Hong Kiat, Tan

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Education

University of California, Los Angeles

- **Ph.D.** Candidate, Mathematics. Aug 2021 – Jun/Dec 2026
- Advisor: Andrea L. Bertozzi. (GPA: 3.98/4.00)
- **Masters of Arts** in Mathematics. Aug 2021 – Jun 2022
- Relevant Courses: Statistical Learning, High-dim Statistics, Optimization, Causal Inference, Functional Analysis, PDEs.

National University of Singapore

- **Bachelor of Science (Honours)** in Applied Mathematics with Highest Distinction. Aug 2017 – May 2021
- Second Major in Physics and Minor in Statistics. (GPA: 4.97/5.00)
- *Ho Family Prize* – Top graduating student in Applied Mathematics, with 28 A+'s in Math/Physics/Statistics courses.
- Relevant Courses: Math of Machine Learning, Bayesian Statistics, Differential Geometry, Statistical Mechanics.

Industrial/Work Experiences

Quantitative Research Intern, WorldQuant Intraday Team Sep 2025 – Dec 2025

- Developed tensorized infrastructure in Python using amortized singular value decomposition for regression analysis.
- Productionized features from limit order book data pipeline via Slurm-orchestrated C++ infrastructure.

Data Scientist Intern, Amazon Search Data Science and Economics Jun 2025 – Sep 2025

- Pioneered novel framework combining ℓ^0-changepoint detection with multi-agent LLMs for 78 search metrics in 17 locales to generate interpretable economic insights. (Paper with public dataset submitted to a conference.)
- Built agentic production pipeline on AWS Bedrock AgentCore using Strands/LangChain with ECS/Docker orchestration.
- Spearheaded agentic coding initiatives and authored internal documentation on MCP servers and workflows.

Academic Experiences

Graduate Research Assistant, UCLA 2022 – Present

- Developed a modified vector autoregressive framework using causal inference and double machine learning for confounding-adjusted lag detection in time series, implemented in Python with EconML. (Submitted to a conference.)
- Architected a novel object-oriented Python framework for continuum traffic modeling, integrating game-theoretic equilibrium, PDEs on directed graphs, and stochastic block coordinate descent optimization algorithms.
- Designed numerical PDE schemes in Python with penalized regression for physics-informed flux functions and proved convergence using functional analysis and differential topology.

Graduate Teaching Assistant, UCLA 2021 – Present

- Developed 786 pages of instructional materials across 10 quarters for advanced mathematics courses (Algorithms, Probability, Graduate PDEs, Mathematical Finance, and Analysis), with an average teaching evaluation of 8.6/9.0.

Undergraduate Research Assistant, NUS 2020 – 2021

- Developed a numerical scheme incorporating hypothesis testing and regression in R for quantum field theory simulations.
- Co-authored a 148-page paper investigating a fundamental conjecture in mathematical general relativity.

Undergraduate Research Assistant, UNC – Chapel Hill 2019

- Designed Bayesian hierarchical models for analyzing astrophysical data with Markov chain Monte Carlo samplers in R.

Undergraduate Teaching Assistant, NUS 2019 – 2021

- Served as TA for discrete structures and Python programming across 5 semesters, with average feedback score of 4.8/5.0.

Selected Publications

- *Generic Structural Stability for Riemann Solutions to 2 × 2 System of Hyperbolic Conservation Laws.*
  H.K. Tan, A. L. Bertozzi. || SIAM Journal of Mathematical Analysis.
- *Hierarchical Bayesian Thermonuclear Rate for the 7Be (n, p) 7Li Big Bang Nucleosynthesis Reaction.*
  R.S de Souza, **H.K. Tan**, A. Coc, C. Iliadis. || The Astrophysical Journal 894 (2), 134.

Technical Skills & Professional Activities

- *Programming Languages*: Python, C++ (Intermediate), SQL (PostgreSQL), R, LaTeX.
- *Libraries/Frameworks*: PyTorch, LangChain, Strands, MCP, EconML, scikit-learn, pandas, NumPy, causal-learn, cvxpy.
- *Cloud & DevOps*: AWS (AgentCore, ECS/Fargate, Lambda, Bedrock, Glue), GCP, Docker, Linux (Slurm), Git.
- *Service*: Reviewer for AISTATS 2026. *Certification:* BlueDot Impact Technical AI Safety Course.