Adam J. Thorpe

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Education

PhD in Electrical Engineering, **University of New Mexico** — May 2023

Thesis: Data-Driven Stochastic Optimal Control Using Hilbert Space Embeddings of Distributions

Advisor: Dr. Meeko Oishi

MS Electrical Engineering, University of New Mexico — 2019

Thesis: Verification of Stochastic Reach-Avoid Using RKHS Embeddings

Advisor: Dr. Meeko Oishi

BS Electrical Engineering, University of New Mexico — 2017

BS Languages, University of New Mexico & University of Torino, Italy — 2010

Research Experience

Postdoctoral Fellow, Oden Institute, **University of Texas at Austin** — 2023-present

Research Assistant, Human-Centered Systems & Control Lab, **University of New Mexico** — 2017-2023

SIP Technical Intern, Sandia National Laboratories — 2015-2023

Awards

CPS Rising Stars, University of Virginia — 2024

Publications

Journal Publications

[1] T. Ingebrand, **A. J. Thorpe**, S. Goswami, K. Kumar, and U. Topcu, "Basis-to-basis operator learning using function encoders," *Computer Methods in Applied Mechanics and Engineering*, 2024, (Submitted).

[2] **A. J. Thorpe**, F. Djeumou, C. Neary, M. M. K. Oishi, and U. Topcu, "Physics-informed kernel embeddings: A unified approach to integrating prior knowledge of dynamics and system properties," *Transactions on Automatic Control*, 2024, (Submitted).

[3] H. Sridhar, G. Huang, **A. Thorpe**, M. Oishi, and P. J. Brandon, "Characterizing the effect of mind wandering on braking dynamics in partially autonomous vehicles," *Transactions on Cyber-Physical Systems*, 2023.

[4] **A. J. Thorpe**, K. R. Ortiz, and M. M. K. Oishi, "State-based confidence bounds for data-driven stochastic reachability using Hilbert space embeddings," *Automatica*, vol. 138, p. 110 146, 2022.

[5] A. P. Vinod, **A. J. Thorpe**, P. A. Olaniyi, T. H. Summers, and M. M. K. Oishi, "Sensor selection for dynamics-driven user-interface design," *IEEE Transactions on Control Systems Technology*, vol. 30, no. 1, pp. 71–84, 2022.

[6] **A. J. Thorpe** and M. M. K. Oishi, "Model-free stochastic reachability using kernel distribution embeddings," *IEEE Control Systems Letters*, vol. 4, no. 2, pp. 512–517, 2020.

Highly Selective Conferences

[7] T. Ingebrand, **A. J. Thorpe**, and U. Topcu, "Zero-shot transfer of neural ODEs," in *Advances in Neural Information Processing Systems*, 2024.

[8] **A. J. Thorpe** and M. M. K. Oishi, "SOCKS: A stochastic optimal control and reachability toolbox using kernel methods," in *25th ACM International Conference on Hybrid Systems: Computation and Control*, ser. HSCC '22, Milan, Italy: Association for Computing Machinery, 2022.

Refereed Conference Proceedings

[9] **A. J. Thorpe**, T. Ingebrand, S. Goswami, K. Kumar, and U. Topcu, "Basis-to-basis operator learning: A paradigm for scalable and interpretable operator learning on hilbert spaces," in *2025 SIAM Conference on Computational Science and Engineering*, (Submitted), 2025.

[10] H. I. Khan, **A. J. Thorpe**, and D. Fridovich-Keil, "Act natural! projecting autonomous system trajectories into naturalistic behavior sets," in *IFAC Workshop on Cyber-Physical & Human Systems*, 2024.

[11] K. S. Miller, **A. J. Thorpe**, and U. Topcu, "Active learning of dynamics using prior domain knowledge in the sampling process," in *2024 63rd IEEE Conference on Decision and Control*, 2024.

[12] K. R. Ortiz, J. G. Hunter, **A. J. Thorpe**, *et al.*, "Assessing the relationship between learning stages and prefrontal cortex activation in a psychomotor task," *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, 2024.

[13] **A. J. Thorpe**, F. Djeumou, C. Neary, M. M. K. Oishi, and U. Topcu, "Physics-informed kernel embeddings: Integrating prior system knowledge with data-driven control," in *2024 American Control Conference (ACC)*, 2024.

[14] Y. Yu, **A. J. Thorpe**, J. Milzman, D. Fridovich-Keil, and U. Topcu, "Sensing resource allocation against data-poisoning attacks in traffic routing," in *2024 63rd IEEE Conference on Decision and Control*, 2024.

[15] **A. J. Thorpe**, "Refining human-centered autonomy using side information," in *14th ACM/IEEE International Conference on Cyber-Physical Systems, Humans in Cyber-Physical Systems Workshop*, 2023.

[16] **A. J. Thorpe**, J. A. Gonzales, and M. M. K. Oishi, "Data-driven stochastic optimal control using kernel gradients," in *2023 American Control Conference (ACC)*, 2023, pp. 2548–2553.

[17] K. R. Ortiz, **A. J. Thorpe**, A. Perez, M. Luster, B. J. Pitts, and M. Oishi, "Characterizing within-driver variability in driving dynamics during obstacle avoidance maneuvers," in *IFAC Workshop on Cyber-Physical & Human Systems*, 2022.

[18] **A. Thorpe**, T. Lew, M. Oishi, and M. Pavone, "Data-driven chance constrained control using kernel distribution embeddings," in *Proceedings of The 4th Annual Learning for Dynamics and Control Conference*, vol. 168, PMLR, 23–24 Jun 2022, pp. 790–802.

[19] A. Abate, H. Blom, M. Bouissou, *et al.*, "ARCH-COMP21 category report: Stochastic models," in *8th International Workshop on Applied Verification of Continuous and Hybrid Systems (ARCH21)*, ser. EPiC Series in Computing, United Kingdom, Dec. 2021, pp. 55–89.

[20] **A. J. Thorpe** and M. M. K. Oishi, "Stochastic optimal control via Hilbert space embeddings of distributions," in *2021 60th IEEE Conference on Decision and Control*, 2021, pp. 904–911.

[21] **A. J. Thorpe**, K. R. Ortiz, and M. M. K. Oishi, "Learning approximate forward reachable sets using separating kernels," in *Proceedings of the 3rd Conference on Learning for Dynamics and Control*, vol. 144, PMLR, Jul. 2021, pp. 201–212.

[22] **A. J. Thorpe**, K. R. Ortiz, and M. M. K. Oishi, "SReachTools kernel module: Data-driven stochastic reachability using Hilbert space embeddings of distributions," in *2021 60th IEEE Conference on Decision and Control*, 2021, pp. 5073–5079.

[23] **A. J. Thorpe**, V. Sivaramakrishnan, and M. M. K. Oishi, "Approximate stochastic reachability for high dimensional systems," in *2021 American Control Conference*, 2021, pp. 1287–1293.

[24] **A. J. Thorpe**, C. L. Arrington, and J. R. Pillars, "Additively manufactured electrochemical plating enclosures," in *ECS Meeting Abstracts*, IOP Publishing, 2018, p. 857.

Technical Reports

[25] I. F. El-Kady, C. M. Reinke, J. R. Pillars, C. L. Arrington, and **A. Thorpe**, "Phononic barrier communication: Channeling information and energy through metallic barriers with high fidelity high efficiency and low bit errors.," Sandia National Laboratories, Tech. Rep., 2019.

[26] J. Richards, A. Patel, **A. Thorpe**, and R. Schlossman, "Autonomous multi-platform sensor scheduling for intelligence surveillance and reconnaissance.," Sandia National Laboratories, Tech. Rep., 2019.

[27] E. Langlois, P. S. Finnegan, J. R. Pillars, *et al.*, "Modeled electroformed mems variable capacitor for cobalt iron alloy magnetostriction measurements.," Sandia National Laboratories, Tech. Rep., 2017.

[28] E. Langlois, J. R. Pillars, T. Monson, *et al.*, "Magnetoelastic smart tags using electroformed cobalt iron boron.," Sandia National Laboratories, Tech. Rep., 2016.

[29] C. St John, C. L. Arrington, J. R. Pillars, *et al.*, "Lifecycle characterization of a high magnetostriction cobalt iron electroplating chemistry.," Sandia National Laboratories, Tech. Rep., 2016.

Invited Talks

[30] **A. J. Thorpe**, *LP solutions for stochastic optimal control problems via hilbert space embeddings of distributions*, Stanford University (virtual), NASA ULI Safe Aviation Autonomy, Host: Edward Schmerling, Marco Pavone, Jan. 2022.

[31] **A. J. Thorpe**, *Stochastic optimal control & safety via kernel embeddings*, Stanford University (virtual), Host: Edward Schmerling, Marco Pavone, Jul. 2022.

[32] **A. J. Thorpe**, *Stochastic optimal control & safety via kernel embeddings*, University of Texas at Austin, Host: Ufuk Topcu, Oct. 2022.

[33] **A. J. Thorpe**, *Stochastic optimal control & safety via kernel embeddings: A data-driven approach*, Weierstrass Institute for Applied Analysis and Stochastics, Berlin (virtual), Host: Jia-Jie Zhu, Apr. 2022.

Teaching & Service

TACC Summer REU for Social Change, UT Austin	2024
Code2College Volunteer Instructor, Elite 101 & 102 Courses	2024
STEM Muse Mentorship Program, UT Austin	2023-2024
English Language Instructor, Prague, Czech Republic	2012-2013

– Worked one-on-one with over 50 students, in groups typically of 3 or fewer.

Informal Student Mentoring:

Sarah Etter, UT Austin, 2024 · Arda Vurankaya, UT Austin, 2024 · Nathan Tsao, UT Austin, 2024 · Hamzah Khan, UT Austin, 2024 · Will Ward, UT Austin, 2024 · Tyler Ingebrand, UT Austin, 2024 · Junette Hsin,

UT Austin, 2023 · Georgia Kaufman, University of New Mexico, 2022 · Jake Gonzales, (now) University of Washington, 2022 · AnaMaria Perez, (now) Harvard University, 2021 · Kendric Ortiz, University of New Mexico, 2020 · Max Fajardo, University of New Mexico, 2019

Conference Organizing Committees:

– ADHS 2024 Program Committee   2024

References

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