

# ALEXANDRE KAISER

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## EDUCATION

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**New York University – Courant Institute of Mathematical Sciences**

NYC, NY

Master of Science in *Computer Science* (GPA: 3.9)

Sept 2022 - May 2024

**Thesis:** *On Continual Learning using Deep Linear Networks* [[pdf](#)]

**Northwestern University**

Evanston, IL

Bachelor of Science in *Applied Mathematics*

Sept 2018 – Jun 2022

Major Concentration in *Artificial Intelligence and Machine Learning* and Minor in *Economics*

Kellogg Certificate Program for Undergraduates, *Financial Economics*

## EXPERIENCE

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**Researcher** - NYU Courant, Arthur Jacot

Jun 2023 – Jun 2024

- Second authored paper titled *Hamiltonian Mechanics of Feature Learning: Bottleneck Structure in Leaky ResNets* that proves and characterizes the low dimensional bias of regularized neural networks [[arXiv](#)]

**Data Science Consultant** – Neuron7

Jun-Aug 2023

- Developed a codebase for rapid prototyping of Retrieval-Augmented Generation (RAG) solutions on client data, evaluating the mixed performance of traditional NLP techniques and 12 modern embedding methods (SBERT, E5)
- Improved search accuracy by up to 20% for relevant document retrieval and up to 30% for multilingual texts
- Led quality check for real client search results to verify the labeling accuracy of the client's proprietary records

**Assistant Modeling Engineer** - Prophesee

Jun-Aug 2022

- Designed a model to replicate the experimental noise profile of the company's proprietary vision system. Along with making the model an interactive tool, the hardware teams were able to optimize 7 sensor parameters
- Analyzed the impact of signal noise on the product error rate across 100+ different test conditions, influencing the direction of future research by the product team
- Compiled a thorough 24-page documentation for continued use by the team once the internship had ended

**Software Engineer** - T4G Limited

Jun-Sept 2019

- Managed Microsoft Azure cloud resources, and manipulated SQL databases to implement data solutions for clients
- Built a *Unity* game object using *Virtual Reality*, including 500+ lines of code; presented a 14-page report

**Algorithms Graduate Tutor** - NYU Courant, Ernest Davis

Sept-Dec 2023

- Personalized instruction for 14 weeks to enhance master's students' understanding of advanced algorithmic concepts
- Facilitated breaking down problem statements and simulating algorithmic decision for 3-4 problems weekly

**Instructor/Counselor** - Future Stars

July-Aug 2021

- Selected, designed and led 14 sports-related activities, adapted to the camper's changing needs and the Covid situation
- Motivated and inspired groups of adolescents by leading with energy and positivity for all 8-hours of the day

## KEY PROJECTS

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**Debrief** – News Aggregator App [[Github](#)]

Present

- Built a News Aggregator app processing 100+ articles daily, enhancing summaries and reducing bias via exposition

**Text2RelationalGraph** [[Github](#)]

Dec 2023

- Created an app to convert long-form texts into hierarchical relational graphs, for use in summarization and search

**Large Language & Vision Model Seminar**

Sept – Dec 2023

- Analyzed cutting-edge research in Foundation Models and presented lectures on Llama 2 [[slides](#) | [paper](#)], Imagen Video [[slides](#) | [paper](#)], DINOv2 [[slides](#) | [paper](#)] and high resolution image synthesis [[slides](#) | [paper](#)]

**Discretization gives Uniformity: Survey of a Universal Algorithm for OCO** [[pdf](#)]

May 2024

- Surveyed proposal to consolidate top OCO algorithms, achieving optimal guarantees across all 3 convex geometries

**Survey of Online Learning and Approachability Theory** [[pdf](#)]

May 2023

- Uncovered how Blackwell's Approachability Theory silently provides the foundation of machine learning

**Adam Limitation Study** [[pdf](#)]

May 2024

- Explored the reasons for Adam's empirical dominance by proving dynamical properties in 4 regimes of importance

## CORE SKILLS

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**Programming:** Python, Typescript, C++, SQL, LLM Prompt Engineering, RAG, PyTorch, HuggingFace, MATLAB

**Awards:** \$5000 in Hackathon prizes, 1st place Math Olympiad, Creteil, France, 2017, 800 SAT Math, 170 GRE Quant