




## Education

- Aug. 2019 – May 2023     **Texas A&M University**  
Ph.D. Ocean Engineering
- Aug. 2018 – July 2019     **Georgia Institute of Technology**  
M.Sc. Aerospace Engineering
- Sep. 2014 – May 2018     **Princeton University**  
B.S.E. Mechanical and Aerospace Engineering, *cum laude*

## Experience

- June 2023 – Present     **Sidney Fernbach Postdoctoral Fellow**  
Lawrence Livermore National Lab, *Center for Applied Scientific Computing*
- May 2023 – Aug. 2023     **Visiting Scholar**  
Princeton University, *Department of Mechanical and Aerospace Engineering*
- April 2023 – May 2023     **Visiting Researcher**  
NASA Ames Research Center, *Aerothermodynamics Branch*
- June 2020 – May 2023     **Computing Scholar Intern**  
Lawrence Livermore National Lab, *Center for Applied Scientific Computing*
- May 2017 – Sep. 2017     **Computational Aerodynamicist Intern**  
Haas Formula One Team

## Publications

### Journal Articles

13. A note on higher-order and nonlinear limiting approaches for continuously bounds-preserving discontinuous Galerkin methods  
**T. Dzanic**. *Submitted*.
12. Positivity-preserving discontinuous spectral element methods for compressible multi-species flows  
W. Trojak, **T. Dzanic**. *Computers & Fluids*, 280, 106343, 2024.
11. Continuously bounds-preserving discontinuous Galerkin methods for hyperbolic conservation laws  
**T. Dzanic**. *Journal of Computational Physics*, 508, 113010, 2024.
10. DynAMO: Multi-agent reinforcement learning for dynamic anticipatory mesh optimization with applications to hyperbolic conservation laws  
**T. Dzanic**, K. Mittal, D. Kim, J. Yang, S. Petrides, B. Keith, R. Anderson. *Journal of Computational Physics*, 506, 112924, 2024.
9. On the anti-aliasing properties of entropy filtering for under-resolved turbulent flows  
**T. Dzanic**, W. Trojak, F. Witherden. *International Journal of Computational Fluid Dynamics*, 37, 474-486, 2024.
8. Validation of wall boundary conditions for simulating complex fluid flows via the Boltzmann equation: Momentum transport and skin friction  
**T. Dzanic**, F. Witherden, L. Martinelli. *Physics of Fluids*, 36, 017109, 2024.
7. Positivity-preserving entropy filtering for the ideal magnetohydrodynamics equations  
**T. Dzanic**, F. Witherden. *Computers & Fluids*, 266, 106056, 2023.
6. A positivity-preserving and conservative high-order flux reconstruction method for the polyatomic Boltzmann-BGK equation  
**T. Dzanic**, F. Witherden, L. Martinelli. *Journal of Computational Physics*, 486, 112146, 2023.

5. Bounds preserving temporal integration methods for hyperbolic conservation laws  
**T. Dzanic**, W. Trojak, F. Witherden. *Computers & Mathematics with Applications*, 135, 6-18, 2023.
4. Positivity-preserving entropy-based adaptive filtering for discontinuous spectral element methods  
**T. Dzanic**, F. Witherden. *Journal of Computational Physics*, 468, 111501, 2022.
3. Utilizing time-reversibility for shock capturing in nonlinear hyperbolic conservation laws  
**T. Dzanic**, W. Trojak, F. Witherden. *Computers & Fluids*, 247, 105652, 2022.
2. Partially-averaged Navier–Stokes simulations of turbulence within a high-order flux reconstruction framework  
**T. Dzanic**, S. Girimaji, F. Witherden. *Journal of Computational Physics*, 456, 110992, 2022.
1. Accuracy, stability, and performance comparison between the spectral difference and flux reconstruction schemes  
C. Cox, W. Trojak, **T. Dzanic**, F. Witherden, A. Jameson. *Computers & Fluids*, 221, 104922, 2021.

## Conference Papers

9. Direct molecular gas dynamics simulations of re-entry vehicles via the Boltzmann equation  
**T. Dzanic**, L. Martinelli. *AIAA SciTech*, 2024.
8. Towards full molecular gas dynamics simulations of complex flows via the Boltzmann equation  
**T. Dzanic**, L. Martinelli. *Cambridge Unsteady Flow Symposium*, 2024.
7. Multi-agent reinforcement learning for adaptive mesh refinement  
J. Yang, K. Mittal, **T. Dzanic**, S. Petrides, B. Keith, B. Peterson, D. Faissol, R. Anderson. *International Conference on Autonomous Agents and Multiagent Systems*, p.14-22, 2023.
6. Reinforcement learning for adaptive mesh refinement  
J. Yang, **T. Dzanic**, B. Peterson, J. Kudo, K. Mittal, V. Tomov, J.S. Camier, T. Zhao, H. Zha, Tz. Kolev, R. Anderson, D. Faissol. *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 26, p.5997-6014, 2023.
5. Shock capturing methods in high-order flux reconstruction I: Graph viscosity and convex limiting approaches  
W. Trojak, **T. Dzanic**, F. Witherden. *AIAA SciTech*, 2021.
4. Numerical analysis and prediction of aero-optical effects  
D. Hartman, **T. Dzanic**, F. Witherden, A. Tropina, R. Miles. *AIAA SciTech*, 2021.
3. Fourier spectrum discrepancies in deep network generated images  
**T. Dzanic**, K. Shah, F. Witherden. *Neural Information Processing Systems (NeurIPS)*, 33, p.3022-3032, 2020.
2. Non-equilibrium wall modeling for large eddy simulation of stalled iced airfoils  
**T. Dzanic**, J. Oefelein. *AIAA SciTech*, 2020.
1. Higher-order implicit large eddy simulations of a VFE-2 delta wing  
**T. Dzanic**, L. Martinelli. *AIAA SciTech*, 2019.


## Invited Talks & Conference Presentations

23. Provably robust limiting schemes for high-order discontinuous spectral element methods  
Brown University. Providence, RI, USA. May 2024.
22. Towards full molecular gas dynamics simulations of complex flows via the Boltzmann equation  
*Cambridge Unsteady Flow Symposium*. Cambridge University, Cambridge, UK. March 2024.
21. Continuously bounds-preserving limiting methods for high-order discontinuous Galerkin schemes  
*7th Chilean Workshop on Numerical Analysis of Partial Differential Equations*. Concepcion, Chile. Jan 2024.
20. Structure-preserving finite element methods for multi-physics applications  
*Office of Science Advanced Scientific Computing Research (ASCR) Principal Investigator Meeting*. Albuquerque, NM, USA. Jan 2024.
19. Constructing provably robust, constraint-satisfying finite element methods for computational physics  
Brown University. Providence, RI, USA. Nov 2023.
18. High-order computational fluid dynamics schemes on GPU architectures  
NASA Ames Research Center. Mountain View, CA, USA. Jun 2023.


17. A positivity-preserving and conservative high-order flux reconstruction method for the polyatomic Boltzmann–BGK equation  
*22nd IACM Computational Fluids Conference*. Cannes, France. April 2023.
16. Constructing provably robust, constraint-satisfying finite element methods for computational physics  
*Lawrence Livermore National Lab*. Livermore, CA, USA. April 2023.
15. A positivity-preserving and conservative high-order flux reconstruction method for the polyatomic Boltzmann–BGK equation  
*Society for Applied and Industrial Mathematics TX-LA Symposium*. Houston, TX, USA. Nov 2022.
14. Positivity-preserving entropy-based adaptive filtering for shock capturing  
*PyFR Seminar Series*. Imperial College London, London, UK. Aug 2022.
13. Utilizing time-reversibility for shock capturing in nonlinear hyperbolic conservation laws  
*15th World Congress on Computational Mechanics*. Yokohama, Japan. Aug 2022.
12. Positivity-preserving entropy-based adaptive filtering for discontinuous spectral element methods  
*8th European Congress on Computational Methods in Applied Sciences and Engineering*. Oslo, Norway. June 2022.
11. Bounds preserving temporal integration methods for hyperbolic conservation laws  
*Society for Applied and Industrial Mathematics TX-LA Symposium*. South Padre Island, TX, USA. Nov 2021.
10. Shock capturing in nodal spectral element methods via Riemann solutions for intra-element fluxes  
*16th U.S. National Congress on Computational Mechanics*. Chicago, IL, USA. July 2021.
9. Shock capturing for high-order nodal spectral element methods  
*PyFR Seminar Series*. Imperial College London, London, UK. April 2021.
8. Variable resolution turbulence modeling within a flux reconstruction framework  
*14th World Congress in Computational Mechanics/ECCOMAS*. Paris, France. Jan 2021.
7. Fourier spectrum discrepancies in deep network generated images  
*Neural Information Processing Systems*. Vancouver, Canada. Dec 2020.
6. A Riemann difference scheme for shock capturing in discontinuous finite element methods  
*Society for Applied and Industrial Mathematics TX-LA Symposium*. College Station, TX, USA. Oct 2020.
5. Partially-averaged Navier-Stokes in PyFR  
*PyFR Symposium*. Imperial College London, London, UK. July 2020.
4. Non-equilibrium wall modeling for large eddy simulation of stalled iced airfoils  
*AIAA SciTech*. Orlando, FL, USA. Jan 2020.
3. Higher-order implicit large eddy simulations of a VFE-2 delta wing  
*AIAA SciTech*. San Diego, CA, USA. Jan 2019.
2. Toward high-fidelity, high-resolution aerodynamic analysis of iced airfoils  
*Federal Aviation Administration JUP Conference*. The University of Ohio, Athens, Ohio, USA. July 2018.
1. Implicit large eddy simulations of vortex dominated flows  
*Federal Aviation Administration JUP Conference*. Massachusetts Institute of Technology, Cambridge, MA, USA. Oct 2017.

## Funding & Grants

### Principal Investigator








- 2023 – 2024      Continuously bounds-preserving finite element methods for multi-physics applications  
                             *Sponsor:* Department of Energy Laboratory Directed Research and Development  
                             *Award:* \$190,000

### Co-principal Investigator

- 2024 – 2025      Direct numerical simulation of the Boltzmann equation for hypersonic transitional boundary layers  
                             *Sponsor:* Oak Ridge Leadership Computing Facility Director's Discretionary Program  
                             *Award:* 125,600 GPU-hours on Frontier



## Achievements

---

- 2024       Computing Directorate SPOT Award, *Lawrence Livermore National Lab*
- 2023 – 2025       Sidney Fernbach Postdoctoral Fellowship, *Lawrence Livermore National Lab*
- 2023       Editor's Pick, *Physics of Fluids*
- 2023       Art of Science Showcase, *Air Force Office of Scientific Research*
- 2019       Department Excellence Fellowship, *Texas A&M University*
- 2018       George Bienkowski Memorial Prize Recipient, *Princeton University*
- 2014 – 2018       Questbridge Scholar, *Princeton University*





## Service

---

- Reviewed for:**       AIAA Journal, Cambridge Unsteady Flow Symposium, Computers & Mathematics with Applications, Computer Physics Communications, International Journal of Computational Fluid Dynamics, Journal of Computational Physics, Journal of Computational and Theoretical Transport, Journal of Ocean Engineering, Physics of Fluids
- Volunteering:**       Girls Who Code, LLNL Summer Slam

## Teaching Experience

---

- 2022       Teaching Assistant for OCEN 345: *Theory of Ocean Engineering Structures*  
*Texas A&M University*
- 2021       Teaching Assistant for OCEN 405: *Finite Element Analysis in Engineering Design*  
*Texas A&M University*
- 2020       Teaching Assistant for OCEN 261: *Applied Numerical Methods with Python*  
*Texas A&M University*
- 2018-2019       Teaching Assistant for AE 3340: *Design and Systems Engineering Methods*  
*Georgia Institute of Technology*