ANDREY A. POPOV

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Assistant Professor, **U.S. Citizen**
Department of Information and Computer Sciences, the University of Hawai'i at Mānoa

PROFESSIONAL PREPARATION AND EDUCATION

Sep 2022–Aug 2024 Postdoctoral Fellow **The Oden Institute for Computational Science & Engineering, The University of Texas at Austin**
Advisor: Renato Zanetti

Aug 2022 Ph.D. **Virginia Tech, Department of Computer Science and Applications**
Thesis: "Combining Data-driven and Theory-guided Models in Ensemble Data Assimilation"
Advisor: Adrian Sandu

May 2015 B.S. **Rensselaer Polytechnic Institute (RPI), Mathematics**
Cum Laude

RESEARCH INTERESTS

Data Assimilation/State Estimation/Data Fusion, Uncertainty Quantification
Multi-target tracking, Space Domain Awareness, Navigation
Reduced Order Modeling, Mistrust of AI, Theory-guided AI

SUBMITTED FUNDING AND PLANNED FUNDING

Submitted:
NAVY STTR Grant on Computer Vision data reconstruction. Projected share **$37.5k**
NSF CDS&E on Bayesian system identification with labeled random finite sets. Projected share **$230k**
DoD HBCU/MI Research and Education Program—Equipment/Instrumentation **$1 mil total**

Planned Submissions:
NSF CPS Construction Worker Mental Health collaboration with Perdue University (Planned for 2026 cycle)
NSF FFR on Mobile Target Tracking by Multi-modal Sensing of Bio-inspired Robotics
NSF Career (Planned for 2026 cycle)
AFoSR YIP (Planned for 2026 cycle)

ADVISORSHIP AND MENTORSHIP

Current PhD. students:
Aug 2024–present Zain Jabbar (Dept. of Mathematics, Ph.D. Candidate)
Aug 2025–present Tianlu Lu (Dept. of Information and Computer Sciences)
Deferred due to Iran ban Sormeh Serpoosh (Dept. of Information and Computer Sciences)
Deferred due to Iran ban Matin Azad (Dept. of Information and Computer Sciences)
Current Masters students:
Jan 2025–present Alexander Apo (Dept. of Information and Computer Sciences)

Mentees as a Postdoc: *Jan 2024–Aug 2024* Andrea Rigato, *Jan 2024–Aug 2024* Rachel Mamich, *Sep 2022–Aug 2024* Kristen Michaelson, *Sep 2022–Aug 2024* Dalton Durant, *Sep 2022–Aug 2024* Felipe Giraldo-Grueso
Mentees as a senior Ph.D. student: *Aug 2019–Aug 2022* Amit N. Subrahmanya, *Aug 2020–Aug 2022* Abhinab Bhattacharjee

LEADERSHIP AND SERVICE

SIAM UQ 2026, Co-chairing and organized a mini-symposium on "Data Driven Inference, Reduction, and Estimation using Dynamical Models "

SIAM CSE 2025, Co-chairing and organized a mini-symposium on "Advances in Non-linear Data Assimilation"

SIAM UQ 2024, Co-chairing and organized a mini-symposium on "Uncertainty Quantification in Astrodynamics"

SIAM CSE 2023, Co-chairing and organized a mini-symposium on "Recent Advances in Data Assimilation"

SCUDEM VII 2022, Modeling with Differential Equations, Judge

SIAM UQ 2022, Co-chaired and organized a mini-symposium on "Novel approaches in variational particle filtering"

SIAM CSE 2021, Co-chaired and organized a two part mini-symposium "Advances in Data Assimilation"

SIAM UQ 2020, Co-chaired and organized a two part mini-symposium "Algorithms for Large Scale and Non-linear Data Assimilation" (Cancelled due to COVID-19)

Virginia Tech CS 2018-2020 Laboratory representative to the computer science graduate student association.

PRESENTATIONS (AS PRESENTER AND FIRST AUTHOR)

SIAM UQ 2026, "A Labeled Random Finite Set Approach to Dynamical Model Identification"

ICS Seminar Fall 2025, "Fun with Non-linear data assimilation"

Applied Math Seminar Fall 2025, "A few fun advances in non-linear ensemble data assimilation"

MFI 2025, "Polytope Flow Filtering"

ARTEMIS, "Uncertainty in Space Domain Awareness" (Joint UH Manoa program with the Missile Defense Advocacy Alliance)

SIAM CSE 2025, "A High-Dimensional Deterministic(ish) Convergent Particle Filter"

ICS Seminar 2024, "Fun with Ensemble Mixture Model Filters"

FUSION 2024, "Are Non-Gaussian Kernels Suitable for Ensemble Mixture Model Filtering?" (a fill-in speaker presented because of a schedule conflict)

FUSION 2023, "An Adaptive Covariance Parameterization Technique for the Ensemble Gaussian Mixture Filter"

Oden Institute Seminar 2022, "Combining collections of high fidelity and reduced order for large-scale system state estimation"

SIAM UQ 2022, Minisymposium on Multilevel Data Assimilation, "Model Forest Extensions to the Multifidelity Ensemble Kalman Filter"

3rd International Workshop on Data Assimilation, Invited Speaker, "Localized Stochastic Shrinkage Rejuvenation in the Ensemble Transport Particle Filter"

ECMWF Annual Seminar 2021, "Surrogate Tree and Model Forest Extensions to the Multifidelity Ensemble Kalman Filter"

SIAM CSE 2021, Mini-symposium on Advances in Data Assimilation, "Multifidelity Data Assimilation"

University of Reading, DARC 2020, DARC Seminar, " Multispace Ensemble Kalman Filtering with POD Control Variates"

Oak Ridge 2020, Multilevel Ensemble Kalman Filter with POD-Galerkin Control Variates for Quasi-Geostrophic Flow

Virginia Tech, Math Dept. 2020, Fluids Seminar, " Multilevel Ensemble Kalman Filter with POD-Galerkin Control Variates for Quasi-Geostrophic Flow"

SIAM UQ 2020, Mini-symposium on Algorithms for Large Scale and Non-linear Data Assimilation, "Multilevel Ensemble Kalman Filter with Reduced Order POD-Galerkin Control Variates" (Cancelled due to COVID-19)

SIAM CSE 2019, Mini-symposium on Computational Methods for Data Assimilation and Uncertainty Quantification, "Adaptive Multivariate Schur Product Localization in Ensemble-based Filters"

PUBLICATIONS

The following is a list of all publications, including conferences and preprints.

[1] Jostein Barry-Straume, Arash Sarshar, **Andrey A. Popov**, and Adrian Sandu. "Physics-informed neural networks for PDE-constrained optimization and control". In: *Communications on Applied Mathematics and Computation* (2025), pp. 1–24.

[2] Dalton Durant, **Andrey A. Popov**, and Renato Zanetti. "Updating Gaussian Mixture Weights Using Posterior Estimates". In: *IEEE Transactions on Aerospace and Electronic Systems* (2025).

[3] Felipe Giraldo-Grueso, **Andrey A. Popov**, Uwe D Hanebeck, and Renato Zanetti. "OPTIMAL GRID POINT SAMPLING FOR POINT MASS FILTERING". In: *2025 AAS/AIAA Space Flight Mechanics Meeting, Kaui, Hawaii*. 2025.

[4] Felipe Giraldo-Grueso, **Andrey A. Popov**, Uwe D Hanebeck, and Renato Zanetti. "Optimal Sampling for Point Mass Filtering with Applications to Cislunar Orbit Determination". In: *The Journal of the Astronautical Sciences* 72.5 (2025), pp. 1–32.

[5] Felipe Giraldo-Grueso, **Andrey A. Popov**, Uwe D Hanebeck, and Renato Zanetti. "Optimal Transport as a Reduction Technique for Deterministic Nonlinear Filtering". In: *2025 28th International Conference on Information Fusion (FUSION)*. 2025.

[6] Felipe Giraldo-Grueso, **Andrey A. Popov**, and Renato Zanetti. "Gaussian Mixture-Based Point Mass Filtering With Applications to Terrain-Relative Navigation". In: *IEEE Transactions on Aerospace and Electronic Systems* (2025).

[7] Rachel Mamich, Kristen Michaelson, **Andrey A. Popov**, and Renato Zanetti. "Particle Flow and the Kalman Filter". In: *Journal of Advances in Information Fusion* 20.1 (2025).

[8] Kristen Michaelson, **Andrey A. Popov**, and Renato Zanetti. "Multiple data assimilation as an approximate maximum a posteriori estimator". In: *Computational Geosciences* 29.2 (2025), pp. 1–19.

[9] **Andrey A. Popov**. "A geometric ensemble method for Bayesian inference". In: *arXiv preprint arXiv:2504.07084* (2025).

[10] **Andrey A. Popov**. "Polytope Flow Filtering". In: *2025 IEEE International Conference on Multisensor Fusion and Integration for Intelligent Systems (MFI)*. 2025.

[11] **Andrey A. Popov** and Renato Zanetti. "Deterministic Optimal Transport-based Gaussian Mixture Particle Filtering for Verifiable Applications". In: *arXiv preprint arXiv:2501.17302* (2025).

[12] **Andrey A. Popov**, Enrico M Zucchelli, and Renato Zanetti. "Ensemble-regularized Kernel density estimation with applications to the ensemble Gaussian mixture filter". In: *Computational Geosciences* 29.2 (2025), pp. 1–23.

[13] Amit N Subrahmanya, Julie Bessac, **Andrey A. Popov**, and Adrian Sandu. "A copula-based rank histogram ensemble filter". In: *arXiv preprint arXiv:2505.01918* (2025).

[14] Amit N Subrahmanya, **Andrey A. Popov**, Reid J Gomillion, and Adrian Sandu. "Preserving nonlinear constraints in variational flow filtering data assimilation". In: *Computational Geosciences* 29.5 (2025), pp. 1–22.

[15] Abhinab Bhattacharjee, **Andrey A. Popov**, Arash Sarshar, and Adrian Sandu. "IMPROVING ADAM THROUGH AN IMPLICIT-EXPLICIT (IMEX) TIME-STEPPING APPROACH". In: *Journal of Machine Learning for Modeling and Computing* (2024).

[16] Dalton Durant, **Andrey A. Popov**, Kyle J DeMars, and Renato Zanetti. "PROCESSING ANGLES-ONLY TRACKLETS FOR CISLUNAR MULTI-TARGET TRACKING". In: *AAS/AIAA Astrodynamics Specialist Conference*. 2024.

[17] Dalton Durant, **Andrey A. Popov**, and Renato Zanetti. "What are You Weighting For? Improved Weights for Gaussian Mixture Filtering". In: *2024 27th International Conference on Information Fusion (FUSION)*. 2024.

[18] Dalton Durant, **Andrey A. Popov**, and Renato Zanetti. "What are You Weighting For? Improved Weights for Gaussian Mixture Filtering With Application to Cislunar Orbit Determination". In: *arXiv preprint arXiv:2405.11081* (2024).

[19] Felipe Giraldo-Grueso, **Andrey A. Popov**, and Renato Zanetti. "A Neural-Network-Based Gaussian Nonlinear Filter". In: *AIAA SCITECH 2024 Forum*. 2024, p. 1671.

[20] Felipe Giraldo-Grueso, **Andrey A. Popov**, and Renato Zanetti. "ADAPTIVE MARS ENTRY GUIDANCE WITH ATMOSPHERIC DENSITY ESTIMATION". In: *AAS/AIAA Astrodynamics Specialist Conference*. 2024.

[21] Felipe Giraldo-Grueso, **Andrey A. Popov**, and Renato Zanetti. "Gaussian Mixture-Based Point Mass Filtering". In: *2024 27th International Conference on Information Fusion (FUSION)*. 2024.

[22] Felipe Giraldo-Grueso, **Andrey A. Popov**, and Renato Zanetti. "Precision Mars Entry Navigation with Atmospheric Density Adaptation via Neural Networks". In: *Journal of Aerospace Information Systems* 21.12 (2024), pp. 982–995.

[23] Yuqin Jiang, **Andrey A. Popov**, Zhenlong Li, Michael E Hodgson, and Binghu Huang. "A Sensor-Based Simulation Method for Spatiotemporal Event Detection". In: *ISPRS International Journal of Geo-Information* 13.5 (2024), p. 141.

[24] Rachel Mamich, Kristen Michaelson, **Andrey A. Popov**, and Renato Zanetti. "Burnished Flow Filter". In: *2024 27th International Conference on Information Fusion (FUSION)*. 2024.

[25] Kristen Michaelson, **Andrey A. Popov**, Renato Zanetti, and Kyle J DeMars. "Particle Flow with a Continuous Formulation of the Nonlinear Measurement Update". In: *2024 27th International Conference on Information Fusion (FUSION)*. 2024.

[26] **Andrey A. Popov** and Renato Zanetti. "An adaptive covariance parameterization technique for the ensemble Gaussian mixture filter". In: *SIAM Journal on Scientific Computing* 46.3 (2024), A1949–A1971.

[27] **Andrey A. Popov** and Renato Zanetti. "Are Non-Gaussian Kernels Suitable for Ensemble Mixture Model Filtering?" In: *2024 27th International Conference on Information Fusion (FUSION)*. 2024.

[28] **Andrey A. Popov** and Renato Zanetti. "SMALL-DATA REDUCED-ORDER MODELING OF CHAOTIC DYNAMICS THROUGH SYCO-AE: SYNTHETICALLY CONSTRAINED AUTOENCODERS". In: *Journal of Machine Learning for Modeling and Computing* 5.2 (2024).

[29] **Andrey A. Popov** and Renato Zanetti. "The Ensemble Epanechnikov Mixture Filter". In: *arXiv preprint arXiv:2408.11164* (2024).

[30] Amit N Subrahmanya, **Andrey A. Popov**, and Adrian Sandu. "Ensemble Variational Fokker-Planck Methods for Data Assimilation". In: *Journal of Computational Physics* (2024), p. 113681.

[31] Dalton Durant, **Andrey A. Popov**, and Renato Zanetti. "MCMC EnGMF for Sparse Data Orbit Determination". In: *AAS/AIAA Astrodynamics Specialist Conference, Big Sky, MT*. Vol. 23. 356. 2023.

[32] Kristen Michaelson, **Andrey A. Popov**, and Renato Zanetti. "Bayesian Recursive Update for Ensemble Kalman Filters". In: *arXiv preprint arXiv:2310.18442* (2023).

[33] Kristen Michaelson, **Andrey A. Popov**, and Renato Zanetti. "Ensemble Kalman Filter with Bayesian Recursive Update". In: *2023 26th International Conference on Information Fusion (FUSION)*. IEEE. 2023, pp. 1–6.

[34] Kristen Michaelson, **Andrey A. Popov**, and Renato Zanetti. "Recursive Update Filtering: A New Approach". In: *AAS/AIAA Astrodynamics Specialist Conference, Austin, TX*. Vol. 23. 321. 2023.

[35] **Andrey A. Popov** and Adrian Sandu. "Multifidelity ensemble Kalman filtering using surrogate models defined by theory-guided autoencoders". In: *Data-driven modeling and optimization in fluid dynamics: From physics-based to machine learning approaches* 16648714 (2023), p. 41.

[36] **Andrey A. Popov** and Renato Zanetti. "Ensemble Gaussian Mixture Filtering with Particle-localized Covariances". In: *2023 26th International Conference on Information Fusion (FUSION)*. IEEE. 2023, pp. 1–7.

[37] Benjamin L Reifler, **Andrey A. Popov**, Brandon A Jones, and Renato Zanetti. "Large-Scale Space Object Tracking in a Proliferated LEO Scenario". In: *2023 26th International Conference on Information Fusion (FUSION)*. IEEE. 2023, pp. 1–8.

[38] **Andrey A. Popov** and Adrian Sandu. "Multifidelity data assimilation for physical systems". In: *Data Assimilation for Atmospheric, Oceanic and Hydrologic Applications (Vol. IV)* (2022), pp. 43–67.

[39] **Andrey A. Popov** and Adrian Sandu. "The Model Forest Ensemble Kalman Filter". In: *arXiv preprint arXiv:2210.11971* (2022).

[40] **Andrey A. Popov**, Arash Sarshar, Austin Chennault, and Adrian Sandu. "A Meta-learning Formulation of the Autoencoder Problem for Non-linear Dimensionality Reduction". In: *arXiv preprint arXiv:2207.06676* (2022).

[41] **Andrey A. Popov**, Amit N Subrahmanya, and Adrian Sandu. "A stochastic covariance shrinkage approach to particle rejuvenation in the ensemble transform particle filter". In: *Nonlinear Processes in Geophysics* 29.2 (2022), pp. 241–253.

[42] Andrey A.natoliyevich Popov. "Combining Data-driven and Theory-guided Models in Ensemble Data Assimilation". PhD thesis. Virginia Tech, 2022.

[43] Steven Roberts, **Andrey A. Popov**, Arash Sarshar, and Adrian Sandu. "A Fast Time-Stepping Strategy for Dynamical Systems Equipped with a Surrogate Model". In: *SIAM Journal on Scientific Computing* 44.3 (2022), A1405–A1427.

[44] Austin Chennault, **Andrey A. Popov**, Amit N Subrahmanya, Rachel Cooper, Ali Haisam Muhammad Rafid, Anuj Karpatne, and Adrian Sandu. "Adjoint-matching neural network surrogates for fast 4D-var data assimilation". In: *arXiv preprint arXiv:2111.08626* (2021).

[45] Rachel Cooper, **Andrey A. Popov**, and Adrian Sandu. "Investigation of Nonlinear Model Order Reduction of the Quasigeostrophic Equations through a Physics-Informed Convolutional Autoencoder". In: *arXiv preprint arXiv:2108.12344* (2021).

[46] **Andrey A. Popov**, Changhong Mou, Adrian Sandu, and Traian Iliescu. "A multifidelity ensemble Kalman filter with reduced order control variates". In: *SIAM Journal on Scientific Computing* 43.2 (2021), A1134–A1162.

[47] **Andrey A. Popov** and Adrian Sandu. "An Explicit Probabilistic Derivation of Inflation in a Scalar Ensemble Kalman Filter for Finite Step, Finite Ensemble Convergence". In: *arXiv preprint arXiv:2003.13162* (2020).

[48] **Andrey A. Popov**, Adrian Sandu, Elias D Nino-Ruiz, and Geir Evensen. "A Stochastic Covariance Shrinkage Approach in Ensemble Transform Kalman Filtering". In: *Tellus A* (2020).

[49] **Andrey A. Popov** and Adrian Sandu. "A Bayesian approach to multivariate adaptive localization in ensemble-based data assimilation with time-dependent extensions". In: *Nonlinear Processes in Geophysics* 26.2 (2019), pp. 109–122.

[50] Steven Roberts, **Andrey A. Popov**, Arash Sarshar, and Adrian Sandu. "ODE Test Problems: a MATLAB suite of initial value problems". In: *arXiv preprint arXiv:1901.04098* (2019).

[51] **Andrey A. Popov**, S-C Lee, PP Kuksa, JD Glickson, and AA Shestov. "Fast Parallel Algorithm for Large Fractal Kinetic Models with Diffusion". In: *bioRxiv* (2018), p. 275248.

[52] Alexander V Kachur, **Andrey A. Popov**, E James Delikatny, Joel S Karp, and Anatoliy V Popov. "Synthesis of 18F-labeled phenolphthalein and naphtholphthalein". In: *Journal of fluorine chemistry* 151 (2013), pp. 1–6.

[53] Anatoliy V Popov, E James Delikatny, Joel S Karp, **Andrey A. Popov**, and Alexander V Kachur. "Synthesis and NMR study of fluorinated aryl (sulfone) phthaleins". In: *ABSTRACTS OF PAPERS OF THE AMERICAN CHEMICAL SOCIETY*. Vol. 245. AMER CHEMICAL SOC 1155 16TH ST, NW, WASHINGTON, DC 20036 USA. 2013.

JOURNAL REVIEWS

Journal of Guidance, Control, and Dynamics(2025[1])
IEEE TAES(2024[1])
IEEE Access(2023[2])
IEEE Transactions on Signal Processing(2023[1])
Geophysical Model Development(2017[1], 2019[1], 2020[1], 2021[1])
Applied Numerical Mathematics(2019[1])
Computational Geosciences(2021[1])
Statistics and Computing(2021[1])
Journal of Computational Physics(2022[1])
International Journal of Computer Mathematics(2022[1])
Frontiers Physics(2022[1])
Frontiers Earth Science(2022[1])

EXPERIENCE

Information and Computer Sciences Department, University of Hawai'i at Manoa Honolulu, HI
Assistant Professor *Aug 2024–present*

- I am a computational scientist working on advancing theory for Bayesian inference in the most broad philosophical sense of that term.
- My current projects as the lead PI include "Discriminator driven resampling for chaotic dynamics", "Geometric sensor tasking", "Deterministic and representative sampling from particle filters", "Mistrust in AI", and "System identification with labeled random finite sets".
- I am actively building collaborations across a broad collection of disciplines from the sciences, social sciences, and engineering disciplines in order to apply and adapt my methods to a broad range of problems, including those in geographic information systems, space domain awareness, robot and agent control, swarm tracking
- I am currently advising two (plus two deferred) PhD students in two different departments, one masters student, and two undergraduate students in their capstone project.

Oden Institute for Computational Engineering and Science, University of Texas at Austin Austin, TX
Postdoctoral Fellow *Sep 2022–Aug 2024*

- Under Prof. Renato Zanetti
- Mentoring graduate students while advisor is on sabbatical.
- Researching of advanced methodologies for statistical inference of dynamic systems, including novel algorithms for sequential filtering, kernel density estimation, and data association.
- Working on theoretical developments of reduced order models.
- Working on incorporating Scientific Machine Learning methods into cis-Lunar operations and Mars entry.

· Assisting with proposal writing.

Computational Science Lab, Dept. of Computer Science, Virginia Tech Blacksburg, VA
Graduate Research Assistant *Aug 2016–Aug 2022*

· Led by Prof. Adrian Sandu
· Worked on a project for multilevel/multifidelity filtering in the ensemble Kalman filter with reduced order models. I completely reworked the theory from the ground up through linear control variates and generalized the theory to model trees and model forests. The work resulted in three papers and a book chapter. Part of this work were a collaboration with Changhong Mou, and professor Traian Iliescu from the department of mathematics at Virginia Tech.
· Worked on a project developing a stochastic shrinkage technique for ensemble filtering whereby ensembles are augmented by synthetic draws from a climatological distribution and combined in a statistically rigorous way. This collaboration involved Elias Nino-Ruiz, a collaborator in Colombia and a Geir Evensen from Norway, the progenitor of the ensemble Kalman filter. This project resulted in two publications.
· Worked on project on proving the convergence of the ensemble Kalman filter multiple finite time steps and finite ensemble size. Showed that for a scalar ensemble Kalman filter. The work resulted in a technical report.
· Worked on a project for developing a methodology for adaptive localization in the ensemble Kalman filter. This project resulted in one paper.
· I have also collaborated with many of my lab members on six projects resulting in at least four other works (more to come) not as first author.

U. Pittsburgh/Jefferson U. Collaboration Pittsburgh, PA, Philadelphia, PA
Volunteer *Oct 2015–Aug 2016*

· Collaboration between Profesors Jim Faeder at Pittsburgh and Yuri Sykulev at Jefferson.
· The project involves the modeling of the interactions of pMHC-laden Quantum Dots with TCR/CD8-laden T-Cells. We are developing novel approaches to the modeling of kinetic interactions on the cell surface in order to better understand the underlying mechanisms involved.

University of Pennsylvania Philadelphia, PA
Volunteer *Oct 2015–Aug 2016*

· Under Alexander A Shestov
· The project involved fractal kinetic calculation of inter-cell Enzyme-Substrate reaction, and computational algorithms thereof. The work resulted in a technical report

University of Pennsylvania Philadelphia, PA
Laboratory Technician *Mar 2012–Aug 2012*

· Under Alexander Kachur
· My project involved the development of fluorinated radioactive (18F-labeled) pH-sensors for the measurement of pH at the physiological range (6.5-9) by Cerenkov imaging. I was tasked with the isolation of a number of novel synthesized mono- and di- fluorinated phenol- and naphthol- phthaleins by preparative thin layer chromatography. The research resulted in the publication of a paper and an abstract.

TEACHING

Advanced Reconnaissance and Tracking for Environmental monitoring and Indo-Pacific Security UH Mānoa / MDAA
One of 12 Instructors *Fall 2025 and Spring 2026*

· Lead on teaching US Armed forces officers about uncertainty quantification, for space domain awareness and missile defense.

ICS 141 Discrete Mathematics for Computer Science I UH Mānoa
Instructor of Record *Fall 2025*

· Continued to restructure the course by moving to formal logical proofs and utilizing a formal set theory with universal sets to teach a more intuitive and formal type of set theory, moving on to a formal use of functions for computing.
· Started writing a discrete math textbook titled "Discrete Math done medium-well".

ICS 691B Introduction to Data Fusion UH Mānoa
Instructor of Record *Fall 2024*

· A seminar style class that provides an introduction to data fusion concepts for applications such as autonomous vehicles, space domain awareness, etc.
· The course was project-based, and taught the students to both utilize and implement methods as well as to communicate their understanding of what they did.

ICS 141 Discrete Mathematics for Computer Science I UH Mānoa
Instructor of Record *Fall 2024*

· Fully restructured the course to be more mathematically rigorous and to provide a solid foundation in discrete mathematics for computer science

CS 2114 Software Design & Data Structures Virginia Tech
Graduate Teaching Assistant *Spring 2022*

· In charge of two lab sections guiding students in completing test-driven software projects.

CS/ISE 5714 Usability Engineering Virginia Tech
Graduate Teaching Assistant *Fall 2021*

· Guided student-led projects in developing practical and usable applications; graded assignments.

CS/ECE 5560 Fundamentals of Information Security Virginia Tech
Graduate Teaching Assistant *Spring 2020*

· Graded Assignments.

CS 2104 Intro to Problem Solving in CS Virginia Tech
Graduate Teaching Assistant *Spring 2017*

· My job was to help sophomore computer science students start developing their logical and mathematical thinking; graded assignments

CS/MATH 3414 Numerical Methods Virginia Tech
Graduate Teaching Assistant *Fall 2016*

· Assisted with students understanding of both theory and practice; graded assignments.

AWARDS

Jean-Pierre Le Cadre—First Place (Best Paper Award). 27th Conference on Information Fusion, Venice, Italy, July 2024.

PROFESSIONAL ORGANIZATIONS

2022-present, American Astronautical Society (AAS)
2016-present, Society for Industrial and Applied Mathematics (SIAM)
2021-present, American Association of Geographers (AAG)

SOFTWARE PROJECTS

DATools
https://github.com/ComputationalScienceLaboratory/DATools

- A test-bed for Data Assimilation research. Used in the class CS 6404 *Computational Data Assimilation—Inverse Problems with Differential Equation* at Virginia Tech in the Fall of 2022.

ODE Test Problems
https://github.com/ComputationalScienceLaboratory/ODE-Test-Problems

- A comprehensive test-suite of ordinary differential equations, discretized partial differential equations, and differential algebraic equations for research into both time integration methods and data assimilation.

BACHELOR THESIS

Chaos in Nonlinear Systems of Order Three with Periodic Forcing and its Cryptographic Applications
Supervised by Professor Yuri Lvov, RPI
Analysed chaotic systems of order three and developed methods with which to create cryptographic primitives. Presented two novel algorithms: a chaotic system based Cryptographically Secure Pseudo-Random Number Generator, and a Cryptographically Secure Hash Function. Provided evidence for the cryptographic security of these algorithms, and discussed the conditions under which viable real-world algorithms based on chaotic systems of order three could be developed.

COURSEWORK

Graduate: Science-Guided Machine Learning, Data Analytics, Statistics, Inverse Problems, Data Assimilation, Numerical Analysis, Finite Difference Methods, Finite Element Methods, Optimization, Cryptography

Undergraduate: Numerical Computing, Applied Mathematics, Analysis, Topology, Algebra, Philosophy, Logic, Statistics

PROGRAMMING

MATLAB (Expert), C, Julia, D, Rust, Java, Python

LANGUAGES

English (Native), Russian (Native)