

Anh Tran

Senior Member of Technical Staff

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Personal Information

JOB TITLE: Senior Member of Technical Staff
DEPARTMENT: Scientific Machine Learning Department
AFFILIATION: Sandia National Laboratories
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Education

- 2014–2018 **Ph.D. in Mechanical Engineering**, *Georgia Institute of Technology*, Atlanta, GA
Dissertation: Multiscale uncertainty quantification for physics-based data-driven materials design and optimization
- 2014–2018 **M.S. in Mechanical Engineering**, *Georgia Institute of Technology*, Atlanta, GA
- 2012–2014 **M.S. in Mathematics**, *Georgia Southern University*, Statesboro, GA
Thesis: Adaptive state feedback control of Lorenz systems
- 2010–2011 **B.S. in Mechanical Engineering**, *Georgia Institute of Technology*, Atlanta, GA

Employment History

- Sep 2020 – **Senior Member of Technical Staff**, *Sandia National Laboratories*
July 2025
- Jan 2019 – **Postdoctoral Appointee**, *Sandia National Laboratories*
Sep 2020
- Jul 2019 – **Technical Consultant**, *KSB/GIW Industries, Inc.*
Dec 2019
- Sep 2014 – **Graduate Research Assistant**, *Georgia Institute of Technology*
Dec 2018
- May 2013 – **Engineering Intern**, *KSB/GIW Industries, Inc.*
Dec 2018
- Aug 2012 – **Graduate Teaching Assistant**, *Georgia Southern University*
May 2014

Research Capabilities and Skills

Machine Learning	Deep Learning, Probabilistic ML, Generative AI, Data Visualization
Mathematics	Applied Mathematics, Optimization, Statistics
Engineering	Computational Mechanics, Mechanical Engineering, Materials Science
Uncertainty	Uncertainty Quantification, Bayesian Inference, Sensitivity Analysis

Programming Languages

Languages	Python, C++, Fortran, Bash, MATLAB, R, SQL
Frameworks	PyTorch, TensorFlow, Scikit-learn, NumPy, SciPy, JAX, ABAQUS, Star-CCM+, ParaView
Concepts	Generative AI, Bayesian Optimization, Gaussian Process, Reduced-Order Models, UQ, Scientific ML, Surrogate Models, CFD, FEM, Inverse Problems
Workflow	Linux, Git, SLURM

Awards and Honors

- 2025 Panelist for National Academies study “Frontiers of Statistics: 2035 and Beyond” IMSI Uncertainty Quantification for Materials Science Workshop ([link](#))
- 2025 Sandia Spot Award (CIS/External Review Board - poster)
- 2024 ASME News on CIE/IDETC 2024 Hackathon ([link](#))
- 2022 Sandia Thunderbird Kudos Team Award for Superb Reviews for CSRI Summer Proceedings
- 2021 ASME Journal of Mechanical Design 2021 ASME JMD Reviewer With Distinction Award ([link](#))
- 2021 ASME IDETC/CIE 2021 - Advanced Modeling and Simulation (AMS) Best Paper Award
- 2021 ASME JBME Editors’ Choice Paper Award (9 out of 189 selected) ([link](#))
- 2020 ASME Journal of Computing and Information Science in Engineering 2020 ASME JCISE Reviewer of the Year ([link](#))
- 2020 ASME IDETC/CIE 2020 - Computer and Information in Engineering (CIE) Best Paper Award
- 2019 ASME IDETC/CIE 2019 - Advanced Modeling and Simulation (AMS) Best Paper Award
- 2019 Travel Awards (MUMS Transition Workshop and SPUQ – May 2019)
- 2010 Finalist Awards (top 1%) in the Mathematical Contest in Modeling (MCM/COMAP) MCM Problem A.
- 2010 6th place in US National Collegiate Mathematics Championship Pittsburgh, PA. August 7, 2010
- 2009 2nd place at the Third Biennial Mercer University Undergraduate Research in Mathematics Conference (MUURMaC) ([link](#))

- 2009– 2010 Recipient of Gulfstream Aerospace scholarship. August 2009 – May 2010
- 2008– 2009 Champions in Departmental Mathematical Problem Solving Contest. Georgia Southern University
- 2009 Putnam Exam (19 points) ([link](#)).
- 2005 Bronze Awards in Singapore Mathematical Olympiads (Senior Section).

Publications

Please see my [Google Scholar](#) and/or [ORCID](#) and/or [Research Gate](#) for a full and updated list of publication.

Refereed Journal Articles

31. Hannah Sims, Anh Tran, and Jonathan Pegues (2025). “Active learning for semi-autonomous lab – Human-in-the-loop approach for remelting in additive manufacturing”. In: *APL Machine Learning (under second reviews)*
30. Anh Tran and Brad Boyce (2025). “Accelerating microstructurally-aware digital twins with reduced order models”. In: *Engineering with Computers (under reviews)*
29. Anh Tran, David Montes de Oca Zapiain, Warren Leon Davis, and Hojun Lim (2025). “A parametric, data-driven, non-intrusive reduced-order model framework for crystal plasticity simulations of voids”. In: *Integrating Materials and Manufacturing Innovation (accepted)* – [Highlighted with Editor Video Summaries](#)
28. Nathan Hoffman, Cashen Diniz, Dehao Liu, Theron Rodgers, Anh Tran, and Mark Fuge (2025). “GrainPaint: A multi-scale diffusion-based generative model for microstructure reconstruction of large-scale objects”. In: *Acta Materialia*, p. 120784
27. Leidong Xu, Zihan Wang, Theron Rodgers, Dehao Liu, Anh Tran, and Hongyi Xu (2025). “Exascale granular microstructure reconstruction in 3D volumes of arbitrary geometries with generative learning”. In: *Acta Materialia*, p. 120859
26. Anh Tran, Max Carlson, Philip Eisenlohr, Hemanth Kolla, and Warren Davis (2024). “Anomaly Detection in Materials Digital Twins with Multiscale ICME for Additive Manufacturing”. In: *Integrating Materials and Manufacturing Innovation*, pp. 1–14
25. David Montes de Oca Zapiain, Anh Tran, Nathan W Moore, and Theron M Rodgers (2024). “Calibration of thermal spray microstructure simulations using Bayesian optimization”. In: *Computational Materials Science* 235, p. 112845
24. Raymond Wong, Anh Tran, Bogdan Dovggy, Claudia Santos Maldonado, and Minh-Son Pham (2023). “Meta-analysis of literature data in metal additive manufacturing: What can we (and the machine) learn from reported data?” In: *arXiv preprint arXiv:2308.16621 (submitted to Materials & Design)*
23. Venkat Nemani, Luca Biggio, Xun Huan, Zhen Hu, Olga Fink, Anh Tran, Yan Wang, Xiaoge Zhang, and Chao Hu (2023). “Uncertainty quantification in machine learning for engineering design and health prognostics: A tutorial”. In: *Mechanical Systems and Signal Processing* 205, p. 110796. ISSN: 0888-3270
22. Anh Tran, Pieterjan Robbe, Theron Rodgers, and Hojun Lim (2023). “Multi-fidelity uncertainty quantification for homogenization problems in structure-property relationships from crystal plasticity finite elements”. In: *JOM*, pp. 1–14
21. Anh Tran and Hojun Lim (2023). “An asynchronous parallel high-throughput model calibration framework for crystal plasticity finite element constitutive models”. In: *Computational Mechanics*

20. Anh Tran, Pieterjan Robbe, and Hojun Lim (2023). “Multi-fidelity microstructure-induced uncertainty quantification by advanced Monte Carlo methods”. In: *Materialia* 27, p. 101705
19. Anh Tran, Tim Wildey, and Hojun Lim (2022). “Microstructure-sensitive uncertainty quantification for crystal plasticity finite element constitutive models using stochastic collocation method”. In: *Frontiers in Materials* 9, pp. 1–20
18. Anh Tran, Kathryn Maupin, and Theron Rodgers (2022). “Monotonic Gaussian process for physics-constrained machine learning with materials science applications”. In: *Journal of Computing and Information Science in Engineering*
17. Anh Tran, Timothy Wildey, Jing Sun, Dehao Liu, and Yan Wang (2022). “A stochastic reduced-order model for statistical microstructure descriptors evolution”. In: *Journal of Computing and Information Science in Engineering*, pp. 1–18
16. Anh Tran, Mike Eldred, Tim Wildey, Scott McCann, Jing Sun, and Robert J Visintainer (2022). “aphBO-2GP-3B: a budgeted asynchronous parallel multi-acquisition functions for constrained Bayesian optimization on high-performing computing architecture”. In: *Structural and Multidisciplinary Optimization* 65.4, pp. 1–45
15. Anh Tran, Michael S Eldred, Scott McCann, and Yan Wang (2021). “srMO-BO-3GP: A sequential regularized multi-objective Bayesian optimization for constrained design applications using an uncertain Pareto classifier”. In: *Journal of Mechanical Design*, pp. 1–15
14. Anh Tran and Tim Wildey (2020). “Solving stochastic inverse problems for property-structure linkages using data-consistent inversion and machine learning”. In: *JOM* 73, pp. 72–89
13. Anh Tran, Julien Tranchida, Tim Wildey, and Aidan P Thompson (2020). “Multi-fidelity machine-learning with uncertainty quantification and Bayesian optimization for materials design: Application to ternary random alloys”. In: *The Journal of Chemical Physics* 153 (7), p. 074705
12. Anh Tran, John A. Mitchell, Laura P. Swiler, and Tim Wildey (2020). “An active-learning high-throughput microstructure calibration framework for process-structure linkage in materials informatics”. In: *Acta Materialia* 194, pp. 80–92
11. Sze-Man Ngai, Wei Tang, Anh Tran, and Shuai Yuan (2020). “Orthogonal Polynomials Defined by Self-Similar Measures with Overlaps”. In: *Experimental Mathematics*, pp. 1–13
10. Anh Tran, Tim Wildey, and Scott McCann (2020). “sMF-BO-2CoGP: A sequential multi-fidelity constrained Bayesian optimization for design applications”. In: *Journal of Computing and Information Science in Engineering* 20.3, pp. 1–15
9. Stefano Travaglini, Kyle Murdock, Anh Tran, Caitlin Martin, Liang Liang, Yan Wang, and Wei Sun (2020). “Computational optimization study of transcatheter aortic valve leaflet design using porcine and bovine leaflets”. In: *Journal of Biomechanical Engineering* 142 (1) – [JBME Editors’ Choice Paper Award](#)
8. Anh Tran and Hoang Tran (2019). “Data-driven high-fidelity 2D microstructure reconstruction via non-local patch-based image inpainting”. In: *Acta Materialia* 178, pp. 207–218
7. Anh Tran, Dehao Liu, Hoang A Tran, and Yan Wang (2019). “Quantifying uncertainty in the process-structure relationship for Al-Cu solidification”. In: *Modelling and Simulation in Materials Science and Engineering* 27.6, p. 064005
6. Anh Tran, Minh Tran, and Yan Wang (2019). “Constrained mixed-integer Gaussian mixture Bayesian optimization and its applications in designing fractal and auxetic metamaterials”. In: *Structural and Multidisciplinary Optimization* 59 (6), pp. 2131–2154
5. Anh Tran, Jing Sun, John M Furlan, Krishnan V Pagalthivarthi, Robert J Visintainer, and

- Yan Wang (2019). “pBO-2GP-3B: A batch parallel known/unknown constrained Bayesian optimization with feasibility classification and its applications in computational fluid dynamics”. In: *Computer Methods in Applied Mechanics and Engineering* 347, pp. 827–852
4. Anh Tran, John M Furlan, Krishnan V Pagalthivarthi, Robert J Visintainer, Tim Wildey, and Yan Wang (2019). “WearGP: A computationally efficient machine learning framework for local erosive wear predictions via nodal Gaussian processes”. In: *Wear* 422, pp. 9–26
 3. Anh Tran, Lijuan He, and Yan Wang (2018). “An efficient first-principles saddle point searching method based on distributed kriging metamodels”. In: *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part B: Mechanical Engineering* 4.1, p. 011006
 2. Anh Tran and Yan Wang (2017). “Reliable Molecular Dynamics: Uncertainty quantification using interval analysis in molecular dynamics simulation”. In: *Computational Materials Science* 127, pp. 141–160
 1. Scott McCann, Gregory T Ostrowicki, Anh Tran, Timothy Huang, Tobias Bernhard, Rao R Tummala, and Suresh K Sitaraman (2017). “Determination of Energy Release Rate Through Sequential Crack Extension”. In: *Journal of Electronic Packaging* 139.4, p. 041003

Referred Book and Book Chapters

4. Yan Wang, Anh V Tran, and David L McDowell (2024). *Fundamentals of Uncertainty Quantification for Engineers: Methods and Models*. Elsevier
3. Jesse M. Sestito, Dehao Liu, Yanglong Lu, Ji-Hyeon Song, Anh V. Tran, Michael J. Kemper, Tequila A.L. Harris, Sung-Hoon Ahn, and Yan Wang (2018). “Multiscale Process Modeling of Shape Memory Alloy Fabrication with Directed Energy Deposition”. In: *Additive Manufacturing of Multi-Functional Structures*. Springer
2. Anh Tran and Yan Wang (2020). “Reliable Molecular Dynamics (R-MD) simulations for intrusive uncertainty quantification using generalized interval analysis”. In: *Uncertainty Quantification in Multiscale Materials Modeling*. Elsevier
1. Anh Tran, Dehao Liu, Lijuan He-Bitoun, and Yan Wang (2020). “Data-driven acceleration of first-principles saddle point and local minimum search based on Gaussian processes”. In: *Uncertainty Quantification in Multiscale Materials Modeling*. Elsevier

Referred Conference Proceedings

13. Anh Tran, Kathryn Maupin, Ankush Mishra, Zhen Hu, and Chao Hu (Aug. 2023). “Additive Gaussian process regression for metamodeling in high-dimensional problems”. In: *Proceedings of the ASME 2023 IDETC/CIE*. vol. Volume 1: 41th Computers and Information in Engineering Conference. International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. American Society of Mechanical Engineers
12. Anh Tran, Yan Wang, and Theron Rodgers (2023). “Data Assimilation for Microstructure Evolution in Kinetic Monte Carlo”. In: *TMS 2023 152nd Annual Meeting & Exhibition Supplemental Proceedings*. Springer, pp. 561–575
11. Anh Tran, Pieterjan Robbe, and Hojun Lim (2023). “Multi-faceted Uncertainty Quantification for Structure-Property Relationship with Crystal Plasticity Finite Element”. In: *TMS 2023 152nd Annual Meeting & Exhibition Supplemental Proceedings*. Springer, pp. 596–606
10. Anh Tran (Aug. 2021). “Scalable³-BO: Big Data meets HPC - A scalable asynchronous parallel high-dimensional Bayesian optimization framework on supercomputers”. In: *Proceedings of the ASME 2021 IDETC/CIE*. vol. Volume 1: 41th Computers and Information in Engineering Conference. International Design Engineering Technical Conferences and

Computers and Information in Engineering Conference. American Society of Mechanical Engineers – [ASME CIE/IDETC 2021 – AMS Best Paper Award](#)

9. Anh Tran and Hoang Tran (2021). “2D microstructure reconstruction for SEM via non-local patch-based image inpainting”. In: *TMS 2021 150th Annual Meeting & Exhibition*. Springer, pp. 1–8
8. Anh Tran and Tim Wildey (2021b). “Solving stochastic inverse problems for property-structure linkages using data-consistent inversion”. In: *TMS 2021 150th Annual Meeting & Exhibition*. Springer, pp. 1–8
7. Anh Tran and Tim Wildey (2021a). “Solving inverse problems for process-structure linkages using asynchronous parallel Bayesian optimization”. In: *TMS 2021 150th Annual Meeting & Exhibition*. Springer, pp. 1–8
6. Anh Tran, Mike Eldred, Yan Wang, and Scott McCann (Aug. 2020). “srMO-BO-3GP: A sequential regularized multi-objective constrained Bayesian optimization for design applications”. In: *Proceedings of the ASME 2020 IDETC/CIE*. vol. Volume 1: 40th Computers and Information in Engineering Conference. International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. American Society of Mechanical Engineers – [ASME CIE/IDETC 2020 – CIE Best Paper Award](#)
5. Anh Tran, Yan Wang, John Furlan, Krishnan V Pagalthivarthi, Mohamed Garman, Aaron Cutright, and Robert J Visintainer (2020). “WearGP: A UQ/ML wear prediction framework for slurry pump impellers and casings”. In: *ASME 2020 Fluids Engineering Division Summer Meeting*. American Society of Mechanical Engineers
4. Anh Tran, Tim Wildey, and Scott McCann (Aug. 2019). “sBF-BO-2CoGP: A sequential bi-fidelity constrained Bayesian optimization for design applications”. In: *Proceedings of the ASME 2019 IDETC/CIE*. vol. Volume 1: 39th Computers and Information in Engineering Conference. International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. V001T02A073. American Society of Mechanical Engineers – [ASME CIE/IDETC 2019 – AMS Best Paper Award](#)
3. Anh Tran and Yan Wang (2016). “Molecular Dynamics Simulation With Interval-Valued Interatomic Potentials”. In: *Proceedings of the ASME 2016 International Design Engineering Technical Conference & Computers and Information in Engineering Conference IDETC/CIE*. American Society of Mechanical Engineers
2. Anh V Tran and Yan Wang (2016). “Quantifying model-form uncertainty in molecular dynamics simulation”. In: *TMS 2016 145th Annual Meeting & Exhibition*. Springer, pp. 283–292
1. Anh Tran and Yan Wang (2015). “A molecular dynamics simulation mechanism with imprecise interatomic potentials”. In: *Proceedings of the 3rd World Congress on Integrated Computational Materials Engineering (ICME)*. John Wiley & Sons, pp. 131–138

Poster & Presentations

61. Anh Tran (2025). “Computational Statistics meets Materials Science: Advances in Uncertainty Quantification, Optimal Experimental Design, and Scientific Machine Learning”. April 21–25, 2025. Uncertainty quantification for Material Science and Engineering Workshop, Institute of Mathematical and Statistical Innovation, Chicago, IL – [Invited](#).
60. Anh Tran, Pieterjan Robbe, Theron Rodgers, and Hojun Lim (2025). “Multi-fidelity uncertainty quantification applications for microstructures in additive manufacturing”. March 3–7, 2025. SIAM Conference on Science and Engineering, Fort Worth, TX – [Invited](#).
59. Anh Tran (2024). “Versatile active learning with Gaussian process regression and Bayesian

- optimization”. October 2–4, 2024. 2nd SciML workshop on Scientific Machine Learning, Austin, TX
58. Anh Tran and Hojun Lim (2024). “Asynchronous parallel Bayesian optimization for constitutive model calibration in crystal plasticity finite element model”. August 25–28, 2024. International Design Engineering Technical Conferences and Computers and Information in Engineering Conference, Washington, DC
 57. Anh Tran and Theron Rodgers (2024). “Modeling microstructure descriptors evolution with stochastic differential equations”. May 19–23, 2024. SIAM MS 24, Pittsburgh, PA – **Invited**.
 56. Luka Malashkhia, Dehao Liu, Anh Tran, and Yan Wang (2024). “Physics-constrained Bayesian neural networks to predict grain evolution”. March 3–7, 2024. TMS 2024 153th Annual Meeting & Exhibition, Orlando, FL.
 55. Jonathan Pegues, Anh Tran, Hannah Sims, and John Emery (2024). “Batched additive manufacturing meets parallel Bayesian optimization – Highway for materials design”. March 3–7, 2024. TMS 2024 153th Annual Meeting & Exhibition, Orlando, FL.
 54. Anh Tran, Philip Eisenlohr, Warren Davis, Jay Carroll, Tim Wildey, Hemanth Kolla, and Max Carlson (2024). “Anomaly detection on multi-scale materials digital twin for additive manufacturing”. March 3–7, 2024. TMS 2024 153th Annual Meeting & Exhibition, Orlando, FL.
 53. Raymond Wong, Anh Tran, Claudia Santos Maldonado, and Minh Son Pham (2023). “Influence of bias and ways forward for effective data-driven approaches for metal additive manufacturing”. September 27–29, 2023. Alloys for Additive Manufacturing Symposium (AAMS) 2023, Madrid Puerta de Toledo Campus of the Carlos III University.
 52. Anh Tran, Pieterjan Robbe, David Montes de Oca Zapiain, Hojun Lim, and Tim Wildey (2023a). “The multifaceted nature of uncertainty in structure-property linkage with crystal plasticity finite element model”. July 23–27, 2023. Albuquerque, NM.
 51. Anh Tran, Kathryn Maupin, Ankush Mishra, Zhen Hu, and Chao Hu (2023). “Additive Gaussian process regression for learning in high-dimensional problems”. August 20–23, 2023. International Design Engineering Technical Conferences and Computers and Information in Engineering Conference, Boston, MA.
 50. Anh Tran and Hojun Lim (2023). “High-throughput constitutive model calibration for crystal plasticity finite element model”. April 5–7, 2023. 11th Mach Conference 2023, Towson, MD.
 49. David Montes de Oca Zapiain, Anh Tran, and Hojun Lim (2023). “Data-driven plastic anisotropy predictions using crystal plasticity and deep learning models”. March 19–23, 2023. TMS 2023 152th Annual Meeting & Exhibition, San Diego, CA.
 48. Anh Tran, Theron Rodgers, and Yan Wang (2023). “Data assimilation for microstructure evolution: Grain growth in kinetic Monte Carlo”. March 19–23, 2023. TMS 2023 152th Annual Meeting & Exhibition, San Diego, CA.
 47. Anh Tran, Pieterjan Robbe, Tim Wildey, David Montes de Oca Zapiain, and Hojun Lim (2023). “The multifaceted nature of uncertainty in structure-property linkage with crystal plasticity finite element model”. In: *AIAA SciTech 2023 Forum*.
 46. Anh Tran (2023). “Versatile Gaussian Process Regression and Bayesian Optimization for Materials Design with Multiscale ICME Models”. November 18, 2022. MIRAACLE Forum, Air Force Research Laboratory. Online.
 45. Anh Tran, Pieterjan Robbe, David Montes de Oca Zapiain, Hojun Lim, and Tim Wildey

- (2023b). “The multifaceted nature of uncertainty in structure-property linkage with crystal plasticity finite element model”. March 19–23, 2023. TMS 2023 152th Annual Meeting & Exhibition, Virtual.
44. Anh Tran (2023). “Versatile Gaussian Process Regression and Bayesian Optimization for Materials Design with Multiscale ICME Models”. November 18, 2022. MIRAACLE Forum, Air Force Research Laboratory. Online. – **Invited**.
43. Anh Tran and Yan Wang (2022). “Simulation-based design optimization under uncertainty”. October 16–19, 2022. Engineering Science Medal Symposium honoring Professor Wei Chen (Northwestern University). Society of Engineering Science Annual Technical Meeting 2022. College Station, TX – **Invited**.
42. Anh Tran, Tim Wildey, and Hojun Lim (2022b). “Uncertainty Quantification of Constitutive Models in Crystal Plasticity Finite Element Method”. October 9–12, 2022. The ACS/AIST/ASM/TMS Materials Science & Technology. Pittsburgh, PA.
41. Anh Tran (2022c). “Enabling the fourth-paradigm of materials science through versatile Gaussian process & Bayesian optimization”. October 9–12, 2022. The ACS/AIST/ASM/TMS Materials Science & Technology. Pittsburgh, PA.
40. Anh Tran, Theron Rodgers, and Yan Wang (2022). “Data assimilation for microstructure evolution: Grain growth in kinetic Monte Carlo”. October 2–7, 2022. The 10th International Conference on Multiscale Materials Modeling. Baltimore, MD.
39. Anh Tran, Tim Wildey, and Hojun Lim (2022a). “Microstructure-sensitive uncertainty quantification for crystal plasticity finite element constitutive models using stochastic collocation method”. August 18–19, 2022. USACM Thematic Conference on Uncertainty Quantification for Machine Learning Integrated Physics Modeling (UQ-MLIP). Crystal City, Arlington, VA.
38. Anh Tran, Kathryn Maupin, and Theron Rodgers (2022). “Integrated computational materials engineering with monotonic Gaussian process”. August 14–17, 2022. ASME CIE/IDETC 2022 Conference, St. Louis, MS.
37. Anh Tran (2022b). “Beyond forward ICME models: A perspective on materials design as inverse problems”. May 18–19, 2022. Data-driven Modeling and Optimization along the Processing-Structure-Properties Chain for Materials and Process Design Hybrid Workshop, Fraunhofer Institute for Mechanics of Materials (IWM), Freiburg, Germany – **Invited**.
36. Anh Tran (2022a). “Advanced Gaussian process regression and optimization for computational materials science applications”. April 12–15, 2022. SIAM Conference on Uncertainty Quantification, Atlanta, GA.
35. Kathryn Maupin and Anh Tran (2022). “Multi-output surrogate construction for fusion simulations”. April 12–15, 2022. SIAM Conference on Uncertainty Quantification, Atlanta, GA.
34. Anh Tran and Tim Wildey (2022). “Solving inverse problems in process–structure–property linkage with with Gaussian process regression”. April 3–6, 2022. TMS World Congress on Artificial Intelligence in Materials and Manufacturing (AIM 2022) – **Invited**.
33. Anh Tran (2022e). *Versatile Gaussian process and Bayesian optimization for multiscale computational materials science applications*. March 24, 2022. Mathematics in Computation – **Invited**.
32. Anh Tran (2022e). *Versatile Gaussian process and Bayesian optimization for multiscale computational materials science applications*. March 24, 2022. Mathematics in Computation.

31. Anh Tran and Julien Tranchida (2021). *Multi-fidelity and parallel machine-learning approaches for combining first-principles calculations and classical molecular dynamics predictions*. November 15–19, 2021. Psi-k Young & Early Career Researchers' Workshop – **Invited**.
30. Anh Tran (2021). “Gaussian process and Bayesian optimization – Bridging the gap between theory and practice in materials science”. September 18–19, 2021. SIAM Southeastern Atlantic Section, Auburn University, Auburn, AL – **Invited**.
29. Anh Tran and Tim Wildey (2021c). “Solving Stochastic Inverse Problems for Property-Structure Relationship in Computational Materials Science”. July 25–29, 2021. 16th U.S. National Congress on Computational Mechanics, Virtual – **Invited**.
28. Claudia-Tatiana Santos Maldonado, Bogdan Dovygy, Son Pham, and Anh Tran (2021). “Assessing the processing map of Inconel 718 in powder bed fusion: A meta-analysis study”. September 12–16, 2021. EUROMAT 2021 – European Congress and Exhibition on Advanced Materials and Processes.
27. Anh Tran (2022d). “Gaussian process - UQ and optimization for multiscale computational materials design”. May 12, 2022. GE Research Seminar, Virtual – **Invited**.
26. Anh Tran, Julien Tranchida, Aidan Thompson, and Tim Wildey (2021). “Multi-fidelity machine learning with uncertainty quantification and Bayesian optimization for materials design: Application to ternary random alloys”. March 15–18, 2021. TMS 2021 150th Annual Meeting & Exhibition, Virtual.
25. Anh Tran and Hoang Tran (2021). *2D microstructure reconstruction for SEM via non-local patch-based image inpainting*. March 15–18, 2021. TMS 2021 150th Annual Meeting & Exhibition, Virtual. Springer.
24. Anh Tran and Tim Wildey (2021b). *Solving stochastic inverse problems for property-structure linkages using data-consistent inversion*. March 15–18, 2021. TMS 2021 150th Annual Meeting & Exhibition, Virtual. Springer.
23. Anh Tran and Tim Wildey (2021a). *Solving inverse problems for process-structure linkages using asynchronous parallel Bayesian optimization*. March 15–18, 2021. TMS 2021 150th Annual Meeting & Exhibition, Virtual. Springer.
22. Anh Tran, Mike Eldred, Yan Wang, and Scott McCann (2020). “srMO-BO-3GP: A sequential regularized multi-objective constrained Bayesian optimization for design applications”. August 17–19, 2020. International Design Engineering Technical Conferences and Computers and Information in Engineering Conference, Virtual Conference, St. Louis, MO – **ASME CIE/IDETC 2020 – CIE Best Paper Award**.
21. Anh Tran, Tim Wildey, Theron Rodgers, Surya Kalidindi, and Yuksel Yabansu (2020). “On supervised and unsupervised deep learning applications for materials informatics”. August 3–6, 2020. Sandia Machine Learning and Deep Learning Workshop 2020, Sandia National Laboratories, Albuquerque, NM.
20. Julien Tranchida, Aidan Thompson, Anh Tran, and Tim Wildey (2020). “Multi-fidelity machine learning with uncertainty quantification and Bayesian optimization for materials design: Application to ternary random alloys”. August 3–6, 2020. Sandia Machine Learning and Deep Learning Workshop 2020, Sandia National Laboratories, Albuquerque, NM.
19. Anh Tran, Yan Wang, John Furlan, Krishnan Pagalthivarthi, Mohamed Garman, Aaron Cutright, and Robert Visintainer (2020). “WearGP: A UQ/ML wear prediction framework for slurry impellers and casings”. July 13–15, 2020. Virtual Conference. Fluids Engineering Division Summer Meeting, Orlando, FL.

18. Anh Tran (2020). “Linking process-structure-property via physics-based and data-driven approaches: Beyond forward computational materials science”. February 17, 2020. Department of Mechanical & Industrial Engineering, Louisiana State University, Baton Rouge, LA.
17. Timothy Michael Wildey, Lukas Bruder, Tan Bui-Thanh, Troy Butler, John Davis Jakeman, Brad Marvin, Anh Tran, and Scott Walsh (2019). *Moving Beyond Forward Simulation to Enable Data-informed Physics-based Predictions*. Tech. rep. Sandia National Lab.(SNL-NM), Albuquerque, NM (United States).
16. Anh Tran and Tim Wildey (2019). “Materials informatics: data-driven, materials design, and uncertainty quantification perspectives”. December 18, 2019. Sandia 13th Annual Postdoc Technical Showcase, Albuquerque, NM.
15. Anh Tran, Tim Wildey, and Scott McCann (2019). “sBF-BO-2CoGP: A sequential bi-fidelity constrained Bayesian optimization for design applications”. August 18–21, 2019. International Design Engineering Technical Conferences and Computers and Information in Engineering Conference, Anaheim, CA – [ASME CIE/IDETC 2019 – AMS Best Paper Award](#).
14. Tim Wildey and Anh Tran (2019). “Using high performance computing to enable data-informed multiscale modeling with applications to additive materials”. June 18–21, 2019. Engineering Mechanics Institute Conference, California Institute of Technology, Pasadena, CA.
13. Anh Tran, Yan Wang, and Tim Wildey (2019). “A step towards a versatile Bayesian optimization: Constrained, asynchronous batch-parallel, multi-fidelity, and mixed-integer extensions”. May 14–17, 2019. NSF SAMSI - MUMS Transition Workshop and SPUQ – [Travel Award by NSF](#).
12. Anh Tran (2019). “Towards a versatile Bayesian optimization”. Mar 13, 2019. NSF SAMSI - UQ for Materials Working Group .
11. Anh Tran and Yan Wang (2017a). “Design optimization of fractal metamaterials with distributed Gaussian process”. Oct 8–12, 2017. The ACS/AIST/ASM/TMS Materials Science & Technology, Pittsburgh, PA – [Invited](#).
10. Anh Tran and Yan Wang (2017b). “Stochastic dynamics for cross-scale uncertainty propagation in molecular systems”. Feb 27 – March 3, 2017. SIAM Conference on Computational Science and Engineering, Atlanta, GA.
9. Anh Tran and Yan Wang (2016b). “Sensitivity assessment of interatomic potentials on-the-fly in molecular dynamics”. May 22–25, 2016. The Engineering Mechanics Institute Conference 2016 (EMI 2016) and the Probabilistic Mechanics & Reliability Conference 2016 (PMC 2016), Vanderbilt University, Nashville, TN .
8. R.E. Kreeger, M. Vargas, Anh Tran, Yan Wang, J. Palacios, and K.R. Hadley (2016). “Multiscale materials design for inflight icing mitigation.” Feb 21–24, 2016. The 39th Annual Meeting of the Adhesion Society, San Antonio, TX.
7. Anh Tran and Yan Wang (2016a). “Quantifying model-form uncertainty in molecular dynamics simulation”. February 14–18, 2016. The 145th TMS Annual Meeting & Exhibition (TMS) 2016, Nashville, Tennessee.
6. Anh Tran and Yan Wang (2015). “A molecular dynamics simulation mechanism with imprecise interatomic potentials”. May 31 – June 4, 2015. The 3rd TMS World Congress on Integrated Computational Materials Engineering (ICME 2015), Colorado Springs, CO.
5. Anh Tran and Yuan Shuai (2014). “Bernoulli convolutions associated with golden ratio:

- 3-term recurrences and computational results”. March 29–30 2014. SIAM Southeastern Atlantic Section, Florida Institute of Technology, Melbourne, FL.
4. Anh Tran (2014). “3-terms recurrence coefficients of a special orthogonal family”. March 14–15, 2014. AMS Southeastern Sectional Meeting, Tennessee Tech University, Cookeville, TN.
 3. Anh Tran (2013). “Adaptive control of Lorenz system to non-trivial equilibrium points”. March 15–16, 2013. AMS Southeastern Sectional Meeting, Winthrop University, Rockhill, SC.
 2. Anh Tran and Frederic Mynard (2010). “Hindman’s finite sum theorem”. March 26–27, 2010. AMS Southeastern Sectional Meeting, Elon University, Elon, NC.
 1. Anh Tran and Frederic Mynard (2009). “Structure of spaces of ultrafilters and combinatorial applications”. March 13–14, 2009. AMS Southeastern Sectional Meeting, Belmont University, Nashville, TN.

Software

5. Bart van Bloemen Waanders, Karen Willcox, and Ruthotto Lars (2020). *RISE of the Machines: Robust, interpretable, scalable, efficient methods for digital twins*. Funded by DOE/SC AI and Decision Support for Complex Systems program
4. Keith Dalbey, Michael S Eldred, Gianluca Geraci, John Davis Jakeman, Kathryn Anne Maupin, Jason A Monschke, Daniel Thomas Seidl, Laura Painton Swiler, Anh Tran, Friedrich Menhorn, et al. (2020). *DAKOTA A Multilevel Parallel Object-Oriented Framework for Design Optimization Parameter Estimation Uncertainty Quantification and Sensitivity Analysis: Version 6.12 Theory Manual*. Tech. rep. Sandia National Lab.(SNL-NM), Albuquerque, NM (United States)
3. Tim Wildey and Bart van Bloemen Waanders (2019). *MILO: Multiscale/Multiphysics Interfaces for Large-scale Optimization*. <https://github.com/bartvbw/MILO>
2. Anh Tran (2018). *Asynchronous batch-parallel versatile Bayesian optimization for constrained, multi-objective, and multi-fidelity problems in MATLAB*
1. Anh Tran and Yan Wang (2017). *RMD: Reliable molecular dynamics*. <https://github.com/GeorgiaTechM>

Teaching Experience

Fall 2018 **Graduate Teaching Assistant**, *Georgia Institute of Technology*
Course: Experimental Methods (ME 3057)

- Guided students in conducting experiments and data acquisition.
- Set up experimental apparatus.
- Evaluated student performance through regular lab reports.

Spring 2018 **Graduate Teaching Assistant**, *Georgia Institute of Technology*
Course: Creative Decisions and Design (ME 2110)

- Assisted the studio instructor and helped evaluate student performance.
- Supported final competition staging.
- Maintained the design studio, machine shop, and mechatronics inventory.

Fall 2017 **Instructor**, *Georgia Institute of Technology*
Course: Statics (COE 2001)

- Designed and taught an undergraduate engineering course on statics.
- Topics included equilibrium, moments, friction, and trusses in 2D/3D.
- Assessed students via homework, quizzes, and exams.

Fall 2016 **Graduate Teaching Assistant**, *Georgia Institute of Technology*
Course: Computer-Aided Design (Graduate) (ME 6104)

- Graded homework and assisted with course-related questions.
- Delivered guest lectures.

Fall 2012 – **Graduate Assistant**, *Georgia Southern University*
Spring 2014 **Courses:** Pre-Calculus, Calculus I, II, III (MATH 1113, 1441, 2242, 2243)

- Supported students in the Math Lab for multiple calculus levels.
- Conducted weekly recitations, designed quizzes, and supervised exams.

Research Experience

Mar 2022 – **Senior Member of Technical Staff**, *Scientific Machine Learning Dept., Sandia National Laboratories*, Albuquerque, NM
July 2025

- Implement generative machine learning for engineering applications.
- Implement reduced-order models for multi-scale computational materials science applications.

Sep 2020 – **Senior Member of Technical Staff**, *Optimization & Uncertainty Quantification Dept., Sandia National Laboratories*, Albuquerque, NM
Mar 2022

- Implement UQ/Optimization methods for Sandia's DAKOTA framework.
- Publish scientific papers.
- Support PIs on various research projects.

Jan 2019 – **Postdoctoral Appointee**, *Optimization & Uncertainty Quantification Dept. (01463), Sandia National Laboratories*, Albuquerque, NM
Sep 2020

- Mentored by Dr. Tim Wildey.
- Developed mathematical framework for materials informatics.
- Applied framework to ICME applications.

Aug 2014 – **Graduate Research Assistant**, *Georgia Institute of Technology*, Atlanta, GA
May 2018

- Conducted research in materials informatics.
- Developed simulation code and performed large-scale computations.

Aug 2012 – **Graduate Assistant**, *Georgia Southern University*, Statesboro, GA
May 2014

- Developed a stability theory for the Lorenz system.
- Simulated controlled trajectories of the Lorenz system.

May – Dec 2011 **Undergraduate Research Assistant**, *Georgia Institute of Technology*, Atlanta, GA

- Developed demo movements for humanoid robots.
- Researched panoramic image stitching techniques.

Industry Experience

- Jul 2019 – **Technical Consultant**, *GIW Industries*, Grovetown, GA
- Dec 2019
- Developed and implemented a large-scale machine learning framework (WearGP) for wear prediction using computational and experimental data.
 - Supported design and sales engineers in product development.
 - Created a computational geometry framework for impeller design.
- May 2013 – **Hydraulic Research Intern**, *GIW Industries*, Grovetown, GA
- Dec 2018
- Developed and prototyped ML algorithms for wear prediction using CFD results.
 - Performed uncertainty quantification for diverse pump operating conditions.
 - Conducted large-scale design optimization using Bayesian optimization and in-house Fortran codes.
 - Performed CFD and heat transfer analysis with Star-CCM+ and in-house codes.
 - Developed automated in-house tools for large-scale CFD simulations.
 - Characterized wear behavior of various alloy and slurry combinations.
- Jan 2012 – **General Assistant**, *Georgia Institute of Technology*, Atlanta, GA
- May 2012
- Converted LaTeX books to ePub format for iOS/iBooks compatibility.
 - Embedded interactive content such as figures, videos, and 3D CAD models into ePubs.

Professional Service

Committee Membership

- 2025 S. Scott Collis Fellowship in Data Science — Member of Selection Committee
- 2024 S. Scott Collis Fellowship in Data Science — Member of Selection Committee

Conference and Event Organization

- 2024 Vice-Chair, ASME CIE/IDETC Hackathon
- 2024 Symposium Co-Organizer, TMS 2024 Conference
- 2023 Chair, ASME CIE/AMS Technical Committee
- 2023 Chair, ASME CIE/IDETC Hackathon
- 2023 Symposium Co-Organizer, USNCCM 17 (17th U.S. National Congress on Computational Mechanics)
- 2023 Symposium Co-Organizer, ASME 2023 CIE/IDETC Conference
- 2022 Symposium Co-Organizer, ASME 2022 CIE/IDETC Conference
- 2022 Vice-Chair, ASME CIE/AMS Technical Committee
- 2022 Symposium Co-Organizer, SIAM Conference on Uncertainty Quantification
- 2021 Symposium Co-Organizer, ASME 2021 CIE/IDETC Conference
- 2021 Vice-Chair, ASME CIE/AMS Technical Committee
- 2021 Symposium Co-Organizer, Mechanistic Machine Learning and Digital Twins for Computational Science, Engineering & Technology
- 2021 Symposium Co-Organizer, USNCCM 16 (16th U.S. National Congress on Computational Mechanics)
- 2020 Secretary, ASME CIE/AMS Technical Committee
- 2019 Member-at-Large, ASME CIE/AMS Technical Committee
- 2020 Mentor, ASME-IMECE Hackathon (Virtual)

- 2020 Mentor, ASME-CIE Hackathon (Virtual)
- 2020 Symposium Co-Organizer, ASME 2020 CIE/IDETC Conference
- 2019 Symposium Co-Organizer, ASME 2019 CIE/IDETC Conference

Reviewer Roles

- Grants Sandia National Laboratories / LDRD Office
Air Force Office of Scientific Research (AFOSR)
Swiss National Science Foundation (SNSF)
DOE/SC/ASCR – Advanced Scientific Computing Research
Undergraduate Research Opportunities Program (PURA), Georgia Tech (2014–2018)
- Journals Mechanics of Materials, npj Materials Degradation, Additive Manufacturing, International Journal of Mechanical Sciences, Applied Mathematical Modelling, Digital Chemical Engineering, Scripta Materialia, Metallurgical and Materials Transactions A, APL Machine Learning, Computational Mechanics, Materials & Design, Materials Today Communications, Materials, Applied Physics Letters, Scientific Reports, Mathematics, Computer Physics Communications, Results in Materials, Science and Technology of Advanced Materials: Methods, Advanced Engineering Informatics, Petroleum Science and Technology, AIAA Journal, Patterns, npj Computational Materials, Acta Materialia, Wear of Materials, Computational Materials Science, Mechanical Systems and Signal Processing, Journal of Manufacturing Systems, Structural and Multidisciplinary Optimization, Engineering Reports, International Journal of Uncertainty Quantification, Computer Methods in Applied Mechanics and Engineering, Journal of Computing and Information Science in Engineering, Journal of Mechanical Design, Journal of Risk and Uncertainty in Engineering Systems Part B: Mechanical Engineering
- Conferences ASME CIE/IDETC Conference (2016–Present)
- Editorial Guest Associate Editor, Frontiers in Materials – Uncertainty Quantification in Characterization, Modelling, and Design of Materials

Student Mentorship

6. Nicole Aragon (Sandia National Labs): UQ for dislocation dynamics and crystal plasticity FEM; Gaussian processes for Big Data.
5. Stefano Travaglini (Georgia Tech, Spring 2018): Stefano Travaglini, Kyle Murdock, Anh Tran, Caitlin Martin, Liang Liang, Yan Wang, and Wei Sun (2020). “Computational optimization study of transcatheter aortic valve leaflet design using porcine and bovine leaflets”. In: *Journal of Biomechanical Engineering* 142 (1) – [JBME Editors’ Choice Paper Award](#).
4. Yoo Dong (Justin) Yeon (Georgia Tech, Fall 2018): Dong Yeon Yoo (2018). *Simulation based design of lithium Ion battery configuration using Bayesian optimization*.
3. Minh Tran (Georgia Tech, Spring 2016): Anh Tran, Minh Tran, and Yan Wang (2019). “Constrained mixed-integer Gaussian mixture Bayesian optimization and its applications in designing fractal and auxetic metamaterials”. In: *Structural and Multidisciplinary Optimization* 59 (6), pp. 2131–2154.
2. Trent Callcott (Georgia Tech, Summer 2016): Geometric modeling for fractal metamaterials

in ABAQUS FEM using Python.

1. Amy Li (Georgia Tech, Fall 2018): Modeling calcium/fat deposits on heart valves using ABAQUS Python API.

Professional Associations

The Minerals, Metals & Materials Society (TMS)

The American Society of Mechanical Engineers (ASME)

Society for Industrial and Applied Mathematics (SIAM)

U.S. Association for Computational Mechanics (USACM)

Citizenship and Residency

Nationality Vietnamese

U.S. Status Legal Permanent Resident (since April 2022)