

Chuntian Wang

Curriculum Vitae

Assistant Professor
Department of Mathematics
The University of Alabama
Box 870350
Tuscaloosa, Alabama 35487-0350
✉ cwang27@ua.edu
🌐 <https://cwang.people.ua.edu/>

Research Interests

Stochastic modeling, simulation, computation, and applied analysis

- Stochastic-statistical modeling of criminal behavior
- Stochastic-statistical epidemics modeling of human behavior

Data Science

- Supervision-aware dimensionality-reduction models for classification
- Dynamic topic modeling with tensor decomposition
- Concept discovery approaches in medical image

Nonlinear deterministic and stochastic partial differential equations

- The deterministic and stochastic Zakharov-Kuznetsov equation
- Numerical analysis for stochastic geophysical fluid models
- Stochastic PDE with applications in complex fluids

Appointments

- 2018.08–
Present **Assistant Professor (Tenure-track appointment),**
The University of Alabama
- 2015–2018 **Hedrick Assistant Professor (Post-doc),**
University of California, Los Angeles
Postdoc Advisor: Andrea L. Bertozzi
- Fall 2015 **Postdoctoral Fellow,**
Mathematical Sciences Research Institute
Mentor: Andrea Montanari

Education

- 2009–2015 **Ph.D., Pure Mathematics,**
Indiana University Bloomington, USA
Thesis Advisors: Roger Temam & Nathan Glatt-Holtz
- 2008–2009 **M.S., Applied Mathematics,**
Sichuan University, P. R. China
- 2004–2008 **B.S., Applied Mathematics and Actuary,**
Sichuan University, P. R. China

Publications

- [16] Sizikova, E., Vendrow, J., Cao, X., Grotheer, R., Haddock, J., Kassab, L., Kryshchenko, A., Merkh, T., Madushani, R. W. M. A., Moise, K., Ulichney, A., Vo, H. V., Wang, C., Coffee, M., Leonard, K., Needle, D.. Automatic infectious disease classification analysis with concept discovery. *Extended Abstract presented at Machine Learning for Health (ML4H) symposium 2022, November 28th, 2022, New Orleans, United States & Virtual.*
- [15] Haddock, J., Kassab, L., Li, S., Kryshchenko, A., Grotheer, R., Sizikova, E., Wang, C., Merkh, T., Madushani, R. W. M. A., Ahn, M., Needell, D., Leonard, K. (2021). Semi-supervised nonnegative matrix factorization for document classification. *55th Asilomar Conference on Signals, Systems, and Computers, 2021, pp. 1355–1360.*
- [14] Bongarti, M., Galvan, L. D., Hatcher, L., Lindstrom, M. R., Parkinson, C., Wang, C., Bertozzi, A. L. (2022). Alternative SIAR models for infectious diseases and applications in the study of non-compliance. *Mathematical Models and Methods in Applied Sciences*, **32**, no. 10, 1987–2015.
- [13] Cai, Y., Zhang, Y., Wang, C. (2022). A multiscale stochastic criminal behavior model and convergence to a Piecewise-deterministic-Markov-process limit. *Mathematical Models and Methods in Applied Sciences*, **32**, no. 4, 619–645.
- [12] Li, X., Wang, C., Li, H., Bertozzi, A. L. (2022). A martingale formulation for stochastic compartmental susceptible-infected-recovered (SIR) models to analyze finite size effects in COVID-19 case studies. *Networks and Heterogeneous Media*, **17**, no. 3, 311–331.
- [11] Peng, K., Lu, Z., Lin, V., Lindstrom, M. R., Parkinson, C., Wang, C., Bertozzi, A. L., Porter, M. A. (2021). A multilayer network model for co-evolution of epidemic and competing opinion spread. *Mathematical Models and Methods in Applied Sciences*, **31**, no. 12, 2455–2494.
- [10] Wang, C., Zhang, Y. (2021). A multiscale stochastic criminal behavior model under a hybrid scheme. *Electronic Research Archive*, **29**, no. 4, 2741–2753.
- [9] Ahn, M., Eikmeier, N., Haddock, J., Kassab, L., Kryshenko, A., Leonard, K., Needell, D., Madushani, R. W. M. A., Sizikova, E., Wang, C. (2021). On large-scale dynamic topic modeling with nonnegative CP tensor decomposition. In Demir, I., Lou, Y., Wang, X., Welker, K. (Eds.), *Advances in Data Science* (vol. 26, pp. 181–210). Springer, Cham.
- [8] Wang, C., Zhang, Y., Bertozzi, A. L., Short, M. B. (2020). A stochastic-statistical residential burglary model with independent Poisson clocks. *European Journal of Applied Mathematics*, **32**, no. 1, 32–58.
- [7] Wang, C., Zhang, Y., Bertozzi, A. L., Short, M. B. (2019). A stochastic-statistical residential burglary model with finite size effects. In Bellomo, N., Degond, P., Tadmor, E. (Eds.), *Active Particles, Volume 2: Advances in Theory, Models, and Applications* (vol. 2, pp. 245–274). Birkhäuser, Cham.
- [6] Pan, C., Li, B., Wang, C., Zhang, Y., Geldner, N., Wang, L., Bertozzi, A. L. (2018). Crime modeling with truncated Lévy flights for residential burglary models. *Mathematical Models and Methods in Applied Sciences*, **28**, no. 9, 1857–1880.

- [5] Glatt-Holtz, N., Temam, R., Wang, C. (2017). Time discrete approximation of weak solutions for stochastic equations of geophysical fluid dynamics and applications. *Chinese Annals of Mathematics, Series B*, **38**, no. 2, 425–472.
- [4] Glatt-Holtz, N., Temam, R., Wang, C. (2014). Martingale and pathwise solutions to the stochastic Zakharov-Kuznetsov equation with multiplicative noise. *Discrete Continuous Dynamical Systems, Series B*, **19**, no. 4, 1047–1085.
- [3] Wang, C. (2014). The existence of strong solutions to the 3D Zakharov-Kuznetsov equation in a bounded domain. *Discrete Continuous Dynamical Systems, Series A*, **34**, no. 11, 4897–4910.
- [2] Wang, C. (2014). Local existence of strong solutions to the 3D Zakharov-Kuznetsov equation in a bounded domain. *Applied Mathematics & Optimization*, **69**, no. 1, 1–19.
- [1] Saut, J., Wang, C., Temam, R. (2012). An initial and boundary-value problem for the Zakharov-Kuznetsov equation in a bounded domain. *Journal of Mathematics Physics*, **53**, no. 11, 29 pp.

Manuscripts in preparation

- [2] Sun, Z., Wang, C., Shao, Y. A spatial multi-scale modeling of human mental activities impacted by epidemics. *in preparation*.
- [1] Du, H., Wang, C. Partial regularity of stochastic Ericksen-Leslie system. *in preparation*.

Manuscripts ready to submit

- [1] Xiong, Y., Wang, C., Zhang, Y. On the impact of spatially heterogeneous human behavioral factors on 2d dynamics of infectious diseases. *ready to submit*.

Teaching Experiences

The University of Alabama

- Fall 2023 **Math 452/552**, Math Stats W/Applications II
- Fall 2023 **Math 457/557**, Stochastic Processes I
- Spring 2023 **Math 355**, Theory Of Probability
- Spring 2023 **Math 457/557**, Stochastic Processes I
- Fall 2022 **Math 452/552**, Math Stats W/Applications II
- Fall 2022 **Math 457/557**, Stochastic Processes I
- Spring 2022 **Math 355**, Theory Of Probability
- Spring 2022 **Math 457/557**, Stochastic Processes I
- Fall 2021 **Math 457/557**, Stochastic Processes I
- Fall 2021 **Math 554**, Math Statistics I
- Fall 2020 **Math 452**, Math Stats W/Applications II
- Fall 2020 **Math 457/557**, Stochastic Processes I
- Spring 2020 **Math 355**, Theory Of Probability

Spring 2020 **Math 355**, Theory Of Probability
 Spring 2020 **Math 457/557**, Stochastic Processes I
 Fall 2019 **Math 451/551**, Math Stats W/Applications I
 Fall 2019 **Math 554**, Math Statistics I
 Spring 2019 **Math 355**, Theory Of Probability
 Spring 2019 **Math 451/551**, Math Stats W/Applications I
 Fall 2018 **Math 451/551**, Math Stats W/Applications I
 [University of California, Los Angeles](#)
 Spring 2018 **M171**, Stochastic Processes
 Winter 2017 **M170B**, Probability Theory
 Winter 2017 **M170A**, Probability Theory
 Fall 2016 **M170A**, Probability Theory
 Spring 2016 **M32B**, Multivariable Calculus
 Winter 2015 **M170A**, Probability Theory
 Spring 2014 **M025**, Precalculus
 [Indiana University Bloomington](#)
 Fall 2013 **M741**, Selected Topics in Applied Mathematics: The 2D Stochastic Navier-Stokes Equations with a Multiplicative Noise

--- Mentoring of graduate and undergraduate students

- Fall 2022 and Spring 2023. Haoyang Lyu.
Project name: Early-die out probabilities and their connection to the Martingale formulation of SIR epidemic models.
- Summer 2022. Keyi Chen and Hayley Zhang.
Project name: Early-die out probabilities and application of compound Poisson processes to stochastic SIR models.
- June to August 2022. Haoyang Lyu, Jaya Ren, Michael Ting, Karina Santoso, Haley Zhang, Jiantong Liu, Thein Tran, and Antonia Fabian.
Program: UCLA Applied Math 2021 Online Summer Program.
Project name: Stochastic modeling with practical applications in gang prevention and reduction in Los Angeles.
- June to August 2022. Zheng Lu, Vanessa Lin, and Kaiyan Peng.
Program: UCLA Applied Math 2020 Online Summer Program.
Project name: Network epidemics modeling, and we successfully published an article together.
Output: [11] in the “Publications” section.
- July 2020 to November 2021. Yiru Cai.
Project name: multi-scale criminal behavioral modeling
Output: [13] in the “Publications” section.

- June to August 2020. Lawford Hatcher, Diego Galvan, and Marcelo Bongarti.
Program: UCLA Applied Math 2020 Online Summer Program.
Project name: Deterministic compartmental epidemic models.
Output: [14] in the “Publications” section.
- June to August 2020. Atta Ullah, Bohan Chen, Pujan Shrestha, and Wen-Hao Chiang.
Program: UCLA Applied Math 2020 Online Summer Program.
Project name: Hawkes process with applications in epidemic models.
- June to August 2015. Nathan Geldner, Bo Li, Chaohao Pan, and Yuqi Zhang.
Program: California Research Training Program in Computational and Applied Mathematics, University of California, Los Angeles.
Project name: Hawkes processes with applications in epidemic models.
Output: [6] in the “Publications” section.

Invited Research Visits

- Vanderbilt University, Nashville, March 2022.
- Vanderbilt University, Nashville, December 2022.
- Georgia Institute of Technology, Atlanta, August 2019.
- University of California, Los Angeles, August, 2019.
- ICERM, Brown University, Providence, August 2019.
- Indiana University Bloomington, Bloomington, June 2019.
- University of California, Los Angeles, Los Angeles, March 2019.
- California Institute of Technology, Los Angeles, June 2017.
- Claremont McKenna College, Claremont, April 2017.
- University of Maryland, Baltimore County, Baltimore, November 2016.
- University of Virginia, Charlottesville, March 2015.
- Virginia Polytechnic Institute and State University, Blacksburg, March 2015.
- Virginia Polytechnic Institute and State University, Blacksburg, November 2014.
- Virginia Polytechnic Institute and State University, Blacksburg, August 2013.

Invited Presentations at Conferences and Meetings

- *The 13th AIMS Conference on Dynamical Systems, Differential Equations and Applications*, University of North Carolina Wilmington, Wilmington, June 2023.
- *AMS Sectional meeting*, Georgia Institute of Technology, Atlanta, March 2023.
- *AMS Sectional meeting*, University of Texas at El Paso, El Paso, September 2022.
- *Departmental Applied Math Colloquium at the Department of Mathematics and Statistics of University of Maryland Baltimore County (UMBC)*, online, April 2022.
- *AMS sectional meeting*, online, November 2021.
- *R.F.B Seminar at Mathematics Department, Old Dominion University*, online, April 2021.
- *Mathematics Graduate Seminar at Mathematics Department of California State University of Channel Islands*, online, October 2020.

- *AMS Sectional meeting*, online, September 2020.
- *Math 285 J virtual class meeting offered by Department of Mathematics, University of California, Los Angeles*, online, May 2020.
- *AMS Sectional meeting*, University of Florida, Gainesville, November 2019.
- *Applied and Computational Mathematics Seminar*, Georgia Institute of Technology, Atlanta, August 2019.
- *Scientific Computing and Applied Math Institute Seminar*, Indiana University Bloomington, Bloomington, June 2019.
- *AMS Sectional meeting*, Auburn University, Auburn, March 2019.
- *Applied Math Colloquium*, University of California, Los Angeles, Los Angeles, March 2019.
- *Young Researchers Workshop: Kinetic models in biology and social sciences*, Arizona State University, Tempe, February 2018.
- *Southern California Applied Mathematics Symposium*, University of California, Irvine, June 2017.
- *Southern California Applied Mathematics Symposium*, University of California, Irvine, June 2017.
- *MURI Review Meeting*, , Institute for Creative Technologies University of California, University of Southern California, Los Angeles, September 2016.
- *Southern California Applied Mathematics Symposium*, Claremont Graduate University, Claremont, June 2016.
- *AMS Sectional meeting*, University of Utah, Salt Lake, City, April 2016.
- *SIAM Conference on Analysis of PDEs*, Scottsdale, December 2015.
- *AMS Sectional meeting*, University of Nevada, Reno, April 2015.
- *PDE/Applied Math Seminar*, Indiana University Bloomington, Bloomington, February 2015.
- *IPAM Long Program: Mathematics of Turbulence*, Institute for Pure and Applied Mathematics, Los Angeles, October 2014.
- *NSF-CBMS Regional Research Conference in the Mathematical Sciences*, Oklahoma State University, Stillwater, July 2014.
- *AMS Sectional meeting*, University of New Mexico, Albuquerque, April 2014.
- *PDE Workshop*, the University of Maryland, Baltimore County, Baltimore, January 2014.
- *Joint Mathematics Meetings*, Baltimore, January 2014.
- *AMS Sectional meeting*, University of California, Riverside, Riverside, November 2013.
- *AMS Sectional meeting*, University of Louisville, Louisville, October 2013.
- *AMS Sectional meeting*, University of Arizona, Tucson, October 2012.

Conferences and Meetings Attended

- "Broadening Participation: 2021 MPS Workshop for Young Investigators," hosted by The University of Florida, in collaboration with the NSF Directorate for Mathematical and Physical Sciences (MPS), online, October 2021.

- “NSF-CBMS Conference: Mathematical Molecular Biosciences and Biophysics,” The University of Alabama, Tuscaloosa, May 2019.
- “Thirty-first Annual University of Alabama System Applied Mathematics Meeting,” University of Alabama Huntsville, Huntsville, November 2018.
- “IPAM Workshop: Turbulent Dissipation, Mixing and Predictability,” Institute for Pure and Applied Mathematics, Los Angeles, January 2017.
- “Interdisciplinary Workshop on Multi-scale Modeling of Complex Systems in Development & Plant Biology,” University of California, Riverside, Riverside, December, 2016.
- ICERM Workshop “Predictive Policing,” ICERM, Brown University, Providence, August 2016.
- “Analysis & Computation in Kinetic Theory,” Stanford University, Palo Alto, November 2015.
- “Shanks Workshop on Mathematical Aspects of Fluid Dynamics,” Vanderbilt University, Nashville, February 2015.
- “Heidelberg Laureate Forum (HLF),” Heidelberg, Germany, September 2014.
- “IPAM Workshop: Mathematical Analysis of Turbulence,” Institute for Pure and Applied Mathematics, Los Angeles, October 2014.
- “MSRI Summer Graduate School: Stochastic Partial Differential Equations,” Mathematical Sciences Research Institute, Berkeley, July 2014.
- “IMA Workshop: Theory and Applications of Stochastic PDEs,” Institute for Mathematics and its Applications, Minneapolis, January 2013.
- “AIM Workshop: Stochastic in Geophysical Fluid Dynamics,” The American Institute of Mathematics, Palo Alto, February 2013.
- “The 9th AIMS Conference on Dynamical Systems, Differential Equations and Applications,” Orlando, July 2012.
- Special session “Interdisciplinary Session on Deterministic and Stochastic Partial Differential Equations” at the AMS Sectional Meeting, University of Notre Dame, South Bend, November 2010.

Awards and Honors

- Fall 2015 Postdoctoral Fellowship, Mathematical Sciences Research Institute.
- 2014 Travel Award, Heidelberg Laureate Forum Foundation. Total expense to attend HLF supported by the HLF foundation and Oak Ridge Associated Universities)
- 2014 Joseph and Frances Morgan Swain Fellowship, Indiana University Bloomington.
- 2014 College of Arts and Sciences Travel Award, Indiana University Bloomington.
- 2014 Schober Travel Award, Indiana University Bloomington.
- 2013 Schober Travel Award, Indiana University Bloomington.
- 2008 Excellent Undergraduate Dissertation Award (top 5% of seniors), Sichuan University, P. R. China.

Service

- Referee for several mathematical journals.

- Co-organizer, Special session “Stochastic Modeling in Biological, Physical and Social Sciences: Theory and Applications”, The 13th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Wilmington. (May 31, 2023–June 4, 2023).
- Committee Member, MATHCOUNTS Tuscaloosa Chapter, Tuscaloosa, AL. (August 2021–Present).
- Co-organizer, MATHCOUNTS West Alabama Regional Competition by MATHCOUNTS Tuscaloosa Chapter, Tuscaloosa, AL (August 2021–Present).
- Panelist, AWM UA Chapter Female Faculty Panel, September 2020.
- Panelist, AWM UA Chapter Female Faculty Panel, September 2019.
- Presenter, AWM UA Chapter Research Talk, March 2019.
- Co-organizer, Special session “Stochastic Modeling in Fluid Dynamics: Theory and Approximation,” The 11th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Orlando (July 1–5, 2016).
- Co-organizer, Mini-symposium “Deterministic and Stochastic Aspects of Fluid Dynamics,” ,” SIAM Conference on Analysis of PDEs, Scottsdale (December 7–10, 2015).