Sigfrido D. Ciletti

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Research Summary

I work on the mathematical foundations of prediction and verification in learning systems. My PhD develops a domain-theoretic account of approximations to Solomonoff induction — the idealised limit of sequence prediction — treating practical, resource-bounded predictors as converging approximations to the universal prior. With Kee Siong Ng, I developed test martingales that detect, online, when a Bayesian sequence predictor is misspecified, and recalibrate it. Earlier work in logic establishes zero-one laws for modal and intuitionistic logics.

Education

Australian National University, Canberra, Australia
Doctor of Philosophy (Ph.D.), School of Computing
Supervisors: Dirk Pattinson, Marcus Hutter, Kee Siong Ng, Ranald Clouston.
Apr.2025—Dec.2028

La Trobe University, Melbourne, Australia
Bachelor of Science, Major in Mathematics, First-Class Honours (GPA 6.83/7)
Supervisors: Marcel Jackson, Guillermo Badia, Tomasz Kowalski.
Jun.2023—Dec.2024

The University of Adelaide, Adelaide, Australia
Bachelor of Mathematical & Computer Sciences (GPA 6.5/7)
Jan.2019—Dec.2022

Papers & Preprints

Martingale Tests for Model Misspecification in Bayesian Sequence Prediction — *Manuscript*
Jun.2026–Kee Siong Ng, Sigfrido D. Ciletti. Test martingales for detecting and correcting misspecification online in Bayesian sequence predictors such as Context Tree Weighting.

Asymptotic Probabilities for Formulas of Propositional Intuitionistic Logic — *Manuscript*
Dec.2024–Sigfrido D. Ciletti, Guillermo Badia, Marcel Jackson, and Tomasz Kowalski. Proves a zero-one law for IPL via a new technique for the asymptotic enumeration of finite posets.

Published Abstracts

A Zero-one Law for Modal Logic S4—Bulletin of Symbolic Logic, Sep.2025.

A Zero-one Law for Propositional Intuitionistic Logic—Bulletin of Symbolic Logic, Sep.2024.

Talks

ANU Computing Foundations — *Seminar.* Apr.2026-A Domain-Theoretic Approach to Approximations of Lower Semi-Computable Semi-Measures, Aug.2025-Solomonoff Induction from Foundations to Prediction, Jun.2025-Asymptotic Enumeration of Partially Ordered Sets.

Australasian Association for Logic — *Conference.* Nov.2025-Asymptotic probabilities in modal logic S4, Nov.2024–Asymptotic probabilities in intuitionistic propositional logic.

Experience & Projects

TorahGPT — *Personal Project*
Sep.2026-Two character-level GPT-style transformers, trained from scratch in PyTorch on the Hebrew Torah and the King James Bible, exported to ONNX and run entirely in the browser (torahgpt.io).

Australian National University — Computer Science — *Tutor*
2025/2026-Taught classes in formal methods COMP1600, mathematical logic COMP2620, and SWE COMP3500.

PwC — World Museum Artefact Digitisation — *Software Engineering Consultant*
Nov.2022/Feb.2023–Developed a proposal and implementation strategy for the digitisation of artefacts held at the World Museum in Liverpool.

Roque Group — Consensus Algorithm Design & Implementation — *Software Engineer*
Nov.2021/Mar.2022–Designed and implemented a proprietary variant of the Paxos algorithm for reaching consensus under uncertainty in a closed distributed system (Java).

Maptek — Block Compression Algorithm — *Software Engineering Intern*
Jul.2021/Jul.2021–Designed and helped implement a compression algorithm for .csv files. The goal of the project was to reduce data transfer times between Maptek and its clients (C++).

Awards & Scholarships

Iliad Fellowship (Iliad.ac) — *Research Fellowship & Program Intensive*
Nov.2026/March.2027–Value: $25,000 (AUD). Awarded by Iliad.ac, research fellowship and program intensive in applied mathematics for AI safety.

Australian National University (ANU) — *RTP Scholarship*
Apr.2025/Dec.2028–Value: $152,616 (AUD). Awarded by ANU.

Association for Symbolic Logic (ASL) — *Student Travel Award*
Nov.2023-Nov.2026–Value: $1996 (AUD). Granted by the ASL.

Technical Skills

Proficient: C, C++, Python, Java, Dafny, Prolog; Basic: Lean, PyTorch, MySQL, Node.js, Vue.js, JavaScript, HTML, CSS