LIN TU

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SUMMARY

Software engineer with 7+ years of experience spanning **semiconductor (ASML)**, **numerical simulation**, and **quantitative finance**. PhD-track researcher in computational plasma physics (University of Vienna) with peer-reviewed publications (200+ citations). Currently building AI-driven stock prediction systems integrating GPT sentiment analysis, Monte Carlo particle simulation, and multi-objective genetic algorithm optimization (NSGA-II). Deep expertise in C/C++ numerical computing, Python data pipelines, and OPC model optimization.

EXPERIENCE

Software RD Engineer — iStart Software

Mar 2022 – Present

- Develop and maintain Verilog simulation pipelines for hardware verification.
- Build automated testing frameworks to validate hardware design iterations.
  Tech: Verilog, Python, Hardware simulation

Software Engineer — Moldex3D

Nov 2021 – Mar 2022

- Implemented C++ numerical solvers for **Finite Volume Method (FVM)** simulations in injection molding and CVD deposition processes.
- Optimized computational performance of large-scale 3D fluid dynamics calculations.
  Tech: C++, FVM, Numerical simulation, CVD modeling

IT Engineer — Metawin

Jul 2021 – Nov 2021

- Managed IT infrastructure and designed internal tool layouts.
- Automated system administration workflows using Bash and Linux tools.
  Tech: Bash, Linux, IT infrastructure

Senior Field Engineer — ASML Brion

Aug 2019 – Nov 2020

- Performed **OPC model parameter optimization** and data analysis for advanced lithography process control.
- Developed **OPC AI model training pipelines** — data cleaning, outlier removal, and AI flow integration for semiconductor manufacturing.
- Maintained parallel computing systems on Linux workstations; ensured stable operation of high-throughput computation clusters.
- Communicated directly with fab customers to translate requirements into technical solutions.
  Tech: Python, Bash, Lua, OPC modeling, Parallel computing, Linux

Software Engineer — Mirle Automation

Jan 2018 – Aug 2019

- Built C/C++ and Matlab simulation environments for automated mechanical arm controllers, replacing costly physical experiments with virtual testing.
- Co-filed a **patent** after achieving 10x accuracy improvement in controller simulation over one year of iterative development.
- Designed AutoCAD-integrated workflows for experimental parameter management.
  Tech: C/C++, Matlab, AutoCAD, Bash, Controller simulation

PROJECTS

AI-Powered Stock Prediction System (News_DB) — 8,900+ lines, Personal Project

- End-to-end quantitative pipeline: news scraping, GPT sentiment analysis, directional particle simulation (5,000 particles/stock), and Discord alerting for 31 Taiwan-listed equities.
- Built **NSGA-II multi-objective optimizer** from scratch — dual-objective minimization (direction error + price MAE) across 6-dimensional parameter space with SBX crossover and polynomial mutation.
- Automated daily scheduler (pre-market/intra-day/post-market) with comprehensive backtesting framework against 2+ months TWSE/TPEX historical data.
  Tech: Python, NumPy, Pandas, OpenAI GPT API, BeautifulSoup, TWSE/TPEX APIs, Discord Webhooks

EUV Photoionized Particle Simulations — **Published Research (200+ citations)**
- Modeled extreme UV and X-ray driven high-energy evolutionary tracks of solar-like stars; published with Johnstone, Colin P.; Güdel, Manuel; Lammer, Helmut (2014).
- Simulated solar XUV-driven water loss from early Venus atmosphere including charge-exchange, photo-ionization, and non-thermal escape processes.
- Developed thermal ray-tracing model for sublimation-driven exospheric dynamics of Ceres.
  Tech: Fortran, C, Matlab, Computational physics, Monte Carlo methods

ML in C++ & Systems Programming
- Implemented SVM, K-means, Gaussian Processes, CNN, and autoencoders using Shogun ML framework in C++; OpenCV facial recognition (Eigenfaces).
- POSIX systems programming: IPC (pipes, shared memory, message queues), pthreads, signal handling, socket client-server, daemon processes.
  Tech: C/C++, Shogun ML, OpenCV, POSIX API, pthreads

Cybersecurity & OSINT
- Deployed Sherlock (300+ social networks), SQLmap (10+ DBMS), Spiderfoot, and OWASP Nettacker for penetration testing and reconnaissance.
  Tech: Python, SQLmap, Sherlock, Docker, Tor

EDUCATION

PhD Candidate — Computational Plasma Physics — University of Vienna, Austria
Jul 2014 – Jun 2017

Research on energetic particle deposition, computer hydromechanics. Multiple peer-reviewed publications on planetary atmospheric escape simulations.

M.S. — Institute of Space Science — National Central University, Taiwan
Sep 2011 – Jun 2014
Thesis: *The Seasonal Exchange Model of Polar Caps of Vesta*

B.S. — Department of Atmospheric Science — National Central University, Taiwan
Sep 2007 – Jun 2011

TECHNICAL SKILLS

Languages	Python (expert), C/C++ (advanced), Verilog, Matlab/Simulink, Lua, Bash, Swift, SQL
ML / AI	NSGA-II, Genetic Algorithms, SVM, KNN, CNN, Autoencoders, PCA, Gaussian Processes, OpenAI GPT API, LangChain, RAG,
Simulation	Monte Carlo methods, FVM, Thermal modeling, OPC optimization, Particle-in-cell, Kalman filters, Numerical optimization (Broyde
Finance	Particle simulation models, EMA/RSI/Momentum, Backtesting, TWSE/TPEX APIs, Institutional flow analysis
Tools	Git, Docker, Linux, AutoCAD, Xcode (iOS), Jupyter, Discord Webhooks, Web scraping (BeautifulSoup), OpenCV
Security	OSINT (Sherlock, Spiderfoot), SQLmap, Nettacker, Tor

SELECTED PUBLICATIONS

- Tu, Lin; Johnstone, Colin P.; Güdel, Manuel; Lammer, Helmut. "The extreme ultraviolet and X-ray Sun in Time: High-energy evolutionary tracks of a solar-like star." (2014) — **200+ citations**
- Tu, Lin et al. "Solar XUV and ENA-driven water loss from early Venus' steam atmosphere." (2014)
- Lin, Tu and Wing-Huen, Ip. "Time Variability of the Global Temperature Distribution of Mimas." (2015)
- Lin, Tu and Wing-Huen, Ip, Y.-C. Wang. "A Sublimation-driven Exospheric Model of Ceres." (2014)

References available upon request