Alexander Wiegand

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EDUCATION

Stony Brook University, Honors College — Stony Brook, NY
Bachelor of Engineering in Computer Engineering — Expected May 2028
Double Major in Applied Mathematics and Statistics
Honors: GPA: 3.9, Dean's List (4 Semesters)
Relevant Coursework: Parallel Computing (Graduate), VHDL Design, Computer Architecture, Embedded Systems, Probability, Statistics, Data Structures and Algorithms

WORK EXPERIENCE

Reliable Systems Lab — March 2026-Present
Undergraduate Researcher, Supervised by Professor Stoller and Professor Smolka — Stony Brook, NY

- Collaborating with 2 faculty, a professional researcher, and 2 graduate students to iteratively refine multi-agent MPC and neural-network-based control architectures, incorporating experimental feedback to improve collision avoidance and target-seeking performance in flocks of 8-20 agents
- Automating simulation and expert policy execution pipelines in Python and MATLAB to generate 500k+ state-action samples for Risk-Aware DAgger imitation learning in 800+ time steps
- Leveraging Slurm workload management on Linux-based HPC clusters to enable large-scale, computationally intensive control and reinforcement learning controller experiments

Stony Brook Robotics Team — August 2025-Present
Software Lead — Stony Brook, NY

- Co-architecting a 12-node ROS2 software stack in C++ and Python integrating autonomous navigation, perception, and controls across 15+ developers for the international URC and MATE competitions of 100+ teams
- Leading software architecture discussions, incorporating feedback from various team members and other team leads
- Integrating computer vision, machine learning, and control systems with STM32s via PWM, UART, and I2C to transition behaviors and policies from Gazebo simulations to physical deployment
- Integrating LiDAR, depth cameras, and IMU sensors to support autonomous navigation and environment perception

Stony Brook Tutoring Center — August 2025-Present
Lead Tutor — Stony Brook, NY

- Conducting one-on-one coaching sessions with peer tutors, delivering constructive feedback and helping improve implementation of tutoring strategies and student engagement in learning
- Tutoring 20+ students in advanced programming, linear algebra, discrete math, and embedded systems
- Leading and mentoring 10+ peer tutors in tutoring strategies and communication while assisting in trainings sessions

PROJECTS

FPGA Signature Analyzer — April 2026-May 2026

- Designed and implemented a digital signature analyzer using VHDL to verify 256-bit data streams
- Synthesized and place-and-routed designs onto FPGAs with Synplify, ispLEVER, and Lattice Diamond
- Developed a custom linear feedback shift register (LFSR) for signature generation to compress 256+ bit data streams into 16-bit signatures using FSMs
- Wrote VHDL testbenches to verify LFSR, signature generation, and analyzer modules

AI Nerf Sentry Turret — January 2025–January 2026

- Designed and implemented a real time pan-tilt control system using OpenCV and YOLO that achieved 30 FPS object tracking and 135 degrees per second rotational speed
- Implemented predictive actuation algorithms using response curve modulation to reduce target lock time from 3 seconds to 0.75 seconds
- Developed a secure remote-control interface using Cloudflare to enable remote monitoring and operation

Clue AI Solver — November 2025-January 2026

- Built a symbolic inference engine using Python and PySAT to model uncertainty and deduce hidden information
- Used heuristic-based expected value calculations across 1000+ simulated game states using Monte-Carlo methods
- Applied discrete math principles to implement constraint-based reasoning on 160+ size sets of incomplete data

TECHNICAL SKILLS

Programming Languages: VHDL, Python, C++, C, MATLAB, Assembly
Frameworks & Libraries: ROS2, ROS, TensorFlow, YOLO, NumPy, Pandas
Development Tools: Linux, Git, GitHub, Synplify, Lattice Diamond, Aldec HDL, Slurm, Cloudflare
Areas of Interest: Autonomous Robotics Systems, Machine Learning, Reinforcement Learning, Optimization, Embedded Systems