

# Hong Xiao

Department of Computer and Information Science  
University of Mississippi, University, MS 38677

Phone: (662) 915-6011  
Email: hxiao1@olemiss.edu

<https://scholar.google.com/citations?user=aqtHt0QAAAAJ>

---

## EDUCATION

**Yale University**, New Haven, CT

*Ph. D., Computer Science*

*May 2001*

- Thesis: Prolate Spheroidal Wave Functions, Quadrature, Interpolation, and Asymptotic Formulae
- Thesis Advisor: Vladimir Rokhlin

**Rensselaer Polytechnic Institute**, Troy, NY

*M. Sci., Computer Science*

*May 1995*

**Tsinghua University**, Beijing, China

*B. Eng., Computer Science and Technology*

*July 1992*

## EXPERIENCE

**University of Mississippi**, Oxford, MS

*Assistant Professor, Department of Computer and Information Science*

*2023 - present*

*Associate Director, Institute for Data Science (IDS)*

*2023 - present*

- **Research focus:** Structure-exploiting numerical methods and machine learning for efficient computation with controlled accuracy.
- Supervise Ph.D. dissertation research. My first doctoral advisee at the University of Mississippi defended his dissertation in July 2026 and now holds a tenure-track faculty position at Mississippi Valley State University.
- Co-lead research collaborations between IDS and campus researchers on projects involving computation, machine learning, and data science.

**Clostra, INC.**, Miami, FL (Remote)

*Head of Research and Development; Director of Engineering*

*2018 - 2023*

- Led research and development for multiple machine-learning projects: anomaly detection of time-series data, 3D reconstruction from videos and images, reinforcement learning for drone design, and height of burst estimation from multi-camera recordings.
- Wrote SBIR proposals, five of which were selected for funding by the Department of Defense and the Department of Energy.
- Assisted in marketing and commercialization of SBIR projects.
- Led early software development of Keymaker (Phase II), a DOE-funded machine learning-based project for anomaly detection of network data and consumer time-series data.

**Samba TV, San Francisco, CA**

*Director of Engineering; Research Scientist; Chair of Technical Advisory Board* 2012 - 2018

- Researched, developed, and implemented the core fingerprinting algorithms for automatic content recognition of videos with spatial and color space distortions.
- Implemented a content identification client on an Android TV platform.
- Led the embedded integration, testing and deployment of client software across 15 OEM TV platforms, which include Linux, Android, and WebOS operating systems, on System-on-Chip (SoC) chipsets such as Mstar, Mediatek, Novatek, etc. The software has been shipped to millions of TVs worldwide.
- Worked with external partners (TV manufacturers and SoC providers) at both the engineering and product levels, for API definition, UI flow negotiation, technical implementation trade-offs, testing, and validation.
- Managed a team of 10 people across the United States, European Union, and Asia, responsible for the company's worldwide client integration, testing, and deployment.

**University of California, Davis, CA**

*Assistant Professor (Department of Mathematics)* 2002 - 2011

- Member of Graduate Group of Applied Mathematics (GGAM) and Member of Graduate Group of Electrical and Computer Engineering (GGECE).
- Led a research group in band-limited methods and fast algorithms.
- Supervised dissertation research for two Ph.D. students in GGECE, including one through completion, and mentored four undergraduate researchers.
- Co-organizer of the Workshop on Integral Equation Methods, Fast Algorithms and Applications at the Institute for Mathematics and its Applications (IMA), University of Minnesota in August 2010.
- Co-organizer of the Mini-Workshop on Band-limited Functions, Prolate Spheroidal Wave Functions, and High Order Methods at the Institute for Pure and Applied Mathematics (IPAM), University of California at Los Angeles in November 2004.

**Yale University, New Haven, CT**

*Post-doctoral Associate (Department of Computer Science)* 2001 - 2002

- Developed asymptotic formulae for Prolate Spheroidal Wave Functions at high frequencies; developed algorithms for constructing efficient high-order symmetric quadratures for triangles, squares, etc., in two and three dimensions.

*Research Assistant*

1996 - 2001

- Developed a numerical evaluation procedure for Prolate Spheroidal Wave Functions and associated eigenvalues, and constructed quadratures and interpolation formulae.
- Constructed asymptotic expansions of Prolate Spheroidal Wave Functions using Hermite functions.
- Constructed optimal low-order quadrature rules and efficient moderate-order quadrature rules for integrating polynomials on the triangle.
- Developed an image-based place recognition algorithm for indoor navigation of autonomous robots.

## PUBLICATIONS AND ACCEPTED PAPERS

### Books

*Prolate spheroidal wave functions of order zero.* A Osipov, V Rokhlin, and **H Xiao**. Springer Ser. Appl. Math. Sci 187. 2013.

### Journal Articles

*Natural Language Processing Methods for the Study of Protein-Ligand Interactions.* J Michels, R Bandrupalli, A Ahangar Akbari, T Le, **H Xiao**, J Li, and E F Y Hom. Journal of Chemical Information and Modeling, 65(5):2191–2213. 2025. <https://doi.org/10.1021/acs.jcim.4c01907>

*Maximum Projection Gini Correlation (MaGiC) for Mixed Categorical and Numerical Data.* **H Xiao**, R Adhikari, Y Chen, and X Dang. Journal of Statistical Planning and Inference 239, 106294. 2025. <https://doi.org/10.1016/j.jspi.2025.106294>

*Collapse of Pre-COVID-19 Differences in Performance in Online vs. In-Person College Science Classes, and Continued Decline in Student Learning.* G Davidson, **H Xiao**, and K Davidson. Education Sciences. 2024. <https://doi.org/10.3390/educsci14111268>

*Generalized Gaussian Quadrature Rules on Arbitrary Polygons.* S E Mousavi, **H Xiao** and N Sukumar. International Journal for Numerical Methods in Engineering, 82(1):99-113, 2010. <https://doi.org/10.1002/nme.2759>

*A Numerical Algorithm for the Construction of Efficient Quadrature Rules in Two and Higher Dimensions.* **H Xiao** and Z Gimbutas. Computers & Mathematics with Applications, 59(2):663-676, 2010. <https://doi.org/10.1016/j.camwa.2009.10.027>

*Approximate Formulae For Certain Prolate Spheroidal Wave Functions Valid for Large Values of Both Order and Band-Limit.* V Rokhlin and **H Xiao**. Applied and Computational Harmonic Analysis, 22(1):105-123, 2007.

*High-Frequency Asymptotic Expansions for Certain Prolate Spheroidal Wave Functions.* **H Xiao** and V Rokhlin. Journal of Fourier Analysis and Applications, 9(6):577-598, 2003.

*Symmetric Quadrature Rules on a Triangle,* S Wandzura and **H Xiao**. Computers & Mathematics with Applications, 45(12):1829-1840, 2003.

*Prolate Spheroidal Wave Functions, Quadrature and Interpolation.* **H Xiao**, V Rokhlin and N Yarvin. Inverse Problems, 17(4):805-838, 2001.

*A Refutation of Penrose's New Gödelian Case Against Artificial Intelligence.* S Bringsjord and **H Xiao**. Journal of Experimental and Theoretical Artificial Intelligence, 12(3):307-329, 2000.

## Selected Peer-Reviewed Conference Papers

*Mind the Binding Gap: Evaluation of AlphaFold 3 Reliability for Protein-Ligand Complex Prediction.* J Michels, W Zhou, R Bandrupalli, R Nautiyal, J Li, E Hom, and **H Xiao**. 60th Hawaii International Conference on System Sciences (HICSS-60). 2027. Accepted for publication.

*Perceptual Similarity-Constrained Evolutionary Robustness Testing for Multimodal Railway Defect Detection.* A Zakaria, C Walter, P Lautala, T Oommen, and **H Xiao**. 60th Hawaii International Conference on System Sciences (HICSS-60). 2027. Accepted for publication.

*Railroad Track Defect Detection Using YOLO Models: A Comparative Study.* A Zakaria, C Walter, P Lautala, T Oommen, and **H Xiao**. Hawaii International Conference on System Sciences (HICSS). January 2026. <https://doi.org/10.24251/HICSS.2026.137>

*Unified Track Risk Index Using Remotely Sensed Dataset and Geometry Measurements.* A Zakaria, C Walter, P Lautala, T Oommen, and **H Xiao**. The 14th World Congress on Railway Research (WCRR 2025). Colorado Springs, CO, USA. November 17–21, 2025.

*Piecewise planar scene reconstruction and optimization for multi-view stereo.* H Kim, **H Xiao**, and N Max. Proc. Asian Conf. on Computer Vision (ACCV), pp. 191-204, 2012.

*Gaussian Quadrature for Optical Design with Noncircular Pupils and Fields, and Broad Wavelength Range.* B Bauman and **H Xiao**. Proc. SPIE, 7652 (76522S):1-12, 2010.

*Update and Image Quality Error Budget for the LSST Camera Optical Design.* B Bauman, G Bowden, J Ku, M Nordby, S Olivier, V Riot, A Rasmussen, L Seppala, **H Xiao**, N Nurita, D Gilmore, and S Kahn. Proc. SPIE Ground-based and Airborne Telescopes III, vol. 7733, pp. 1045–1055. 2010.

*Gaussian quadrature ray selection on the non-circular pupil.* B J Bauman and **H Xiao**. Proc. Int. Optical Design Conf., paper IThB4, 2010.

*Spectrally Compliant Waveforms for UWB Radio With an Auto-correlation Criterion,* R Sood and **H Xiao**. Proc. IEEE Vehicular Technology Conf. (VTC-Spring), 2009.

*Pulse Waveforms with a Correlation Criterion for Synthetic Aperture Imaging Systems.* R Sood and **H Xiao**. Proc. IEEE Vehicular Technology Conf. (VTC-Spring), 2009.

*DS-CDMA Chip Waveforms with Maximally Concentrated Spectra.* R Sood and **H Xiao**. Proc. IEEE Int. Conf. on Communications (ICC), pp. 855-859, 2008.

*Geometric Construction of Pulse Pairs with Small Cross-correlation for Dual Transmitter Synthetic Aperture Imaging.* R Sood and **H Xiao**. Proc. Fifth IEEE Sensor Array and Multichannel Signal Processing Workshop (SAM), pp. 216-220, 2008.

*Pulse Shapes for OFDM with Maximum Energy Concentration in the Spectral Main-lobe.* R Sood and **H Xiao**. Proc. The XXIX General Assembly of the Int. Union of Radio Science (URSI-GA), 2008.

*Classification of Objects in Synthetic Aperture Sonar Images.* B Marchand, N Saito, and **H Xiao**. Proc. IEEE Statistical Signal Processing Workshop, 2007.

*Root Nyquist Pulses with an Energy Criterion.* R Sood and **H Xiao**. Proc. IEEE Int. Conf. on Communications (ICC), 2711-2716, 2007.

*Design of Low Interference Pulse Shapes for OFDM Systems.* R Sood and **H Xiao**. Proc. 2nd Int. Conf. Broadband Networks, 2, 1181-1187, 2005.

*Visual Place Recognition for Autonomous Robots.* H D Tagare, D McDermott and **H Xiao**. Proc. IEEE Conf. on Robotics and Automation (ICRA), 1998.

## Book Chapters

*A Modular Segmentation-Agnostic Framework for Object-Based Change Detection in Multi-Temporal VHR Imagery.* A Zakaria, T DiMeola, C Walter, P Lautala, T Oommen, and **H Xiao**. Springer Singapore. Automated Spatial and Temporal Anomaly Detection, Chapter 9. N Armanfard, H Hojjati, T K K Ho (Eds.), 2026. Extended version of the ASTAD@AAAI 2026 workshop paper.

*Pulse Shapes With Reduced Interference via Optimal Band-Limited Functions.* R Sood and **H Xiao**. SciTech Publishing, Inc., Applications and Methods of Waveform Diversity, Chapter C-V-1. V Amuso, S D Blunt, E Mokole, R Schneible and M.C. Wicks (Eds.), 2010.

*Exploring Opportunistic Spectrum Availability in Wireless Communication Networks.* W Wang, X Liu and **H Xiao**. CRC Press, Cognitive Radio Networks, Chapter 3. Y. Xiao and F. Hu (Eds.), 2008.

## PREPRINTS AND MANUSCRIPTS UNDER REVIEW

*A Unified Distributional Consistency Framework for Diffusion and Flow Models.* **H Xiao**, H Tran, X Dang, and Y Chen. Manuscript under review; submitted to AAAI 2027.

*Restrict, Don't Retrain: Inference-Time VLM Guidance for Zero-Shot Aerial Segmentation.* T DiMeola, C Walter, and **H Xiao**. arXiv:2609.00628. September 2026.

## GRANTS

S Zhang (PI), A Bhuiyan, Y Zheng, L Zhang, **H Xiao (Co-PI)**, and M Barnard. *A Multi-modal and Interdisciplinary Data Science Training Program to Enhance a Diverse Workforce for Addiction Research*. National Institutes of Health (NIH)/National Institute on Drug Abuse (NIDA) REI #1R25DA061764; September 2024 – July 2029. Total awarded: \$635,811.

**H Xiao (PI)**. *Diffusion Modeling For Special Domain Synthetic Data Generation*. OpenAI / University of Mississippi Faculty AI Research Seed Grant; September 1, 2026 – December 31, 2026; \$3,000.

**H Xiao (PI, University of Mississippi)**, Y Chen (Co-PI, University of Mississippi), H Carlton (PI, University of Memphis). *Integration of Computer Vision And Diffusion-Based Generative Models for Non-invasive Thermometry in Thermal Therapies*. M<sup>2</sup>AIR Joint University of Mississippi - University of Memphis Applied Artificial Intelligence Research Award; May 2026 – March 2027; \$10,000 total award; \$5000 allocated to the University of Mississippi.

**H Xiao (PI)**. *Fast Evaluation and Fast Transforms of Band-Limited Functions*. National Science Foundation DMS-1016712; August 15, 2010 – July 30, 2013; \$274,955.

**H Xiao (PI)**. *Localized Bases and Band-Limited Methods for Image Modeling and Analysis*. National Science Foundation DMS-0513069; July 1, 2005 – June 30, 2009; \$120,000.

**H Xiao (PI)**. *Band-Limited Functions and Numerical Methods: Theory and Application*. University of California Davis Grant to Promote Extra Mural Funding; October 1, 2005 – September 30, 2006; \$20,000.

## HONORS AND AWARDS

Member, Upsilon Pi Epsilon Honor Society, University of Mississippi. 2024 - present.

Student-nominated for the ASUCD Excellence in Education Award, University of California at Davis, Davis, CA. 2010.

Fellow of the Institute for Pure and Applied Mathematics (IPAM), University of California at Los Angeles, Los Angeles, CA. 2004 and 2007.

Faculty Award to Promote Extra-Mural Funding, University of California at Davis. 2005.