Will Thompson

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github.com/WillHWThompson

EDUCATION

University of Vermont   Burlington VT

PhD Complex Systems and Data Science   *2022-Present*
- GPA: 4.0/4.0

St. John's College   Santa Fe, NM

Bachelor of Arts in Liberal Arts   *2020*
- GPA: 3.95/4.0

EXPERIENCE

University of Vermont   August 2022 – Present

Graduate Research Assistant   *Burlington VT*
- Researched models of robustness and optimal facility placement in at attempt to understand the emergence of spatial inequality
- Studied dynamical processes on networks analytically and developed inferential methods for network dynamics
- Rigorous coursework training in complex systems, statistical physics, chaos theory, and advanced modeling techniques including master equations, supporting interdisciplinary blend of physics and sociology

Los Alamos National Labs   January 2021 – Present

Post-Baccalaureate Researcher   *Los Alamos, NM*
- Constructed new 200+ unit photon detection system using advanced light-sensitive tubes for 10-ton particle physics experiment
- Developed and maintained code for controlling detector and analyzing experimental data, implementing upgrades for more sensors and enhanced functionality
- Made significant improvements to system capturing experimental data, doubling simultaneous data collection capacity and boosting stability
- Analyzed experimental data on particle interactions and rates
- Introduced automation like automatic shift reminders and emergency dial-out alerts to support smooth detector operations

MITRE Corporation   August 2020 – December 2020

Data Scientist   *Santa Fe, NM*
- Developed solutions leveraging complex systems science to address real-world challenges for government sponsors
- Co-created open-source tool enabling agent-based modeling through genetic programming
- Modeled satellite network structures to evaluate impacts on failure cascades and system stability
- Performed network and semantic analysis on judicial corpus to improve legal search relevancy and equity

St John's College   May 2019 – May 2021

Head Senior Lab Assistant   *Santa Fe, NM*
- Oversaw development of tabletop quantum optics set-up for instruction
- Managed teams of 4 lab assistants, instructing them in theory and procedure for atomic physics and microbiology labs
- Tutored students in individual sessions, helped them to understand technical mathematical material
- Developed new labs and writings read by hundreds of students

Carnegie Mellon University   June 2018 – August 2018

Undergraduate Research Fellow   *Pittsburgh, PA*
- Conceived of and completed research project using natural language processing and machine learning to perform comparative analysis of the structure of philosophical treatises
- Developed and implemented novel statistical models to analyze structure of texts through use of random walks
- Authored two research papers currently in peer review, listed as first author on one

Santa Fe Institute   June 2017 – June 2018

Undergraduate Researcher   *Santa Fe, NM*
- Conducted independent research, employed natural language processing and machine learning to understand the role of the chorus in Greek tragedy
- Presented results of research to researchers and faculty members in presentation

GRANTS AND AWARDS

- **Second Place, University of Vermont Computing Student Research Day**, Burlington, VT, 2023. Presented research on developing learnable asynchronous models of opinion dynamics.

- **Third Place, University of Vermont Computing Science Research Day**, Burlington, VT, 2022. Awarded for research employing evolutionary algorithms to develop robust facility placements.

- **MITRE Best Paper Incentive Prize**, 2022. Paper "The Structure and Dynamics of US Common Law" recognized as best out of hundreds published that year.

- **Large Team Distinguished Performance Award, Los Alamos National Labs**, 2022. Recognized for construction and dark matter search leadership with Coherent Captain Mills Detector.

- **Science Undergraduate Laboratory Internship (SULI) Grant**, 2020. Highly selective DOE grant for post-baccalaureate research at LANL.

- **Dean's Award for College Service, St. John's College**, Santa Fe, NM, 2020. Recognized for exceptional leadership and dedication.

- **Robert Neidorf Memorial Scholarship**, St. John's College, 2018. Awarded for commitment to liberal arts ideals and college community.

- **Award for Relating Intense Education to Life (ARIEL) Grant**, St. John's College, 2017. Funded by Santa Fe Institute to relate education to complex systems.

PUBLICATIONS

- P. Chodrow et al. "Inferring Interaction Kernels in Learnable Asynchronous Opinion Dynamics" (in preparation)

- **W. Thompson et al**. "Understanding Polarization with the Non-Linear Voter Model on Higher Order Networks" (in preparation)

- A. A. Aguilar-Arevalo et al., "Testing Meson Portal Dark Sector Solutions to the MiniBooNE Anomaly at CCM." arXiv, http://arxiv.org/abs/2309.02599

- **W. Thompson**, et al. "Evolving Robust Facility Placements," in Proceedings of the Companion Conference on Genetic and Evolutionary Computation. New York, NY, USA: Association for Computing Machinery, Jul. 2023, pp. 775–778. doi: 10.1145/3583133.3590712.

- A. A. Aguilar-Arevalo et al. "Axion-Like Particles at Coherent CAPTAIN-Mills", arXiv:2112.09979 hep-ph

- A. A. Aguilar-Arevalo et al. "First Leptophobic Dark Matter Search from Coherent CAPTAIN-Mills", Phys. Rev. Lett. 129(2022) - https://link.aps.org/doi/10.1103/PhysRevLett.129.021801]

- A. A. Aguilar-Arevalo et al. "First dark matter search results from Coherent CAPTAIN-Mills", Phys. Rev. D, 106(2022) — https://link.aps.org/doi/10.1103/PhysRevD.106.012001

- M. Koehler et al.: "The structure and dynamics of US common law", Front. Phys., 07 January 2022 — https://doi.org/10.3389/fphy.2021.695219

- G. Salmon. **W.H.W. Thompson**, S. DeDeo: "Consilience and the cultural evolution of conceptual networks in London's Royal Society", Proc. R. Soc. B (in review)

- **W.H.W. Thompson**, Z. Wojitski, Simon DeDeo: "Levy Flights of the Collective Imagination", arXiv:1812.04013 cs.SI.

PRESENTATIONS

- **W. Thompson**, A. Hill, K. Rohe, P. Chodrow. "The Emergence of Polarization in the Non-Linear Voter Model on Higher Order Networks." Presented at the Joint Mathematics Meeting, San Fransisco, CA, Jan. 2024.

- T. Gebhart, L. Huynh, V. Modisette, **W. Thompson**, M. Tian, A. Wiedemann, P. Chodrow, H. Z. Brooks. "Inferring Interaction Kernels for Stochastic Agent-Based Opinion Dynamics." Presented at the Joint Mathematics Meeting, San Francisco, CA, Jan. 2024.

- **W. Thompson**. "Understanding the Emergence of Inequality with Two Models of Social Dynamics." Oral presentation at Dartmouth College Applied Math Seminar Series, Hanover, NH, Oct. 2023.

- **W. Thompson**. "Understanding Polarization with the Non-Linear Voter Model on Higher Order Networks." Oral presentation at Vermont-KIAS Workshop on Higher Order Interactions, Burlington, VT, Sept. 2023.
- **W. Thompson**. "Learnable Asynchronous Opinion Dynamics." Oral presentation at Vermont Computer Science Research Day, Burlington, VT, Sept. 2023.
- **W. Thompson**. "Polarization with the Voter Model on Hypergraphs." Oral presentation at Contagions in Complex Social Systems, Burlington, VT, Aug. 2023.
- L. Yotsukura, et al. "'Her behavior was disgusting': Emotion and Morality in Online Complaint Discourse." Oral presentation at 18th Annual International Pragmatics Conference, Brussels, Belgium, Jul. 2023.
- **W. Thompson**, et al. "Evolving Robust Facility Placements." Oral presentation at Genetic and Evolutionary Computation Conference, Lisbon, Portugal, Jul. 2023.
- **W. Thompson**. "Coherent Captain Mills Dark Matter Search." Oral presentation at Magnificent CEvNS, Virtual Conference, Oct. 2021.
- **W. Thompson**. "Searching for Light Dark Matter with Coherent Captain Mills." Oral presentation at University of New Mexico NUPAC Colloquia Series, Albuquerque, NM, May 2021.

PROJECTS

Strategy Mining   August 2020 – December 2020
- Open-source genetic programming framework allows evolution of agent based models. Compatible with NetLogo and MASON
- Github: https://github.com/mitre/strategy-mining

TECHNICAL SKILLS

Programming Languages: Julia,Python,C++
Frameworks and LibrariesPython: PyTorch
Other:UNIX systems, MySQL,MongoDB

REFERENCES

Peter Dodds

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University of Vermont

Vermont Complex Systems Center

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Richard Van De Water

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P-2 Pure and Applied Physics

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