Victor **Faraggi**

M.SC. IN COMPUTER SCIENCE

Santiago, Chile

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Education

Department of Computer Science, Universidad de Chile — *Santiago, Chile*

M.SC. IN COMPUTER SCIENCE — *2022 – 2025*

- Thesis: neural network pruning under theoretical performance bounds; empirically compared pruned vs. dense model convergence and efficiency. Funded by Millennium Institute for Foundational Research on Data (IMFD) and National Center for Artificial Intelligence (CENIA).

Faculty of Physical & Mathematical Sciences, Universidad de Chile — *Santiago, Chile*

COMPUTER ENGINEERING & B.SC. IN ENGINEERING — *2016 – 2022*

B.Sc. Major: Computer Science

Faculty of Arts & Sciences, University of Toronto — *Toronto, Canada*

EXCHANGE STUDENT IN COMPUTER SCIENCE — *2021*

Enrolled in both graduate and undergraduate courses with an emphasis in Machine Learning.

Professional Experience

PSINET — *Santiago, Chile*

MACHINE LEARNING ENGINEER — *Feb 2023 – Jun 2023*

- Initiated the development of a Retrieval-Augmented Generation system for automated report generation at a mining company.
- Leveraged closed and open-source models to parse, structure, and summarize diverse data sources (administrative, legal, operational).
- Technologies: LangChain, Hugging Face, Vector Databases, Pydantic, OpenAI API.

Protera, *BioTech Startup* — *Santiago, Chile*

MACHINE LEARNING ENGINEER INTERN — *Aug 2021 – Oct 2021*

- Evaluated the feasibility of embedding-based protein language models for predicting protein stability.
- Conducted comparative analyses, established benchmark results for research improvements.
- Technologies: PyTorch, Protein-specific LLMs, Model Evaluation.

Bloom Alert, *Tech Startup* — *Santiago, Chile*

DATA ENGINEER — *Feb 2020 – Sept 2020*

- Analyzed satellite, oceanographic, and industrial data to detect harmful algal blooms and build desalination recommendations for mining operators.
- Built an API on Google Cloud Storage and BigQuery for extracting, processing, and analyzing remote sensing data.

Worldalytics — *Santiago, Chile*

DATA SCIENCE INTERN — *Jan 2020 – Feb 2020*

- Built an HR analytics platform for a major South American telecom, integrating 10+ internal data sources.
- Designed a scalable data model reflective of the company's organizational structure.

Publications & Conferences

Understanding Encoder-Decoder Structures using Information Measures. — *Elsevier Signal Processing*

SILVA, J, **FARAGGI, V.**, ET AL. — *2025*

- Linked information-theoretical concepts to understand effects of encoder-decoder structures in ML architectures. By decomposing the effects of encoder and decoder in a separate manner, we provided theoretical bounds to the performance of models in terms of information measures.
- I specifically led the efforts into empirically proving the theoretical results.

Characterizing Probabilistic Structure in Learning Using Information Sufficiency — *IEEE Machine Learning & Signal Processing (MLSP), London*

FARAGGI, V., ET AL. — *2024*

- We use the concept of information sufficiency (IS) to represent probabilistic structures in machine learning (ML). Our main result provides a functional expression that characterizes the class of probabilistic models consistent with an IS encoder-decoder latent predictive structure. This result formally justifies the encoder-decoder forward stages many modern ML architectures adopt to learn latent (compressed) representations in data.

Research Experience

Research Assistant, Information Decision System Lab — *Universidad de Chile*

INTERSECTING ML AND INFORMATION THEORY — *2022 – 2025*

- Led empirical validation of information-theoretic encoder–decoder bounds.
- Co-authored Elsevier Signal Processing and IEEE MLSP papers; managed review responses.
- Managed lab resources and mentored new students.

Research Projects — *University of Toronto, Canada*

ACADEMIC EXCHANGE — *2021*

- Cyclone wind speeds: applied Neural ODEs to model the Gradient Wind Balance equation for tropical cyclone estimation.
- Climate downscaling: benchmarked generative super-resolution models on transferability and training stability.

ProjectX 2020: ML for Climate Change, U. Toronto — *Remote*

RESEARCH COMPETITION — *2020*

- Represented U.Chile in a three-month ML competition on landslide early-warning systems; led data processing and model development.

Teaching Experience

Universidad de Chile — *Santiago, Chile*

TEACHING ASSISTANT — *2018 – 2023*

- Information Theory (EE), Deep Learning, Data Mining, Algorithms, ML (Math Eng.), Programming I, Computing Tools, Experimental Methods (Physics).

Honors & Awards

2019–2021 **Honor Student**, Universidad de Chile — *Santiago, Chile*

Technical Skills

Programming Languages	Python, Julia
Frameworks & Libraries	PyTorch, JAX, Hugging Face, LangChain, Flux, Pydantic
ML Research	Model compression, Information theory, Encoder–decoder bounds, Probabilistic ML
Applied ML	RAG pipelines, LLM evaluation, Protein language models, Normalizing flows, Time-series / Neural ODEs
Data Management	SQL, BigQuery, Vector Databases
Tools & Platforms	Git, Google Cloud Platform, CUDA (lab GPU management), Unix-based server management
Languages	English (IELTS 8.0), Spanish (native), French (professional)

Extracurricular Experience

Redes Beauchef, Student Organization — *Santiago, Chile*

IT STUDENT DIRECTOR — *Mar 2020 – Dec 2021*

- Led a four-person technical team maintaining and developing solutions for a 50+ member student organization.
- Organized job fairs, company talks, and interview workshops connecting students and alumni with industry.

Interests: Model Compression, Performance and Generalization, Uncertainty Quantification, Machine Learning Applications to Climate Change and Weather Forecasting. National water polo athlete (Chile, 2010–2016).