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Jihoon Suh

E-mail: **suh95@purdue.edu**
Nationality: **U.S. Citizen**
Military: **U.S. Army Reserve (2015–2021)**

Personal Website
LinkedIn
Google Scholar
GitHub Repository
YouTube

Research Focus

Control Theory, Reinforcement Learning, Encrypted Control, Optimization, Cryptography

Education

Purdue University
— **Ph.D.** in Control Theory (Expected Graduation: **May '26**, Advisor: Prof. Takashi Tanaka) – GPA: 4.00
Thesis: Encrypted Control Synthesis for Privacy-Preserving Cloud-based Control

The University of Texas at Austin
— **B.S.** in Aerospace Engineering (Math minor, Dec '18) & **M.S.** in Control Theory (Dec '20) – GPA: 3.87

Experience

GRA, **Networked Control Systems Lab** (UT Austin & Purdue) **08/2020 – Present**
- Established encrypted relative-entropy-regularized reinforcement learning (RERL) for efficient encrypted RL
- Prototyped encrypted value/policy iteration over fully homomorphic encryption (MDP, DP, RL, FHE)
- Enabled multi-agent encrypted control through bridging the market-based control (Riccati, LMI, MPC)
- Created rotary inverted pendulum platform and Crazyflie drone swarm (Python, C++, Experiments)

Research Lead, **Nika Capital** (side project with colleagues) **Summer 2023, 2024**
- Search and test trade opportunities in cryptocurrency market
- Built a comprehensive data processing (market, news, on-chain) & trade execution system

Machine Learning Intern, **Draper Laboratory** **05/2021 – 08/2021**
- Training and implementation of RNNs for DARPA CAML project (ALPACA)
- State-space-based world model extraction from RNN and stability analysis
- Refine training simulation for benchmark RL tasks

MAVNI Soldier, US Army **12/2015 – 12/2021**
- Top graduate from the entire battalion of training class (academic & physical)
- Leadership positions (squad & platoon) conducting classes and organizing training
- MOS: 92A (Automated Logistics Specialist)
- ASVAB: 97, Foreign Language Specialist – Korean

Technical Skills

Programming: Python, MATLAB, C++ (from most used to least used; left to right)
Tools: CVXPY, YALMIP, Gurobi, MOSEK, PyTorch, NumPy, SciPy, Pandas, CCXT, Git, ROS, Microsoft SEAL
Selected Coursework: Feedback Control Theory, Optimal/Robust/Stochastic Control Theory, Linear Systems, Statistical Estimation Theory, Machine Learning, Game-Theoretic Modeling of Multi-Agent Dynamical System, Nonlinear Dynamics and Control, Graduate Cryptography, Statistical Inference, Convex Optimization

Publications

[J1] Suh, J., & Tanaka, T. (2025). Efficient implementation of reinforcement learning over homomorphic encryption. *Journal of The Society of Instrument and Control Engineers*, *64*(4), 223–229

[J2] Suh, J., Jang, Y., Teranishi, K., & Tanaka, T. (2025). Relative entropy regularized reinforcement learning for efficient encrypted policy synthesis. *IEEE Control Systems Letters*, *9*, 895–900

[C1] Suh, J., & Tanaka, T. (2021b). SARSA (0) reinforcement learning over fully homomorphic encryption. *2021 SICE International Symposium on Control Systems (SICE ISCS)*, 1–7

[C2] Suh, J., & Tanaka, T. (2021a). Encrypted value iteration and temporal difference learning over leveled homomorphic encryption. *2021 American control conference (ACC)*, 2555–2561

[C3] Suh, J., & Tanaka, T. (2023). Encrypted price-based market mechanism for optimal load frequency control. *IFAC-PapersOnLine*, *56*(2), 11203–11208

[C4] Suh, J., Hibbard, M., Teranishi, K., Tanaka, T., Jah, M., & Akella, M. (2024). Encrypted computation of collision probability for secure satellite conjunction analysis. *75th International Astronautical Congress*

[C5] Jang, Y., Teranishi, K., Suh, J., & Tanaka, T. (2026). Privacy-preserving fully distributed gaussian process regression. *(Under Review) The 40th Annual AAAI Conference on Artificial Intelligence*

Teaching Experience

Teaching Assistant – The University of Texas at Austin

Duties: Grading, **conducting large class lectures**, course materials, student interactions, and office hours.

- Feedback Control Systems (Prof. Tanaka, Prof. Topcu): Sp2021, Sp2023, Fa2023, Sp2024
- Linear Systems Analysis (Prof. Bakolas): Fa2023, Fa2024
- **Reference available** (Prof. Ufuk Topcu)

Mentoring / Advising

Mentor for REACT-REU (media) 🔗, The Center for Autonomy at the Oden Institute, 05/2023 – 08/2023,

- Mentoring undergraduate students while leading a research project on Crazyflies quadcopter formation flying with Python and basic motion planning (Mentees: Ian Cornwell, Alayasia Thomas).

Poster Presentations

Encrypted Control Experimental Demonstration, Industry Visit at the Auto GNC Lab, 2020.

Community Engagement

Encrypted Inverted Pendulum Demonstration at Explore UT 🔗, 2019, 2020.

Honors & Service

Bob E. Schutz Presidential Fellowship in Aerospace Engineering (2022–2023)
Reviewer: TAC, TCNS, CDC, ACC, ECC, IFAC, L-CSS, Automatica, RA-L, IROS