administrative implementation, among others while also limiting the effects of bias.
- Fall 2017 - Spring 2019: Member, Student Research Conference Task Force
 - Description: The Student Research Conference is a forum for students to display their scholarly and creative projects to their fellow students and faculty.
 - Subcommittee: Logo Competition
- Fall 2017 - Spring 2018: Member, Writing Intensive Task Force
 - The Writing Intensive (WI) Task Force proposed the creation of a WI program for incoming students in the 2018-19 academic year. Beyond English 15000/17000, students would require three WI courses: one course in the General Education block, one course in the major, and one elective course.
 - Status: tabled.
- Spring 2017 - Summer 2018: Member, Intellectual Property Rights Task Force
 - A joint task force with the Educational Policies Committee and the Faculty Student Scholarship Committee was created to review and revise the Intellectual Property Rights statement in the Employee Guidebook. Work was concluded with the Employee Guidebook Task Force in summer 2018.
- Fall 2016 - Spring 2022, Member, Faculty Council
 - Office Positions:
 - * Fall 2016 - Spring 2017: Secretary
 - * Spring 2018 - Spring 2021: Vice Chair

- Subcommittees/Task Forces:
 - * 2017-18: Academic Program Advisory Committee, Promotions Subcommittee, Council of Committee Chairs
 - * 2018-19: Academic Program Advisory Committee, Course Evaluations Task Force, Council of Committee Chairs
 - * 2019-20: Academic Program Advisory Committee, Council of Committee Chairs
- Approved Proposals (Co)-written: Grade Replacement, Academic Renewal, Curriculum Review Infrastructure, Online Course Cap, Fields of Study, Compensation for Undergraduate Research, Post Professorial Review, Senior Instructor, Second Bachelor's Degree.
- Spring 2016: Member, WPA Task Force
 - The task force proposed replacing the WPA with a Writing Intensive (WI) series of courses required for graduation, the precise requirements of which to be determined by committee with representation from both campuses.
- Fall 2013 - Summer 2021: Member, Educational Policies Committee
 - Description: The principal responsibility of the Educational Policy Committee is to review, formulate, and propose academic polices and educational goals of the University. The committee works to create consistent policy, increase academic integrity, standardize the curriculum, and assist in developing smooth administration of University policy and curriculum.
 - Office Positions:
 - * Fall 2014 - Spring 2017: Chair
 - * Fall 2017 - Spring 2018: Vice Chair
 - * Fall 2018 - Summer 2021: Chair
 - Approved Proposals (Co)-written: Removal of 24 Credit Hour Transfer Cap, Removal of Writing Proficiency Assessment, Removal of Proficient Graduates Guarantee, Grade Replacement, Academic Renewal, Online Course Cap, Fields of Study, Compensation for Undergraduate Research, Second Bachelor's Degree, Plus/Minus Grading System, Posthumous Degrees.

Community Service

- February 2023: Judge, Science Olympiad (high school and middle school)
 - Event: Code Busters
 - Designed the exam and grading rubric used the event.
- February 2022: Judge, Science Olympiad
 - Event: Code Busters
 - Designed the exam and grading rubric used the event.
- February 2021: Judge, Science Olympiad
 - Event: Code Busters
 - Designed the exam and grading rubric used the event.

- February 2020: Judge, Science Olympiad
 - Event: Code Busters
 - Designed the exam and grading rubric used the event.
- March 2019: Judge, Science Olympiad
 - Event: Code Busters
 - Designed the exam and grading rubric used the event.
- March 2018: Judge, Science Olympiad
 - Event: Mystery Architecture
 - Designed the bridge and grading rubric used for both the middle school and high school events.
- April 2017: Judge, Missouri Academy of Sciences 53rd Annual Meeting.
 - Co-judged the high school poster session.
- February 2016: Judge, Science Olympiad
 - Event: Write It - Do It
 - Designed the still life used in the Write It - Do It contest. Created the grading rubric. Oversaw one of the rooms used during the day of the competition.
- Fall 2013 - Spring 2019: Organizer, MAA American Mathematics Competitions (AMC 10/12)
 - Description: The AMC 10/12 are 25-question, 75-minute, multiple choice exams offered to secondary school mathematics students to generate interest and excitement in mathematics. Three annually renewable Lindenwood University scholarships awarded to the top juniors/seniors: the winner gets a \$10,000 per year scholarship, the first runner-up a \$8,000 per year scholarship, the second runner-up a \$7,000 per year scholarship. A hooded sweatshirt will be given to each of the top three freshmen/sophomore students. Offered every February.
 - Duties: I create a flyer to advertise the competition and send it to local high schools in the area. I order the catering and ensure visiting students have an opportunity to see the campus. I proctor the exam and mail the bubble sheets to the MAA. I provide the Admissions Office with a list of the top three performers. If a student is eligible, I provide accommodations for them to take a second exam (the American Invitational Mathematics Examination, AIME).
- February 2013: Judge, Missouri Tri-County Regional Science and Engineering Fair (4th grade physical science).
- February 2012: Judge, Missouri Tri-County Regional Science and Engineering Fair (special awards).

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