

Yixiang Wu

✉ yixiang.wu@mtsu.edu

🏠 MTSU Box 34, Murfreesboro, Tennessee 37132

☎ (615) 898-5696

Employment

- Aug. 2019 – Present 📌 **Assistant Professor**, Department of Mathematics, Middle Tennessee State University.
- Aug. 2016 – Jul. 2019 📌 **Assistant Professor (Non-Tenure Track)**, Department of Mathematics, Vanderbilt University.
- Aug. 2015 – Jul. 2016 📌 **Fields Postdoctoral Fellow**, Department of Applied Mathematics, University of Western Ontario, Canada.

Education

- Aug. 2010 – Aug. 2015 📌 **Ph.D. in Mathematics**, University of Louisiana at Lafayette.
- Sep. 2006 – Jul. 2010 📌 **B.Sc. in Mathematics**, Central South University, China.
Exchange studies in Shandong University in the second academic year.

Research Publications

Accepted

- 1 Salako, R. B. & Wu, Y. (n.d.). *Global dynamics of epidemic network models via construction of lyapunov functions*. Proceedings of the American Mathematical Society, Accepted.

Peer Reviewed

- 1 Chen, S., Liu, J. & Wu, Y. (2024). Evolution of dispersal in advective patchy environments with varying drift rates. *SIAM Journal on Applied Dynamical Systems*, 23(1), 696–720.
- 2 Salako, R. B. & Wu, Y. (2024a). On degenerate reaction-diffusion epidemic models with mass action or standard incidence mechanism. *European Journal of Applied Mathematics*, 1–28.
- 3 Salako, R. B. & Wu, Y. (2024b). On the dynamics of an epidemic patch model with mass-action transmission mechanism and asymmetric dispersal patterns. *Studies in Applied Mathematics*.
- 4 Chen, S., Liu, J. & Wu, Y. (2023). On the impact of spatial heterogeneity and drift rate in a three-patch two-species lotka-volterra competition model over a stream. *Zeitschrift für angewandte Mathematik und Physik*, 74(3), 117.
- 5 Chen, S., Shi, J., Shuai, Z. & Wu, Y. (2023). Evolution of dispersal in advective patchy environments. *Journal of Nonlinear Science*, 33(3), 40.
- 6 Nguyen, T. D., Wu, Y., Tang, T., Veprauskas, A., Zhou, Y. & et. al. (2023). Impact of resource distributions on competition of species in stream environment. *Journal of Mathematical Biology*, 87.
- 7 Nguyen, T. D., Wu, Y., Veprauskas, A. & et. al. (2023). Maximizing metapopulation growth rate and biomass in stream networks. *SIAM Journal on Applied Mathematics*, 83(6), 2145–2168.
- 8 Chen, S., Shi, J., Shuai, Z. & Wu, Y. (2022a). Global dynamics of a Lotka-Volterra competition patch model. *Nonlinearity*, 35, 817–842.

- 9 Chen, S., Liu, J. & Wu, Y. (2022). Invasion analysis of a two-species lotka–volterra competition model in an advective patchy environment. *Studies in Applied Mathematics*, 149, 762–797.
- 10 Chen, S., Shi, J., Shuai, Z. & Wu, Y. (2022b). Two novel proofs of spectral monotonicity of perturbed essentially nonnegative matrices with applications in population dynamics. *SIAM Journal on Applied Mathematics*, 82(2), 654–676.
- 11 Deng, K. & Wu, Y. (2021). Global attractivity of delayed and nonlocal diffusive logistic models with variable coefficients. *Journal Differential Equations*, 299, 229–255.
- 12 Fitzgibbon, W. E., Morgan, J. J., Webb, G. F. & Wu, Y. (2021). A diffusive SEIR model for community transmission of COVID-19 epidemics: Application to Brazil. *Mathematics in Applied Sciences and Engineering*, 2, 219–239.
- 13 Leander, R. N., Wu, Y., Ding, W., Nelson, D. E. & Sinkala, Z. (2021). A model of the innate immune response to SARS-CoV-2 in the alveolar epithelium. *Royal Society Open Science*, 8(8), 210090.
- 14 Magal, P., Seydi, O., Webb, G. & Wu, Y. (2021). A model of vaccination for dengue in the philippines 2016–2018. *Frontiers in Applied Mathematics and Statistics*, 7, 64.
- 15 Peng, R. & Wu, Y. (2021). Global L^∞ bounds and long-time behavior of a diffusive epidemic system in a heterogeneous environment. *SIAM Journal on Mathematical Analysis*, 53(3), 2776–2810.
- 16 Chen, S., Shi, J., Shuai, Z. & Wu, Y. (2020). Asymptotic profiles of the endemic equilibrium for an SIS epidemic patch model with asymmetric connectivity matrix. *Journal of Mathematical Biology*, 80, 2327–2361.
- 17 Deng, K., Webb, G. & Wu, Y. (2020). Analysis of age and spatially dependent population model: Application to forest growth. *Nonlinear Analysis: Real World Applications*, 56, 103164.
- 18 Fitzgibbon, W. E., Morgan, J. J., Webb, G. F. & Wu, Y. (2020a). Analysis of a reaction–diffusion epidemic model with asymptomatic transmission. *Journal of Biological Systems*, 28(3), 561–587.
- 19 Fitzgibbon, W. E., Morgan, J. J., Webb, G. F. & Wu, Y. (2020b). Modelling the aqueous transport of an infectious pathogen in regional communities: Application to the cholera outbreak in Haiti. *Journal of the Royal Society Interface*, 17(169), 20200429.
- 20 Magal, P., Webb, G. F. & Wu, Y. (2020a). Spatial spread of epidemic diseases in geographical settings: Seasonal influenza epidemics in Puerto Rico. *Discrete & Continuous Dynamical Systems-Series B*, 25(6), 2185–2202.
- 21 Magal, P., Webb, G. F. & Wu, Y. (2020b). A spatial model of honey bee colony collapse due to pesticide contamination of foraging bees. *Journal of Mathematical Biology*, 80(7), 2363–2393.
- 22 Magal, P., Noussair, A., Webb, G. & Wu, Y. (2020). Modeling epidemic outbreaks in geographical regions: Seasonal influenza in Puerto Rico. *Discrete and Continuous Dynamical Systems-Series S*, 13(12), 3535–3550.
- 23 Shi, J., Wu, Y. & Zou, X. (2020). Coexistence of competing species for intermediate dispersal rates in a reaction–diffusion chemostat model. *Journal of Dynamics and Differential Equations*, 1–28.
- 24 Fitzgibbon, W. E., Morgan, J. J., Webb, G. & Wu, Y. (2019). Spatial models of vector–host epidemics with directed movement of vectors over long distances. *Mathematical Biosciences*, 312, 77–87.
- 25 Magal, P., Webb, G. F. & Wu, Y. (2019a). An environmental model of honey bee colony collapse due to pesticide contamination. *Bulletin of Mathematical Biology*, 4908–4931.

- 26 Magal, P., Webb, G. F. & Wu, Y. (2019b). On the basic reproduction number of reaction–diffusion epidemic models. *SIAM Journal on Applied Mathematics*, 79, 284–304.
- 27 Fitzgibbon, W. E., Morgan, J. J., Webb, G. & Wu, Y. (2018). A vector–host epidemic model with spatial structure and age of infection. *Nonlinear Analysis: Real World Applications*, 41, 692–705.
- 28 Magal, P., Webb, G. F. & Wu, Y. (2018). On a vector–host epidemic model with spatial structure. *Nonlinearity*, 31, 5589–5614.
- 29 Wu, Y. & Zou, X. (2018). Dynamics and profiles of a diffusive host–pathogen system with distinct dispersal rates. *Journal of Differential Equations*, 264, 4989–5024.
- 30 Deng, K. & Wu, Y. (2017). Extinction and uniform strong persistence of a size–structured population model. *Discrete and Continuous Dynamical System, Series B*, 22, 831–840.
- 31 Wu, Y., Tuncer, N. & Martcheva, M. (2017). Coexistence and competitive exclusion in an SIS model with standard incidence and diffusion. *Discrete and Continuous Dynamical System, Series B*, 22, 1167–1187.
- 32 Ackleh, A., Deng, K. & Wu, Y. (2016). Competitive exclusion and coexistence in a two–strain pathogen model with diffusion. *Mathematical Biosciences and Engineering*, 13, 1–18.
- 33 Deng, K. & Wu, Y. (2016). Dynamics of an SIS epidemic reaction–diffusion model. *Proceedings of the Royal Society of Edinburgh, Section A: Mathematics*, 146, 929–946.
- 34 Wu, Y. & Zou, X. (2016). Asymptotic profiles of steady states for a diffusive SIS epidemic model with mass action infection mechanism. *Journal of Differential Equations*, 261, 4424–4447.
- 35 Deng, K. & Wu, Y. (2015a). Asymptotic behavior for a reaction–diffusion population model with delay. *Discrete and Continuous Dynamical System, Series B*, 20, 385–395.
- 36 Deng, K. & Wu, Y. (2015b). Global stability for a nonlocal reaction–diffusion population model. *Nonlinear Analysis: Real World Applications*, 25, 127–136.
- 37 Deng, K. & Wu, Y. (2015c). On the diffusive Nicholson’s blowflies equation with distributed delay. *Applied Mathematics Letters*, 50, 126–132.
- 38 Liu, W., Tang, J. & Wu, Y. (2012). Some new 3–designs from $\text{psl}(2, q)$ with $q \equiv 1 \pmod{4}$. *Science China Mathematics*, 55, 1901–1911.

Teaching Experience

Middle Tennessee State University

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|-------------|---|
| 2023 Fall | ■ One section of Analysis II and one section of Vector Analysis. |
| 2023 Spring | ■ One section of Analysis I and one section of Calculus III. |
| 2022 Fall | ■ One section of Theory of Calculus and one section of Vector Analysis. |
| 2022 Spring | ■ One section of Differential Equations I and one section of Differential Equations II. |
| 2021 Fall | ■ One section of Differential Equations and one section of Precalculus. |
| 2021 Spring | ■ One section of Differential Equations and one section of Calculus III. |
| 2020 Fall | ■ One section of Abstract Algebra and one section of Calculus III. |
| 2020 Spring | ■ One section of Differential Equations and one section of Calculus III. |
| 2019 Fall | ■ One section of College Algebra and one section of Calculus II. |

Teaching Experience (continued)

Vanderbilt University

- 2019 Spring ■ One section of Mathematical Modeling in Biology and Medicine
- 2018 Fall ■ Two sections of Multivariable Calculus.
- 2018 Spring ■ Two sections of Methods of Ordinary Differential Equations.
- 2017 Fall ■ One section of Calculus II.
- 2017 Summer ■ One section of Calculus I.
- 2017 Spring ■ Two sections of Calculus II.
- 2016 Fall ■ Four recitation sections of Calculus I.

University of Louisiana at Lafayette

- 2015 Summer ■ One section of Calculus I.
- 2014 Spring–2015 Spring ■ Six sections of Elementary Statistics.
- 2013 Fall ■ Two sections of College Algebra (Math 105).
- 2012 Fall–2013 Summer ■ Three sections of College Algebra (Math 100).
- 2011 Fall–2012 Spring ■ Four sections of Intermediate Algebra (Math 92).
- 2010 Fall–2011 Spring ■ Teaching assistant.

Awards

- Apr. 2020 ■ FRCAC Faculty Research Award, Middle Tennessee State University, Murfreesboro, TN.
- Jul. 2017–Jul. 2019 ■ AMS–Simons travel grant, American Mathematical Society.
- Jul. 2010 ■ Best Undergraduate Thesis Award with paper published in *Sci. China Math*, Central South University, Changsha, China.
- Jan. 2009 ■ Meritorious Winner, (International) Mathematical Contest in Modeling.
- Jun. 2008 ■ First Prize, China Undergraduate Mathematical Contest in Modeling, Hunan, China.

Special Session Organized

- Mar. 11–13, 2023 ■ Special Session (with Junping Shi and Zhisheng Shuai), The 13th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Wilmington, NC.
- Mar. 11–13, 2022 ■ Special Session (with Junping Shi and Zhisheng Shuai), AMS Sectional Meeting, University of Virginia, Charlottesville, VA. (This event is cancelled in the last minute due to COVID)
- Jan. 6–9, 2021 ■ AMS Special Session (with Zhisheng Shuai), Joint Mathematics Meetings, Virtual.
- Apr. 14–16, 2018 ■ Special Session (with Glenn Webb), AMS Sectional Meeting, Vanderbilt University, Nashville, TN.

Presentations

- Feb. 14, 2024 ■ Mathematical Biology Seminar, University of Tennessee at Knoxville, Attended Virtually.

Presentations (continued)

- Jan. 26, 2024 **■** COMS seminar, Middle Tennessee State University, Murfreesboro, TN.
- Jul. 17-21, 2023 **■** Mini-symposia on Applications of Reaction-Diffusion Models in Biological Systems, Society for Mathematical Biology Annual Meeting, Ohio State University, Columbus, OH.
- May 31-Jun. 4, 2023 **■** Special Session on Reactions diffusion equations with applications to spatial ecology and infectious disease, The 13th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Wilmington, NC.
- Special Session on Emergence and Dynamics of Patterns in Nonlinear Partial Differential Equations and Related Fields, The 13th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Wilmington, NC.
- Apr. 1, 2023 **■** AMS Special Session on Modeling, Analysis, and Control of Populations Impacted by Disease and Invasion, Attended Virtually.
- Mar. 18, 2023 **■** Shanks Workshop on Advances in Mathematical and Theoretical Biology, Vanderbilt University, Nashville, TN.
- Mar. 2, 2023 **■** Mathematical Biology Seminar, Peoples' Friendship University of Russia, Attended Virtually.
- Feb. 12, 2023 **■** Graph theory seminar, Middle Tennessee State University and Vanderbilt University, Murfreesboro, TN.
- Jan. 4-8, 2023 **■** AMS special session on Complex Systems on Life Sciences, Joint Mathematics Meeting, Boston, MA.
- AMS special session on Spatial Ecology Using Reaction-Diffusion Equation Models, Joint Mathematics Meeting, Boston, MA.
- Oct. 28-30, 2022 **■** International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems, University of Louisiana at Lafayette, Lafayette, LA.
- Oct. 24, 2022 **■** Seminar, Department of Mathematics, Beijing Normal University, Attended Virtually.
- Oct. 15-16, 2022 **■** AMS Special Session on Recent Advances in Mathematical Biology, University of Tennessee at Chattanooga, Chattanooga, TN.
- Sep. 11, 2022 **■** Seminar, Department of Mathematics, Shanghai Normal University, Attended Virtually.
- Sep. 4, 2022 **■** Seminar, Department of Mathematics, Harbin Normal University, Attended Virtually.
- Jul. 13, 2022 **■** Special session on Advances in Epidemiology, SIAM Annual Meeting, Attended Virtually.
- May 19, 2022 **■** Seminar, Department of Mathematics, Anhui University of Science and Technology, Attended Virtually.
- Mar. 28, 2022 **■** Seminar, Department of Mathematics, Hailongjiang University, Attended Virtually.
- Dec. 15-17, 2021 **■** Winter Workshop on Competition Dynamics in Biology, Ohio State University, Attended Virtually.
- Oct. 19, 2021 **■** Mathematical Biology Seminar, Washington State University, Virtual Meeting.
- Oct. 1, 2021 **■** Mathematical Biology Seminar, National Center for Theoretical Sciences in Taiwan, Virtual Meeting.

Presentations (continued)

- Jul. 7, 2021 ■ The Seventh International Workshop on Biomathematics Modelling and Its Dynamical Analysis, Virtual Meeting.
- Jun. 14, 2021 ■ Minisymposium on the Complex Adaptive Dynamics of Honeybee Societies, SMB Annual Meeting, Virtual Meeting.
- Jun. 11, 2021 ■ Seminar, Department of Mathematics, Harbin Normal University, China, Virtual Meeting.
- Apr. 25, 2021 ■ Seminar, Department of Mathematics, Shaanxi Normal University, China, Virtual Meeting.
- Jan. 7, 2021 ■ AMS Special Session on Nonlinear Reaction Diffusion Models with Applications in Spatial Ecology, Joint Mathematics Meeting, Virtual Meeting.
- Oct. 29, 2020 ■ Colloquium, Virtual Franklin & Marshall College and Millersville University Joint Colloquium in Mathematics.
- Oct. 12-14, 2019 ■ Seventh International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems, Arizona State University, Tempe, AZ.
- Mar. 15-17, 2019 ■ Special Session on Differential Equations in Mathematical Biology, AMS Sectional Meeting, Auburn University, Auburn, AL.
- Feb. 18, 2019 ■ Colloquium, Department of Mathematics, University of Central Florida, Orlando, FL.
- Jan. 16-19, 2019 ■ AMS Special Session on Mathematical Investigations of Spatial Ecology and Epidemiology, Joint Mathematics Meeting, Baltimore, MD.
- Jun. 22-25, 2018 ■ The 6th International Conference on Mathematical Biology, Beijing, China.
- Jun. 13, 2018 ■ Seminar, Department of Mathematics, Jiangsu Normal University, Xuzhou, China.
- Jun. 8-10, 2018 ■ The Twelfth International Conference on Recent Advances in Applied Dynamical Systems, Chongqing Normal University, Chongqing, China.
- May 29, 2018 ■ Seminar, Department of Mathematics, Central South University, Changsha, China.
- May 16-18, 2018 ■ BCAM Workshop on Populations in Epidemics and Ecology, Bilbao, Basque Country, Spain.
- May 12, 2018 ■ Seminar, Department of Mathematics, University of Bordeaux, Bordeaux, France.
- May 2-4, 2018 ■ Frontiers of Mathematical Biology: Modeling, Computation and Analysis, University of Central Florida, Orlando, FL.
- Mar. 17-18, 2018 ■ Special Session on Differential Equations and Applications, AMS Sectional Meeting, Columbus, OH.
- Jan. 4, 2018 ■ Seminar, Department of Mathematics, Tongji University, Shanghai, China.
- Dec. 1, 2017 ■ Colloquium, Department of Mathematics, College of William and Mary, Williamsburg, VA.
- Oct. 20, 2017 ■ Partial Differential Equations Seminar, Department of Mathematics, Vanderbilt University, Nashville, TN.
- Sep. 17-18, 2017 ■ Special Session on Nonlinear Partial Differential Equations Arising from Life Science, AMS Sectional Meeting, Buffalo, NY.
- May 26-28, 2017 ■ Workshop on Recent Progress in Mathematical Biology, Sun Yat-sen University (Zhuhai Campus), Zhuhai, Guangdong, China.
- May 17, 2017 ■ Seminar, Department of Mathematics, Harbin Normal University, Harbin, Hailongjiang, China.

Presentations (continued)

- May 16, 2017 ■ Seminar, Department of Mathematics, Hailongjiang University, Harbin, Hailongjiang, China.
- May 10, 2017 ■ Seminar, Department of Mathematics, Central South University, Changsha, Hunan, China.
- Sep. 16, 2016 ■ Partial Differential Equations Seminar, Department of Mathematics, Vanderbilt University, Nashville, TN.
- Jul. 1-5, 2016 ■ The 11th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Orlando, FL.
- Jun. 10-12, 2016 ■ The Tenth International Conference on Recent Advances in Applied Dynamical Systems, Xuzhou, China.
- May 27, 2016 ■ International Conference on Reaction-Diffusion Equations and Their Applications to the Life, Social and Physical Sciences, Renmin University, Beijing, China.
- May 24, 2016 ■ Seminar, Department of Mathematics, Central South University, Changsha, China.
- May 20, 2016 ■ Seminar, Department of Mathematics, Changsha University of Science and Technology, Changsha, China.
- Feb. 3, 2016 ■ Colloquium, Department of Applied Mathematics, University of Western Ontario, London, Canada.
- Oct. 4, 2015 ■ The 5th International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems, University of Western Ontario, London, Canada.
- Sep. 29, 2015 ■ Dynamical Systems Seminar, University of Western Ontario, London, Canada.
- Mar. 28, 2015 ■ Special Session on Mathematical Modeling in Ecology and Epidemiology, AMS Sectional Meeting in University of Alabama, Huntsville, AL.
- Sep. 16, 2014 ■ Applied Mathematics Seminar, University of Louisiana, Lafayette, LA.

Miscellaneous Academic Experiences

Students Supervised

- Dec. 2022-Current ■ Zhibei Jiang, Visiting PhD student from Hunan University, Middle Tennessee State University.
- Jan. 2021- Dec. 2021 ■ Zane Reed, Undergraduate Honor Thesis, Middle Tennessee State University.
- May 2019- Jul. 2019 ■ Ruian Li, Interdisciplinary Internship Supervisor, Vanderbilt University.


Thesis Committee

- Apr. 2023 ■ Greg Owanga, Master Thesis, Middle Tennessee State University.
- Apr. 2021 ■ Anthony Krueger, Master Thesis, Middle Tennessee State University.





Institutional Services

- Aug. 2023-Current ■ Undergraduate Program Review Committee, Middle Tennessee State University.
- Aug. 2023-Current ■ Library Committee, Middle Tennessee State University.


Miscellaneous Academic Experiences (continued)

Aug. 2021- May 2023  Undergraduate Research & Creative Activities Committee, Middle Tennessee State University.




Academic Visits

Jul. 14-17, 2023  Daozhou Gao, Cleveland State University, Cleveland, OH.
Jul. 17-21, 2022  Junping Shi, College of William and Mary, Williamsburg, VA.
Aug. 4-8, 2019  Junping Shi, College of William and Mary, Williamsburg, VA.
Feb. 17-19, 2019  Zhisheng Shuai, University of Central Florida, Orlando, FL.
Jun. 10-15, 2018  Rui Peng, Jiangsu Normal University, Xuzhou, China.
May 12-19, 2018  Pierre Magal, University of Bordeaux, Bordeaux, France.
Dec. 1-3, 2017  Junping Shi, College of William and Mary, Williamsburg, VA.

Reviewer of Journals

 Nonlinear Analysis: Real World Applications, Journal of Differential Equations, Journal of the Royal Society Interface, Discrete and Continuous Dynamical Systems-B, Journal of Mathematical Analysis and Applications, Acta Mathematica Scientia, Journal of Evolution Equations, Applicable Analysis, Journal of Mathematical Biology, Mathematical Biosciences and Engineering, Differential Equations and Applications, SIAM Journal on Applied Mathematics, Communications on Pure and Applied Analysis, etc.

Other Activities

May 2022  Co-led (with Zhisheng Shuai) a summer research group of 13 graduate students, postdoc fellows and tenure-track/tenured faculty members that resulted in two manuscripts and a successful AIM SQuaREs proposal, CBMS conference, University of Central Florida.
Apr. 5, 2023  Judge for Middle Tennessee State STEM EXPO.
Jun. 2022  Supervised a summer research group of three graduate students, University of Wyoming.