Dr. Jian Tao

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Education

Washington University in St. Louis	Physics	Ph.D.	2008
Washington University in St. Louis	Physics	M.S.	2003
University of Science & Technology of China	Space Physics	B.A.	2000

Appointments

09/2022–present	Director	Digital Twin Lab, Texas A&M Institute of Data Science
09/2022–present	Affiliated Faculty	Department of Multidisciplinary Engineering, Texas A&M University
09/2021–present	Assistant Professor	Visual Computing and Computational Media Section, College of Performance, Visualization & Fine Arts, Texas A&M University
11/2021–present	Affiliated Faculty	Department of Nuclear Engineering, Texas A&M University
09/2021–present	Assistant Director	Texas A&M Institute of Data Science
09/2019–present	Affiliated Faculty	Department of Electrical & Computer Engineering, Texas A&M University
09/2021–08/2022	Assistant Professor	Department of Visualization, Texas A&M University
01/2020–01/2022	iHESP Scientist	International Laboratory for High Resolution Earth System Prediction, Texas A&M University
01/2021–08/2021	Associate Director	Scientific Machine Learning Lab, Texas A&M Institute of Data Science
11/2018–08/2021	Research Scientist	Texas A&M Institute of Data Science
11/2016–08/2021	Research Scientist	High Performance Research Computing, Texas A&M University
11/2016–08/2021	Research Scientist	Texas A&M Engineering Experiment Station
06/2011–11/2016	Research Scientist	Center for Computation & Technology, Louisiana State University
09/2008–05/2011	Postdoc	Center for Computation & Technology, Louisiana State University
08/2000–08/2008	Teaching Assistant	Physics Department, Washington University in St. Louis

Honors & Awards

- **Texas A&M College of Performance, Visualization & Fine Arts Research Excellence Award (2025)**: $2,000 awarded.
- **Texas A&M Research Leadership Fellowships (2024)**: Awarded $75,000, plus leadership training and opportunities for interdisciplinary collaboration to advance groundbreaking research.
- **First Responder UAS 3D Mapping Challenge (2023) - Team Maroon Scanner**: Awarded $20,000 total as a winner of the challenge in Stage 2.1.
- **Faculty Fellow Program for Summer 2023 at the Center for Teaching Excellence (CTE) (2023)**: A bursary of $2,500 awarded.
- **National Animal Nutrition Program's (NANP) Modeling Committee (2023)**: A honorarium of $1,000 for contributing to the 2023 American Society of Animal Science modeling workshop.
- **Office for Academic Innovation (Fall 2022)**: A gift from the Office of Academic Innovation for the efforts to leverage the digital learning environment in teaching in Fall 2022.
- **ADVANCE National Center for Faculty Diversity and Development Faculty Success Fellow (Spring 2023)**: Awards in the amount of $2500 to support participation in the Faculty Success Program offered by the National Center for Faculty Diversity and Development (NCFDD).
- **Texas A&M Institute of Data Science Career Initiation Fellow (2022)**: Research grant of $10,000 for early career support to work in areas involving Data Science.
- **GM/SAE AutoDrive Challenge (2020 - 2021)**: Second in the overall cumulative score ranking at the 2020 AutoDrive Challenge (the top team in the United States) as one of the faculty advisors of the Texas A&M 12th Unmanned Team.
- **SCC 2018 (2018)**: Finalist of the Student Cluster Competition at the Supercomputering Conference 2018 (Dallas, Texas, USA) as the primary advisor of the Texas A&M University team.
- **ASC 2018 (2018)**: Finalist of the 2018 ASC Student Cluster Challenge (Nanchang, Jiangxi, China) as the primary advisor of the Texas A&M University team.
- **SPEC CPU2017 (2008 - 2017)**: Cash award and a free SPEC CPU2017 benchmark license from the Standard Performance Evaluation Corporation (SPEC) for two benchmarks *507.cactuBSSN_r* and *607.cactuBSSN_s*
- **SCALE 2016 (2016)**: First prize (Tsinghua team) at IEEE International Scalable Computing Challenge (SCALE 2016) with *Benchmark GPU Accelerated PPMLR-MHD Simulations for Space Weather Forecast*
- **SCALE 2009 (2009)**: First prize (LSU team) at IEEE International Scalable Computing Challenge (SCALE 2009) with *Large Scale Problem Solving Using Automatic Code Generation and Distributed Visualization*

Grants & Fundings (Funding Recieved as PI or Co-PI)

- **USDOT-Center for Healthy and Efficient Mobility (CHEM) 2025, Co-PI**, Enhancing Rural Public Transportation Through Community Engagement and Technology ($80,000 awarded for 1 year, 06/2025-05/2026). (PI: Thomas W Sanchez)
- **NSF Accelerating Computing-Enabled Scientific Discovery (ACED) 2025, Co-PI**, ACED: Digital Twin for an Intelligent Electromagnetic Sensor on a Chip (iEM-SoC). ($499,715 awarded for 2 years, 06/2025-05/2027). (PI: Linda Katehi-Tseregounis).
- **Texas A&M Targeted Proposal Teams (TPT) Program 2025, Co-PI**, Leveraging AI and Digital Twins for Tourism Intelligence and Economic Sustainability (TIES) in Rural Development ($42,000 awarded for a year, 06/2025-05/2026), (PI: Jinyang Deng).
- **Texas A&M Targeted Proposal Teams (TPT) Program 2025, Co-PI**, Rapid Design and Optimization of Memristors Using Digital Twin ($42,000 awarded for a year, 05/2025-04/2026), (PI: Linda Katehi-Tseregounis).
- **USDA - Agricultural Research Service 2025, Co-PI**, INSIGHT: Integrating Global Human & Animal Health Technology's Llama LLM. ($140,000 awarded for 14 months, 01/2025-03/2026). (PI: Luis Tedeschi)
- **TAMIDS SPAICD Interdisciplinary Seed Grant, Co-PI**: AutoFLUKA: An AI-Assisted Framework for Automating Monte Carlo Simulations, ($10,000 awarded for 1 year, 01/2025-12/2025) (PI: Yang Liu)
- **Texas A&M College of Performance, Visualization & Fine Arts Research Seed Grant (2024), PI**: Virtual Weather Forecasting: Leveraging Texas A&M Weather Data and Advanced Virtual Production Techniques, ($6,000 awarded for 6 months, 12/2024 - 05/2025).
- **Panther Research and Innovation for Scholarly Excellence (PRISE) Grant Program, PI at TAMU**, Development of a Digital Twin Model for Optimizing Sorghum Cultivation. ($20,000 awarded for 1 year, 10/2024 – 09/2025).
- **Ocean Energy Safety Institute (OESI) 2023, PI**, Metahuman Models for Reducing Human Exposure to Hazardous Conditions During Offshore Wind Turbine Operations and Maintenance. ($499,356 awarded for 1 year, 03/2024 – 06/2025).
- **Texas A&M ASCEND-Targeted Proposal Teams (TPT) 2023, Co-PI**, Engineering and Delivery of Localized Therapeutics. ($250,000 awarded for 2 years, 09/2023 – 08/2025). (PI: Zhilei Chen).
- **USDA-National Institute of Food and Agriculture, Co-PI**, Harnessing Precision Livestock Farming to Support Smart Agriculture for Sustainable Beef Cattle Production. ($106,767 awarded for 3 years, 09/2023 – 09/2026). (PI: Luis Tedeschi).
- **TAMIDS Thematic Lab 2022. PI**, Digital Twin Lab. (around $300,000 w/o IDC awarded for 2 years, 10/2022 – 10/2024)

- **NIST Public Safety Innovation Accelerator Program 2022 (PSIAP-2022). PI**, A Digital-Twin Enabled Testbed for Public Safety Communication Technologies. ($1,200,000 awarded for 2 years, 06/2022 – 11/2024)
- **General Dynamics Information Technology. Co-PI**, Priority Telecommunications (PTS III) Program. ($99,557 awarded for 6 months, 04/2022 – 10/2022) (PI: Walter Magnussen).
- **TAMIDS Data Science Course Development Grant Program 2022. PI**, Introduction to Digital Twins. ($10,000 awarded for 1 year, 02/2022 – 01/2023).
- **NIST Public Safety Innovation Accelerator Program: Artificial Intelligence for IoT Information (AI3) Prize Competition 2022. Co-PI**, Smart Communities, Smart Responders: An AI for IoT Prize Competition. ($1,336,042.34 awarded for 2 years, 02/2022 – 07/2025) (PI: Michael Fox (former PI: Walter Magnussen)).
- **SAE International 2021. Co-PI**, AutoDrive Challenge Graduate Funding Request. ($243,150 awarded for 4 year, 05/2021 – 08/2025). (PI: Sivakumar Rathinam (former PI: Dezhen Song)).
- **DOD-Air Force-Office of Scientific Research 2020. Co-PI**, Expanding Applications for AI Automation and Augmentation. ($159,494 awarded for one year, 10/2020 – 09/2021). (PI: Stephen Cambone).
- **Intel FPGA University Program 2019. Awardee**. The Intel FPGA University Program provides hardware, software, and teaching materials to help introduce students to digital technology.
- **Dell Seed Unit Program 2019. Awardee**. One PowerEdge R740 server with 384GB memory and 112TB raw storage space for research and educational activities on data science at Texas A&M University.
- **NSF-MERIF Travel Award 2019. Awardee**. Financial support from NSF to attend NSF MERIF (Midscale Experimental Research Infrastructure Forum) Education Workshop, 2019.
- **Dell Seed Unit Program 2018. Awardee**. Four PowerEdge R740 servers with two NVIDIA Tesla V100 PCIe GPU cards and one Mellanox ConnectX-4 Dual-Port EDR Infiniband card each for the Texas A&M Student Cluster Competition Team.
- **NVIDIA DLI University Ambassador (2018 – present). Awardee**. Financial support from NVIDIA to host NVIDIA Deep Learning Institute Workshops at Texas A&M University.
- **NSF IIS 2017. PI**, BD Spokes-Big Data Regional I: SimHUB: Enabling Multidisciplinary Collaboration with Containerization Technologies ($17,999 awarded for one year, 12/2017–11/2018).
- **NSF IIS 2013. PI**, BIGDATA: Small: DCM: Collaborative Research: An scalable, and portable storage system for scientific data containers. ($150,000 awarded for 3 years, 07/2013–06/2016).
- **CUDA Research Center Program 2012. Co-PI**, NVIDIA Corporation: CUDA Research Center at LSU (04/2012–2016). (PI: Honggao Liu).

- **Louisiana BOR 2010. Co-PI**, High Performance Computing (HPC) R&D Demonstration Projects for Oil Spill Disaster Response 2010: Modeling and Visualization of the Effect of Severe Storms on Oil Spill Trajectories with the Cactus Framework and LONI. ($10,000 awarded for 3 months, 05/2010–08/2010). (PI: Qin J. Chen).

- **NSF ACI**, NSF Blue Waters Petascale Project Subaward 2012: Cactus Petascale Enhancements. PI: Peter Diener. ($75,000 for 1 year)

- **LONI HPC Allocation 2011-2016 renewal. Co-PI**: Numerical Modeling of Coastal Hazards and Their Impacts on the Northern Gulf Coast. PI: Qin J. Chen. (1,000,000+ SUs (Service Units) awarded for each year)

- **LSU HPC Allocation 2011-2016 renewal. Co-PI**: Numerical Modeling of Coastal Hazards and Their Impacts on the Northern Gulf Coast. PI: Qin J. Chen. (1,000,000+ SUs awarded for each year)

- **ANL Director's Discretionary Allocation 2009. PI**: Automatic Code Generation for Massive Parallel Scientific Applications. (5,000,000 SUs awarded for 3 months)

- **LONI HPC Allocation 2009–2012 renewal. Co-PI**: Towards a Highly Efficient Computational Infrastructure for Petascale Scientific Applications LONI Large Resource Allocation Proposal. PI: Gabrielle Allen. (530,000+ SUs awarded for each year)

- **NSF Teragrid LRAC 2008. Co-PI**: Astrophysical Applications of Numerical Relativity: Coalescing Binary Systems and Stellar Collapse SingleYear Large Resource Allocation Proposal, Renewal. (5,920,000 SUs awarded for 1 year)

- **IPAM Travel Award. Awardee**: Financial support form IPAM to attend the Relativistic Astrophysics Workshop (Part of the Long Program Grand Challenge Problems in Computational Astrophysics) at UCLA, 2005.

- **SDSC Travel Award. Awardee**: Financial support form the San Diego Supercomputer Center (SDSC) to attend the 11th Annual Computing Institute for Scientists and Researchers at SDSC, 2005.

Projects Involved (Funding Received as Senior Investigator)

- **NSF OAC 2023 (SI)**, CC* Data Storage: FASTER Data Infrastructure to Accelerate Computing. PI: Lisa Perez ($499,527 awarded for 2 year, 09/2023 – 08/2025).

- **NIST PSCR 2021 (SI)**: NIST Public Safety Innovation Accelerator Program: Public Safety Radio Data (PSRD): Creating a Shared Public Safety Radio Data Set for Sharing and Analysis. PI: Walter Magnussen ($904,806 awarded for 2 years, 09/2021 – 08/2024)

- **NSF OIA 2021 (SI)**: NSF Convergence Accelerator Track E: Combining global high-resolution climate simulations with ocean biogeochemistry, fisheries and decision-making models to improve sustainable fisheries. PI: Piers Chapman ($749,548 for 1 year)

- **NSF OAC 2021 (SI)**: Category II: ACES - Accelerating Computing for Emerging Sciences. PI: Honggao Liu ($5,000,000 for 5 years, 10/2021 – 09/2026)
- **Catalyst Fund Projects 2021 (SI)**, Development of Research Intelligence Tools that Contribute to the VIVO Platform: An Open-Source Software Development Project. PI: Bruce Herbert ($30,000 for 1 year, 09/2021 – 08/2022).
- **DHHS-NIH-National Institute of General Medical Science 2020 (SI)**: IMSD at Texas A&M University: Initiative for Maximizing Student Diversity in Biomedical Sciences. PI: Karen Butler-Purry ($1,328,493 for 5 years).
- **NSF MRI 2020 (SI)**: MRI: Acquisition of FASTER - Fostering Accelerated Sciences Transformation Education and Research. PI: Honggao Liu ($3,090,000 for 3 years)
- **NSF CC* Team 2019 (SI)**: CC* Team: SWEETER – SouthWest Expertise in Expanding, Training, Education and Research. PI: Dhruva Chakravorty ($1,416,000 for 3 years)
- **NSF CCF 2015 (SI)**: CyberSEES: Type 2: A Coastal Resilience Collaboratory: Cyber-enabled Discoveries for Sustainable Deltaic Coasts. PI: Qin J. Chen ($1,199,154 for 4 years)
- **NSF ACI 2014 (SI)**, Collaborative Research: Petascale Simulations of Core-Collapse Supernovae and Hypermassive Neutron Stars. PI: Peter Diener ($22,139 for 3 years).
- **NSF MRI 2013 (SI)**: Acquisition of SuperMIC - A Heterogeneous Computing Environment to Enable Transformation of Computational Research and Education in the State of Louisiana. PI: Honggao Liu ($3,924,181 for 3 years)
- **NSF Blue Waters Petascale Project Subaward 2012 (SI)**: Cactus Petascale Enhancements. PI: Peter Diener. ($75,000 for 1 year)
- **NSF CRI 2012 (SI)**: IINEW: Shelob A Heterogeneous Computing Platform to Enable Transformation of Computational Research and Education in the State of Louisiana. PI: Honggao Liu. ($539,999 for 3 years)
- **NSF PRAC 2009 (SI)**: Enabling Science at the Petascale: From Binary Systems and Stellar Core Collapse to GammaRay Bursts. PI: Erik Schnetter. ($36,000 for 3 years)
- **NSF PIF 2007 (postdoc researcher)**: XiRel, A Next Generation Infrastructure for Numerical Relativity. PI: Gabrielle Allen. ($250,000 for 3 years)

Skills & Expertise

Fortran, C++, C, Python, Julia, LaTeX, CUDA, OpenCL, MPI, OpenMP, LSF, PBS, SLURM, TensorFlow, PyTorch, High Performance Computing, Digital Twin, Computational Framework, Numerical Modeling and Analysis, Data Analytics, Natural Language Processing, Machine Learning and Deep Learning Algorithms, Remote Sensing, Computational Fluid Dynamics, and Numerical Relativity

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Teaching & Academic Services

- Faculty Development
  - Enrolled in the 25-week Course in Effective Teaching Practices offered by the Association of College and University Educators (ACUE) and endorsed by the American Council on Education (ACE) (Fall 2022, Spring 2023).
  - Enrolled in the ADVANCE National Center for Faculty Diversity and Development Faculty Success Fellow Program (Spring 2023)
- Credit Courses
  - *Special Topics in GPU Programming for Visualization: Advanced Topics & Techniques*
    VIST 689 (Spring 2025)
  - *Principles and Practices in Digital Twin Technology*
    VIST 655 (Spring 2025)
  - *Computational Data Science*
    ECEN 360 (Spring 2024, Spring 2025)
  - *Special Topics: Digital Twin Technologies*
    VIST 689 (Spring 2023, Spring 2024)
  - *Computing for Visualization II*
    VIST 271 (Fall 2022, Summer 2022, Spring 2022, Fall 2023)
  - *Data Science Fundamentals for Energy I*
    ICPE 638 (Fall 2021), ICPE 689 (Fall 2020)
  - *Data Science Fundamentals for Energy II*
    ICPE 689 (Summer 2022, Spring 2021)
  - *AggiE-Challenge Project: A Virtualized Environment For Developing Level 4 Autonomous Vehicles*
    ENGR 491-511 (Fall 2021, Fall 2020), ENGR 491-523 (Spring 2021)
  - *AggiE-Challenge Project: Power-aware High Performance Computing Technologies In Addressing Real World Engineering Applications*
    ENGR 491-523 (Spring 2020, Spring 2019, Spring 2018), ENGR 491-504 (Fall 2019), ENGR 485-515 (Fall 2018)
  - *Special Topics: High Performance Computing*
    ENGR 489-504 (Spring 2019)
  - *Special Topics: Computational Data Science*
    ECEN 489-504 (Fall 2019, Spring 2020)
  - *Research Course*
    ECEN 491-552 (Fall 2020), ECEN 691-688 (Fall 2021)
- Short Courses (2 hours 30 minutes long courses regularly offered at Texas A&M until 2021)
  - Introduction to Fortran 90
  - Introduction to CUDA Programming

  - Intermediate CUDA Programming
  - Python for MATLAB Users
  - Introduction to MATLAB Programming
  - Introduction to Julia
  - Introduction to Deep Learning with TensorFlow
  - Introduction to Quantum Computing
  - Introduction to PySpark
  - Introduction to Deep Learning with PyTorch
  - Introduction to Scientific Machine Learning

- ACCESS Courses (2 hours 30 minutes long courses regularly offered through a national program - Advanced Cyberinfrastructure Coordination Ecosystem: Services & Support (ACCESS))
  - Introduction to CUDA Programming
  - Introduction to Julia (offered until 2023)
  - Introduction to Rust

- Tutorials and Workshops (offered regularly at Texas A&M)
  - NVIDIA Deep Learning Institute (DLI) University Ambassador Program: Fundamentals of Accelerated Computing with CUDA C/C++ - teaches the fundamental tools and techniques for accelerating C/C++ applications to run on massively parallel GPUs with CUDA.
  - Bring Your Own Data (BYOD) Workshop/Consultancy - helps Texas A&M researchers carry out data analysis on high performance computing facilities at Texas A&M and beyond.
  - NVIDIA Deep Learning Institute (DLI) University Ambassador Program: Deep Learning for Computer Vision Workshop (offered until 2023) - offers hands-on training for developers, data scientists, and researchers looking to solve challenging problems with deep learning and accelerated computing.
  - TAMIDS Scientific Machine Learning Lab Workshop (offered until 2022) - helps Texas A&M researchers and students get started on Scientific Machine Learning projects.
  - Bring Your Own Code (BYOC) Workshop (offered until 2021) - provides hands-on support to help Texas A&M researchers to port their software to high performance computing facilities at Texas A&M and beyond.

- Workshops for Professional Development (sponsored events)
  - TAMIDS Generative AI Mastery: From Theory to Practice Learning Workshop. This one-day workshop aims to provide a comprehensive overview of generative AI, focusing on large language models, while also offering practical experience with key technologies and methodologies in the field (Oct 2024).

  - NASA-DEAP PhD Research Development Workshop. This week-long intensive workshop aims to provide students with valuable expertise in the methods and tools of DS/AI/ML that they can apply to their ongoing research. This workshop was made possible due to the DEAP Institute in Research and Education for Science Translation via Low-Resource Neural Machine Translation project supported by NASA and the collaboration of Prairie View A&M University (PVAMU), Texas Southern University (TSU), and Texas A&M University (TAMU)(June 2024).
  - Los Alamos National Lab (LANL) Professional Educational Course. This was a week-long event that was offered in collaboration with other scholars at Texas A&M Institute of Data Science (September 2023).
  - iDiscovery Workshop on Data Science Foundations and Computational Practice - aims to equip participants with diverse skills and knowledge to utilize in their professional practice of data science. This was a week-long event that was offered in collaboration with other scholars at Texas A&M Institute of Data Science (May 2021).

- Competitions / Hackathons
  - 2025 TAMIDS Student Data Science Competition: Cyber Wise - Organizer (Feb 2025)
  - 2024 TAMIDS Student Data Science Competition: Sea Level Rise Data Science Challenge - Organizer (Mar 2024)
  - 2023 TAMIDS Student Data Science Competition: Wildfire Data Science Challege - Organizer (Feb 2023)
  - 2022 TAMIDS Student Data Science Competition: Texas A&M and the World: Exploring the Networks and Impact of Texs A&M's Research - Organizer (Mar 2022)
  - TAMUHack - Judge (Jan 2022)
  - The Harold L. Adams Interdisciplinary Charrette for Undergraduates - Juror (Feb 2022)
  - NOAA GPU Hackathon 2021 - Member of the TAMU/GCOOS team to develop a deep neural network model to classify planktons (Aug 2021)
  - Discovery Hackathon on Materials Design with Graph Learning - Leading an effort to explores potential applications of graph learning in materiasl design. It was a week-long hackathon that was sponsored by Chevron and Texas A&M Institute of Data Science (April 2021).
  - Food for Thought: Using NLP and Machine Learning to Link Food and Nutrition Databases - Leading the Texas A&M team to participate the international competition to use machine learning and natural language processing to link food and nutrition databases on a large scale (Nov 2021)

- Webinars and Tutorials (offered regularly at Texas A&M until 2022)
  - TAMIDS Data Science Webinar Series
    * Introduction to Data Science
    * Graph Analytics with NetworkX

    - Exploratory Data Analysis with pandas and matplotlib
    - Machine learning with Scikit-learn
    - Deep Learning with Keras
- Student Cluster Competition (primary advisor of the Texas A&M Team)
  - Student Cluster Competition (2018 – 2019) sponsored by Dell, NVIDIA, Mellanox, and Intel
  - ASC Student Supercomputer Challenge (2018 – 2020) sponsored by Inspur
- AutoDrive Challenge Competition (member of the faculty leadership team)
  - GM/SAE AutoDrive Challenge (2020 – present) sponsored by GM, SAE, Intel, MatheWorks, Velodyne LiDAR, etc.
- Faculty Advisor for Student Organizations
  - The Tethered Informatics and Data Analytics Lab (TIDAL)

Professional Activities

- IEEE Member
- ACM Lifetime Member
- ACM SIGSIM Member
- NSF Panelist: 2018, 2019, 2020, 2021, 2022, 2024
- Programm Committee Member
  - 2nd IEEE World Forum on Public Safety Technology (2025)
  - 1st IEEE World Forum on Public Safety Technology (2024)
  - 9th IEEE/ACM International Conference on Big Data Computing, Applications and Technologies (BDCAT2022)
- Chair/Co-Chair
  - FUPUSE4ALL - Future Public Safety For All Workshop at the Cyber-Physical Systems and Internet-of-Things Week (FUPUSE4ALL 2023)
- Associated Editor:
  - Journal Scifiniti - Computing&AI Connect
- Journal Reviewer:
  - Journal Scifiniti - Computing&AI Connect
  - Applied Mathematical Modelling

  - Applied Sciences
  - Applied Soft Computing
  - Computer Physics Communications
  - Future Generation Computer Systems
  - IEEE Software
  - Information
  - International Journal of Simulation and Process Modelling
  - Microprocessors and Microsystems
- XSEDE Campus Champion (2019 - 2022)
- NVIDIA University Ambassador (2018 -)

Presentations

- 06/2025 *Revolutionizing public safety training: A digital twin testbed for next-gen tech*, 5X5 The Public Safety Innovation Summit 2025, Bellevue, Washington.
- 04/2025 *Panel Discussion: Digital Twinning for Intelligent Cities*, Connected America 2025, Dallas, Texas.
- 11/2024 *Dynamic Data-Driven Digital Twin Testbed for Enhanced First Responder Training and Communication*, Dynamic Data Friven Applicats System 2024, New Brunswick, New Jersey
- 09/2024 *Panel Discussion: Cybersecurity in Healthcare*, 2024 Texas A&M Global Cyber Research Institute Summit, College Station, Texas.
- 09/2024 *Exploring Auditory Perception for Autopiloting with CARLA Simulator*, CARNATION Webinar, Chicago State University.
- 08/2024 *Applications on ACES: Hierarchical Autoencoder-Based Lossy Compression for Large-Scale High-Resolution Scientific Data*, NSF Review meeting for ACES, Texas A&M University.
- 08/2024 *Bridging Virtual and Real Worlds: Research Activities @ TAMIDS Digital Twin Lab*, Los Alamos National Laboratory Sensing & Evaluation Workshop, Los Alamos National Laboratory, Los Alamos, New Mexico.
- 06/2024 *Digital Twin of Disaster City: a Testbed for Public Safety Technologies*, 5x5: The Public Safety Innovation Summit, Chicago, Illinois
- 06/2024 *Enhancing Public Safety Through Digital Twin Technologies: A Testbed for Advanced Communication and Training*, MITRE Brown Bag Webinar.
- 05/2024 *Smart Communities, Smart Responders-Artificial Intelligence for Internet of Things Competition: A Case Study in Organizing a Public Safety Innovation Challenge*, 2024 IEEE World Forum on Public Safety Technology (WFPST), Washington, D.C.

- 05/2024 *Panel Discussion: The Future of Interoperability (AI/Digital Twin/IoT)*, Interop Institute 2024, Texas A&M University.
- 03/2024 *Digital Twin as a Research & Educational Platform*, 2024 RESURGE Workshop, Texas A&M University.
- 03/2024 *Visualization of Model Systems: Research Activities @ TAMIDS Digital Twin Lab*, Workshop on Digital Twins in Advanced Semiconductor Manufacturing, Texas A&M University.
- 03/2024 *Bridging Virtual and Real Worlds: Research Activities @ TAMIDS Digital Twin Lab*, Texas A&M Global Cyber Research Institute, Texas A&M University.
- 02/2024 *Metahuman Models for Reducing Human Exposure to Hazardous Conditions During Offshore Wind Turbine Operations and Maintenance*, Ocean Energy Safety Institute's Wind Energy Project Kick-off and SME Feedback Meeting, Texas A&M University.
- 02/2024 *Digital Twin As Testbed For Public Safety Technologies*, PVFA Research & Creative Works Day, Texas A&M University.
- 11/2023 *Bridging Virtual and Real Worlds: Insights from the Digital Twin Lab at TAMIDS*, Graduate Seminar Series, Department of Environmental Engineering, Texas A&M University-Kingsville, Kingsville.
- 10/2023 *Learning with Emerging Technology*, Texas A&M Center for Teaching Excellence Hear from Peers Session, Texas A&M University.
- 09/2023 *Deciphering Deep Learning: Unveiling the Mysteries of Neural Networks* , Bryan Rotary Club Talk
- 09/2023 *Digital Twin Technology for Public Safety Communication Testbed*, IEEE MOVE Tech Talk.
- 09/2023 *Digital Twins: From Concept to Deployment: Updates from Digital Twin Lab @ Texas A&M Institute of Data Science* , Guest Lecture for VIZA 681 (Philip Galanter), Texas A&M University.
- 07/2023 *Building Digital Twins For Precision Livestock Farming: Data Analytics And Big Data Challenges*, ASAS-NANP Symposium: Mathematical Modeling in Animal Nutrition, ASAS-CSAS-WSASAS Annual Meeting, Albuquerque
- 05/2023 *Digital Twins: From Concept to Deployment Updates from Digital Twin Lab @ Texas A&M Institute of Data Science*, School of Radiation Emergency Management (International Atomic Energy Agency), Texas A&M University.
- 05/2023 *Efficient Lossy Compression of High-Resolution Scientific Data with Autoencoder*, Texas A&M High Performance Research Computing 6th Annual Texas A&M Research Computing Symposium, Texas A&M University.
- 05/2023 *Digital Twins: From Concept to Deployment Updates from Digital Twin Lab @ Texas A&M Institute of Data Science*, SUNNOVA Energy Virtual Technical Workshop.

- 05/2023 *Teaching Digital Twin Technologies in a Multidisciplinary Setting: From Classroom to Real World*, Transformational Teaching & Learning Conference 2023, Faculty Affairs, the Center for Teaching Excellence and the Office for Academic Innovation, Texas A&M University.
- 04/2023 *Hierarchical Autoencoder-based Lossy Compression for Large-scale High-resolution Scientific Data*, Oden Institute Seminar, University of Texas - Austin.
- 04/2023 *Introduction to Digital Twin Technologies*, Class Presentation - Digital Oil Field (Dr. Eduardo Gildin), Texas A&M University.
- 03/2023 *Towards an Open Source Digital Twin Development Framework*, TWRI Project Meeting, Texas A&M University.
- 03/2023 *DeSim - Optimizing Healthcare Systems with Discrete Event Simulation and Tangible Design*, Spring 2023 Health Industry Advisory Council (HIAC) Meeting, Texas A&M University.
- 03/2023 *Wildfire Data Science Challenge*, TAMIDS 2023 Student Data Science Competition, Texas A&M University.
- 02/2023 *Research Activites of TAU Group*, 2023 the School of Performance, Visualization & Fine Arts Research & Creative Works Day, Texas A&M University.
- 02/2023 *Smart Communities, Smart Responders: An AI for IoT (AI3) Prize Competition - Phase 2 Webinar*, Co-host, Online.
- 02/2023 *Projects @ TAMIDS Digital Twin Lab*, CSCE 421 Machine Learning Course, Texas A&M University.
- 01/2023 *Lossy Compression of High-Resolution Climate Modeling Data*, TCCS - High-Resolution Modeling Workshop, Texas Center for Climate Studies.
- 12/2022 *Application of Uncertainty Quantification in Digital Twins*, 2022 Uncertainty Quantification Workshop, Texas A&M Institute of Data Science.
- 11/2022 *Roadmap for a Digital-Twin Enabled Testbed for Public Safety Communication Technologies*, Invited Speaker, 2022 5th IEEE 5G Workshop on First Responder and Tactical Network, Johns Hopkins University Applied Physics Lab.
- 10/2022 *Smart Communities, Smart Responders: An AI for IoT (AI3) Prize Competition - Phase 1 Webinar*, Co-host, Online.
- 06/2022 *V-RELLIS - a 3D Virtual Environment for Self-driving Cars*, 2022 HPRC Summer Camp, Texas A&M High Performance Research Computing.
- 03/2022 *Introduction to Natural Language Processing*, 2022 Student Data Science Competition, Texas A&M Institute of Data Science.
- 02/2022 *A Virtual 3D Environment for Self-driving Cars*, Digital Twin Workshop, Texas A&M Institute of Data Science.

- 12/2021 *TAMU Research Dashboard (RDASH)*, TAMIDS 2021 Research Conference, Texas A&M Institute of Data Science.
- 12/2021 *Towards a Smart and Sustainable Campus - Energy Consumption Analysis and Anomaly Detection of a Building at Texas A&M*, 2021 Energy Conference, Texas A&M Energy Research Society, Texas A&M University.
- 10/2021 *Machine Learning, Data Analytics, Visualization, and Digital Twins*, Graduate Seminar, Department of Visualization.
- 08/2021 *DS+X: an Immersive and Interdisciplinary Approach for Data Science Education*, South Big Data Hub, Online
- 07/2021 *Application of Advanced Computing and Data-Driven Methods in Modeling and Simulation*, Visual Computing Seminar, Department of Visualization.
- 11/2019 *Deep Learning Institute (DLI) and University Ambassador Program*, NVIDIA Theater - Supercomputing Conference 2019, Denver, Colorado
- 03/2019 *SimHUB - a Cloud-based Computational Platform*, NSF-JST Big Data Kyoto Meeting, Kyoto, Japan
- 03/2018 *XSEDE ECSS Symposium: Panel of PIs Share Experience with ECSS*, XSEDE ECSS Symposium, Webinar.
- 02/2018 *High Performance Computing @ Texas A&M*, Information Science and Systems Seminar, Texas A&M University.
- 12/2017 *Collaborative Research with a Cloud-based Computational Platform*, NSF-JST Big Data Tokyo Meeting, Tokyo, Japan
- 07/2017 *Study on parallelization of components' proportion calculation for three dimensional thermal anisotropy modelof urban targets based on linux cluster*, 2017 IEEE International Geoscience and Remote Sensing Symposium (IGARSS 2017), Fort Worth, Texas.
- 07/2017 *Research on the implementation of multi-source remote sensing image management system based on b/s architecture*, 2017 IEEE International Geoscience and Remote Sensing Symposium (IGARSS 2017), Fort Worth, Texas.
- 06/2017 *Collaborative Research with SIMULOCEAN Science Gateway*, HPRC Research Computing Week 2017, College Station, Texas.
- 07/2016 *Orchestrating Containerized Scientific Applications with SIMULOCEAN*, 6th Digital Earth Summit, Beijing, China.
- 07/2016 *Automatic Code Generation for Solving Partial Differential Equations*, Institute of Applied Mathematics, Academy of Mathematics and Systems Science, Chinese Academy of Sciences, Beijing, China.

- 05/2016 *Orchestrating Containerized Scientific Applications with SIMULOCEAN*, Container Strategies for Data & Software Preservation that Promote Open Science, University of Notre Dame, Notre Dame, Indiana.
- 05/2016 *Running Coastal Models on Cloud Platforms*, Data Flow 2016, LSU, Baton Rouge, Louisiana.
- 04/2015 *Continuous-time Quantum Monte Carlo - Hybridization-expansion Algorithm for Fermions (I)*, LA-SiGMA/CCT TESC Meeting, LSU.
- 11/2014 *Simulocean - a web-based scientific application deployment and visualization framework for coastal modeling and beyond*, presentation and demonstration at CCT booth, Supercomputing 2014, New Orleans, Louisiana.
- 05/2014 *Earth & Space*, Merrydale Elementary School, Baton Rouge, Louisiana.
- 03/2014 *Computational Hierarchy for Engineering Model-Oriented Re-adjustable Applications (CHEMORA)*, LA-SiGMA/CCT TESC Meeting, LSU.
- 06/2013 *Chemora & Cyberinfrastructure Development*, LA-SiGMA/CCT GPU Meeting, LSU.
- 05/2013 *Enabling Science at the Petascale: From Binary Systems and Stellar Core Collapse to Gamma-Ray Bursts*, Blue Waters Symposium, National Center for Supercomputing Applications, Urbana, Illinois.
- 07/2012 *Chemora Project*, LSU REU/RET Meeting, LSU
- 01/2012 *CaKernel - Unleash The Power Of The Cactus Computational Framework On Heterogeneous Systems*, CCT Tech Talk Series, CCT, LSU.
- 01/2011 *Constructing Scientific Applications with CFD Toolkit*, SCALA 2011, New Orleans, Louisiana.
- 11/2010 *A Cyberinfrastructure for Large Scale Collaborative Projects*, the kickoff meeting at the North Gulf Coastal Hazard Collaboratory, New Orleans, Louisiana.
- 09/2009 *Efforts Towards an Open Numerical Relativity Code*, Institute of Applied Mathematics, Academy of Mathematics and Systems Science, Chinese Academy of Sciences at Beijing, China.
- 08/2009 *Automatic Code Generation for Large Scale Scientific Applications*, the 6th Joint Meeting of Chinese Physicists Worldwide International Conference on Physics Education and Frontier Physics at Lanzhou, China.
- 06/2009 *Automating the Development of Parallel Multidisciplinary Scientific Applications*, Argonne Leadership Computing Facility at Argonne National Lab.
- 04/2008 *Poster: Binary Neutron Star Evolution with Adaptive Mesh Refinement Methods*, 2008 American Physical Society (APS) meeting at St. Louis, Missouri.

- 11/2006 *Compare Neutron Star Inspiral and Premature Collapse*, the 16th Midwest Relativity Meeting at Washington University in St. Louis.
- 05/2005 *Binary Neutron Star Evolution with AMR*, Workshop for Relativistic Astrophysics at the Institute for Pure and Applied Mathematics (IPAM) at Los Angeles, California.
- 08/2004 *An XML Descriptor for Cactus*, summer project review, CCT at LSU.
- 03/2004 *Efforts on Building Cactus Portal*, invited talk at CCT at LSU.
- 02/2004 *A Synchrotron Toy Model for Radio Jets*, Washington University in St. Louis Graduate Student Seminar.

Publications

Digital Twin (total: 3)

- E. D. Mendes, Y. Pi, **J. Tao**, and L. O. Tedeschi. Evaluation of computer vision to analyze beef cattle feeding behavior. *Journal of Animal Science*, 101(Supplement_3):2–3, 2023.
- **J. Tao**, E. D. Mendes, Y. Pi, A. Cassity, R. R. Male, K. Kaniyamattam, N. Duffield, and L. O. Tedeschi. Building digital twins for precision livestock farming: Data analytics and big data challenges. *Journal of Animal Science*101(Supplement_3):75–76, 2023.
- N. Hatch, W. Magnussen, and **J. Tao**. Efforts towards a digital twin-based testbed for public safety. In *Proceedings of Cyber-Physical Systems and Internet of Things Week 2023*, pages 297–299. 2023.

Data Science, Machine Learning, and Remote Sensing (total: 14)

- Z. Song, P. Chapman, J. Tao, P. Chang, H. Gao, H. Liu, C. Brannstrom, and Z. Zhang. Mapping the unheard: Analyzing tradeoffs between fisheries and offshore wind farms using multicriteria decision analysis. *Annals of the American Association of Geographers*, 114(3):536–554, 2024.
- S. V. Eslahi, **J. Tao**, and J. Ji. ERNAS: An evolutionary neural architecture search for magnetic resonance image reconstructions. *arXiv preprint arXiv:2206.07280*, 2022.
- P. Maedgen, B. Wellons, S. Prasad, and **J. Tao**. Improving pulse shape discrimination in organic scintillation detectors by understanding underlying data structure. *Nuclear Technology*, 1–18, 2022.
- B. Lin, L. Zou, N. Duffield, A. Mostafavi, H. Cai, B. Zhou, **J. Tao**, M. Yang, D. Mandal, and J. Abedin. Revealing the linguistic and geographical disparities of public awareness to covid-19 outbreak through social media. *International Journal of Digital Earth*, 15(1):868–889, 2022.
- Z. He, **J. Tao**, L. M. Perez, and D. K. Chakravorty. Technology laboratories: Facilitating instruction for cyberinfrastructure infused data sciences. *The Journal of Computational Science Education*, 13:44–49, Apr. 2022.

- F. Huang, J. Lu, **J. Tao**, L. Li, X. Tan, and P. Liu. Research on optimization methods of ELM classification algorithm for hyperspectral remote sensing images. *IEEE Access*, 7:108070–108089, 2019.

- F. Huang, Y. Chen, L. Li, J. Zhou, **J. Tao**, X. Tan, and G. Fan. Implementation of the parallel mean shift-based image segmentation algorithm on a gpu cluster. *International Journal of Digital Earth*, 12(3):328–353, 2019.

- B. Tie, F. Huang, **J. Tao**, J. Lu, and D. Qiu. A parallel and optimization approach for land-surface temperature retrieval on a windows-based pc cluster. *Sustainability*, 10(3):621, 2018.

- F. Huang, B. Lan, **J. Tao**, Y. Chen, X. Tan, J. Feng, and Y. Ma. A parallel nonlocal means algorithm for remote sensing image denoising on an intel xeon phi platform. *IEEE Access*, 5:8559–8567, 2017.

- L. Li, F. Huang, Y. Chen, **J. Tao**, J. Zhou, and G. Fan. Study on parallelization of components' proportion calculation for three dimensional thermal anisotropy modelof urban targets based on linux cluster. In *Geoscience and Remote Sensing Symposium (IGARSS), 2017 IEEE International*, pages 3441–3444. IEEE, 2017.

- F. Huang, **J. Tao**, Y. Xiang, P. Liu, L. Dong, and L. Wang. Parallel compressive sampling matching pursuit algorithm for compressed sensing signal reconstruction with OpenCL. *Journal of Systems Architecture*, 72:51–60, 2017.

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- F. Huang, J. Zhou, **J. Tao**, X. Tan, S. Liang, and J. Cheng. PMODTRAN: A parallel implementation based on MODTRAN for massive remote sensing data processing. *International Journal of Digital Earth*, 9(9):819–834, 2016.

Computational Science and High Performance Computing (total: 23)

- A. Nasari, L. Zhai, Z. He, H. Le, S. Cui, D. Chakravorty, **J. Tao**, and H. Liu. Porting AI/ML models to intelligence processing units (IPUs). In *Practice and Experience in Advanced Research Computing*, pages 231–236. 2023.

- **J. Tao**. Hiera pages 231–236. 2023.rchical autoencoder-based lossy compression for large-scale high-resolution scientific data. *arXiv preprint arXiv:2307.04216*, 2023.

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- P. Chang, S. Zhang, G. Danabasoglu, S. G. Yeager, H. Fu, H. Wang, F. S. Castruccio, Y. Chen, J. Edwards, D. Fu, et al. An unprecedented set of high-resolution earth system simulations for understanding multiscale interactions in climate variability and change. *Journal of Advances in Modeling Earth Systems*, 12(12):e2020MS002298, 2020.

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- S. R. Brandt, O. Korobkin, F. Löffler, **J. Tao**, E. Schnetter, I. Hinder, D. Castleberry, and M. Thomas. The Prickly Pear Archive, Procedia Computer Science, Volume 4, Proceedings of the International Conference on Computational Science, ICCS 2011, 2011, Pages 750-758, ISSN 1877-0509.

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- E. Evans, S. Iyer, E. Schnetter, W.-M. Suen, **J. Tao**, R. Wolfmeyer, and H.-M. Zhang. Computational relativistic astrophysics with adaptive mesh refinement: Testbeds, Phys. Rev.D71, 081301, 2005.

Cloud Computing and Cyberinfrastructure (total: 5)

- N. Mizusawa, Y. Seki, **J. Tao**, and S. Yamaguchi. A study on I/O performance in highly consolidated container-based virtualized environment on overlayfs with optimized synchronization. In *2020 14th International Conference on Ubiquitous Information Management and Communication (IMCOM)*, pages 1–4. IEEE, 2020.

- N. Mizusawa, J. Kon, Y. Seki, **J. Tao**, and S. Yamaguchi. Performance improvement of file operations on overlayfs for containers. In *2018 IEEE International Conference on Smart Computing (SMARTCOMP)*, pages 297–302. IEEE, 2018.

- N. Mizusawa, J. Kon, Y. Seki, **J. Tao**, and S. Yamaguchi. Improving I/O performance in container with overlayfs. In *2018 IEEE International Conference on Big Data (Big Data)*, pages 5395–5395. IEEE, 2018.

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- R. Twilley, S. Brandt, D. Breaux, J. Cartwright, J. Chen, G. Easson, P. Fitzpatrick, K. Fridley, S. Graves, S. Harper, C. Kaiser, A. Maestre, M. Maskey, W. McAnally, J. McCorquodale, E. Meselhe, T. Miller-Way, K. Park, J. Pereira, T. Richardson, **J. Tao**, A. Ward, J. Wiggert, and D. Williamson. Simulation management systems developed by the Northern Gulf Coastal Hazards Collaboratory (NG-CHC): An overview of cyberinfrastructure to support the coastal modeling community in the Gulf of Mexico. *Remote Sensing and Modeling*, 365-394, 2014.

Robotics and Unmanned Aerial Vehicle (total: 2)

- B. Aydin, E. Selvi, **J. Tao**, and M. J. Starek. Use of fire-extinguishing balls for a conceptual system of drone-assisted wildfire fighting. *Drones*, 3(1):17, 2019.

- S. Peng, F. Huang, **J. Tao**, B. Tie, J. Lu, and X. Zhang. Fast 3d map reconstruction using dense visual simultaneous localization and mapping based on unmanned aerial vehicle. In *IGARSS 2018-2018 IEEE International Geoscience and Remote Sensing Symposium*, pages 5712–5715. IEEE, 2018.

Peer-reviewed Posters (total: 2)

- S. Shams, N. Kim, **J. Tao**, M. T. Ha, S. Jha, R. Subramanian, V. Chouljenko, K. G. Kousoulas, R. Ramanujam, S.-J. Park, et al. Developing a scalable platform for next-generation sequencing data analytics over heterogeneous clouds and hpcs: A case for transcriptomes and metagenomes. In *Supercomputing Conference 2016*, 2016.

- W. Yu, **J. Tao**, Q. J. Chen, and X. Li. Geometric-aware partitioning on large-scale data for parallel quad meshing. In *Supercomputing Conference 2015*, 2015.