

Alexander Nania

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EDUCATION

Stanford University

Stanford, CA

B.S. Mechanical Engineering + Minor CS. Activities: Kappa Sigma - Social Chair, Philanthropy Chair.

Expected 2028

GPA: 3.936.

Relevant Coursework: Thermodynamics, Dynamics, Statics, Electricity and Magnetism, Differential Equations, Linear Algebra, C++ and Python Programming, Information Science and Engineering, Product Realization

EXPERIENCE

Mechanical Engineer Intern, HVAC

Jun 2026 – September 2026

CRB Group

St. Louis, MO

- Produced multidisciplinary HVAC construction documents for ISO Class 7 cleanrooms and BSL-2 facilities, including equipment layouts, ductwork, and piping in Revit and AutoCAD Plant 3D.
- Applied psychrometrics and HVAC load calculations to evaluate air properties, humidity control, pressurization, and air-change requirements across regulated facility designs.
- Sized ductwork using governing airflow, friction loss, and velocity targets; evaluated vendor specifications, performance data, and pricing for equipment procurement.

Field Supervisor

Apr 2021 – Dec 2025

Midwest Pool Management

St. Louis, MO

- Directed operations across 10+ aquatic facilities and supervised management teams supporting approximately 600 seasonal employees.
- Led facility audits and inspections, enforced health and safety protocols, and coordinated emergency response.

PROJECTS

Liquid-Cooling Heat Transfer Test Rig | Personal Project

Jun 2026 – Present

- Designed and instrumented a 150 W closed-loop liquid-cooling test rig to determine minimum coolant flow while maintaining an 85°C equipment limit.
- Characterized convective heat transfer across the laminar-to-turbulent transition using Reynolds, Nusselt, and Prandtl analysis; benchmarked results against the Dittus-Boelter correlation.
- Developed an Arduino/NTC-thermistor data-acquisition system with cross-calibration and oversampling to resolve sub-1°C temperature differences and quantify the fluid-side energy balance.

Dynamic Control of Direct-to-Chip GPU Cooling Simulation | Personal Project

Jun 2026 – Present

- Developed a three-state lumped-capacitance thermal model under stochastic GPU loads with an 85°C junction constraint and cubic pump/fan power scaling.
- Benchmarked reactive, predictive, and power-capping control strategies; dynamic pump/fan co-control reduced modeled cooling energy approximately 44% versus matched baselines, incorporating flow-dependent cold-plate resistance and SVD-based identifiability analysis; cross-method convergence verification ongoing.

Signal Coding: Image Compression and Digital Communication | Python, NumPy, SciPy

April 2025

- Built a JPEG-style image codec (Huffman, 2-D DCT, quantization, chroma subsampling) and an acoustic modem (on-off keying, bandpass filtering, Viterbi decoding) from primitives; within 1% of the Shannon entropy bound, error-free to 700 bit/s.

SKILLS

Engineering: heat transfer, thermodynamics, fluid mechanics, thermal modeling, dynamic controls, data acquisition, psychrometrics, HVAC design, ISO Class 7 cleanrooms, BSL-2 facilities

Software & Programming: Python, NumPy, SciPy, Matplotlib, Arduino, Revit, AutoCAD Plant 3D, Fusion 360, C++, Java, R, Julia

Languages: English, Russian, Latin (reading)