ANIF N. SHIKDER

+1 (647) 385 3191 ◇ anifnaiyeershikder@gmail.com ◇ ◇ ◇

EXPERIENCE

Machine Learning Researcher Sep 2022 - Present
Muller Lab (Western University) & Fields Lab for Network Computation (Fields Institute) *Toronto, ON*

- Developed $\mathcal{S}^1$, a **fully interpretable** State Space Model achieving state-of-the-art sequence modeling performance with **full auditability** and **end to end tractability**.
- Created a **mathematical framework** to analyze **latent representations** in sequence models (S4, Mamba), optimizing for long-range dependencies in time-series data.
- Developed **inference-time spectral control methods** to dynamically steer generation in Mamba-based LLMs.

Graduate Teaching Assistant Sep 2022 - Present
University of Western Ontario *London, ON*

- Taught and mentored students in advanced mathematics (linear algebra, calculus, ODEs/PDEs, and mathematical modeling), translating **complex theoretical concepts into practical problem-solving frameworks** for **150+** students.

Associate Strategy Consultant Mar 2022 - Sep 2022
Curinos *Toronto, ON*

- Advised **Big Five Canadian and major US banks** on modernizing retail checking suites, streamlining product offerings, and defining competitive **value propositions** across **$250B+** in deposits.
- Developed a new **advisory product** adopted by **15+** regional banks and fintechs, providing a scalable, data-driven framework to modernize checking and savings portfolios.
- Translated complex financial data into executive-ready insights, directly informing C-suite pricing strategies that optimized margins across **$50B+** product portfolios.

EDUCATION

University of Western Ontario Sep 2022 - Aug 2026 (Expected)
PhD in Applied Mathematics, ***GPA:*** *4.0/4.0* *London, ON*
Focus: *Neural sequence models, mechanistic interpretability, inference-time interventions.*

York University Sep 2020 - Aug 2021
M.A. in Pure Mathematics, ***GPA:*** *8.13/9.0* *Toronto, ON*

University of Toronto Sep 2015 - Aug 2019
HBSc Specializing in Mathematics, ***GPA:*** *3.86/4.0* *Toronto, ON*

PUBLICATIONS & RESEARCH

- **Shikder, A. N.**, et al. *Explicit operator explains end-to-end computation in the modern neural networks used for sequence and language modeling.* Manuscript under review, **Physical Review X**.
- Dey, R* and **Shikder, A. N.***, et al. *$\mathcal{S}^1$: A Precisely Interpretable State Space Model via an End-to-End Closed-Form Oscillatory Operator.* Manuscript under review. **NeurIPS**
- Powanwe, A.*, Liboni, L.*, **Shikder, A. N.**, et al. *Exact expression for maximum Lyapunov exponent during transient dynamics in networks with expressive computational capabilities.* Manuscript under review. **Physical Review Letters.**
- **Shikder, A. N.**, et al. *Complex Walks for Interpretable Associative Memory in State-Space Networks.* Manuscript in preparation.

TECHNICAL SKILLS

Languages & ML:	Python	PyTorch	LangChain	Hugging Face	NumPy
Modeling:	Sequence Models	Representation Learning	Interpretability		
Tools:	Git	Slurm	MATLAB		