

Yuan Gilbert

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📍 Madison, WI 53703

SUMMARY

Early career mechanical engineer with graduate research focused on thermal fluid analysis, **electronics cooling**, and experimental validation. Developed **liquid cooling** loops, cold plate systems, heat exchanger concepts, heat pipes, and vapor chambers for high heat flux applications. Built steady state and transient models in Python and MATLAB for heat transfer, pressure drop, coolant distribution, and system performance. Connected simulation results with controlled laboratory measurements through **design of experiments**, instrumentation, data acquisition, and uncertainty aware analysis. Created SolidWorks models, P&IDs, engineering drawings, test plans, and configuration records for repeatable research work. Applied regression, machine learning, and **data driven methods** to thermal datasets while retaining physics based interpretation. Collaborative research and design leadership experience supports practical evaluation of cooling technologies, clear technical communication, and sound engineering decisions.

EDUCATION

Master of Science in Mechanical Engineering	2026
University of Wisconsin Madison GPA: 4.0	Madison, WI
<i>Coursework: Heat Transfer, Fluid Dynamics, Thermal Systems, Experimental Methods</i>	
Bachelor of Science in Mechanical Engineering	2024
University of Wisconsin Madison GPA: 4.0	Madison, WI
<i>Coursework: Thermodynamics, Fluid Mechanics, Heat Transfer, Mechanical Design</i>	

TECHNICAL SKILLS

- **Thermal Analysis:** Heat transfer, fluid dynamics, thermal resistance
- **Cooling Architectures:** Liquid cooling, two phase cooling, passive cooling
- **Heat Transfer Hardware:** Cold plates, heat pipes, vapor chambers
- **Heat Exchangers:** Compact heat exchangers, heat exchanger design, thermal performance
- **Thermal Modeling:** Steady state modeling, transient modeling, thermal fluid modeling
- **Flow Analysis:** Pressure drop, coolant distribution, flow allocation
- **Experimental Methods:** Design of experiments, experimental testing, model validation
- **Instrumentation:** Thermocouples, pressure sensors, flow sensors
- **Data Acquisition:** DAQ systems, sensor calibration, laboratory measurements
- **Engineering Software:** Python, MATLAB, SolidWorks
- **Engineering Documentation:** P&IDs, engineering drawings, test plans
- **Data Science:** Machine learning, regression, data driven methods

SKILLS

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|-----------------------|----------------------|--------------------|--------------------|
| • Heat transfer | • Liquid cooling | • DOE | • Machine learning |
| • Fluid dynamics | • Heat exchangers | • Model validation | • SolidWorks |
| • Thermal systems | • Cold plates | • Instrumentation | • Python |
| • Electronics cooling | • Transient modeling | • Data acquisition | |

EXPERIENCE

Graduate Thermal Systems Research Assistant, Thermal Fluid Research	September 2024 - September 2026
University Research Lab	Madison, WI
Led supervised graduate research supporting liquid cooling experiments, thermal fluid modeling, passive two phase concepts, and data driven analysis. Owned laboratory documentation and collaborated with faculty and peers on design choices, validation, and research communication.	
• Developed liquid cooling loop with cold plate, pump, heat exchanger, sensors, and pressure instrumentation. • Built Python and MATLAB models predicting heat transfer, pressure drop, and coolant distribution during experiments. • Created SolidWorks models, P&IDs, drawings, test plans, and configuration records for repeatable laboratory builds. • Designed DOE matrices varying flow rate, inlet temperature, and heat load for thermal resistance analysis. • Applied regression and machine learning workflows to thermal datasets while preserving physics based interpretation. • Evaluated heat pipes, vapor chambers, cold plates, and heat exchangers for electronics cooling tradeoffs.	
Mechanical Engineering Thermal Design Lead, Rack Cooling Prototype	January 2024 - May 2024
Capstone Project	Madison, WI

Directed thermal design for a rack scale electronics cooling prototype, coordinating component modeling, mechanical design, instrumentation, validation planning, and technical review. Translated system requirements into practical hardware decisions for a laboratory **data center** representation.

- Led rack scale cooling design covering component heat loads, coolant routing, and heat rejection.
- Developed **MATLAB** framework estimating component temperatures, coolant rise, pressure losses, and flow allocation.
- Designed cold plate interfaces and mechanical components in **SolidWorks** for prototype fabrication and integration.
- Planned temperature, pressure, and flow **instrumentation** around defined **model validation** objectives in test plans.
- Compared **liquid cooling**, heat pipe, and vapor chamber concepts through documented design tradeoffs.
- Presented model comparisons, limitations, and recommended experiments during faculty design review.

Thermal Fluid Research Assistant, Experimental Analysis

September 2023 - December 2023

Academic Research

Madison, WI

Supported supervised thermal fluid research on compact **heat exchangers** through laboratory preparation, instrumentation calibration, analytical modeling, data processing, and technical reporting. Produced repeatable analysis that connected measured operating conditions with thermal performance and model limitations.

- Investigated compact heat exchanger behavior across flow conditions, **pressure drop**, and heat transfer performance.
- Implemented **Python** scripts cleaning **data acquisition** files, calculating thermal quantities, and visualizing experimental behavior.
- Constructed **steady state models** using **heat transfer** and fluid dynamics principles for measured test conditions.
- Calibrated thermocouples, differential pressure sensors, and flow instrumentation before structured laboratory testing.
- Explored data driven thermal response prediction and compared limits against physics based analytical methods.
- Produced technical documentation describing methods, assumptions, results, uncertainty, and follow up experiments.

PROJECTS

Rack Scale Electronics Cooling Study 📅 2024

Connected thermal architecture decisions with practical engineering purpose by modeling component loads, coolant routing, heat rejection, and validation methods for a laboratory scale data center cooling concept.

Compact Heat Exchanger Validation Study 📅 2023

Explored how careful measurement can improve engineering judgment through Python analysis, calibrated instrumentation, pressure drop modeling, heat transfer evaluation, and uncertainty aware comparison.

LEADERSHIP & AWARDS

- Graduate Research Poster Recognition, 2026, awarded for clear thermal systems research communication.
- Dean's List, 2023 and 2024, recognized sustained academic performance in mechanical engineering.
- Mechanical Engineering Capstone Design Team Lead, coordinated thermal design decisions and final technical review.

CERTIFICATIONS

- MATLAB Onramp, MathWorks 📅 2024
- Machine Learning with Python, Coursera 📅 2025

PROFESSIONAL AFFILIATIONS

- Graduate Research Peer Mentor, University Research Lab, supported colleagues with thermal testing and analysis.
- Mechanical Engineering Capstone Design Team Lead, coordinated prototype design reviews and technical documentation.

LANGUAGES

- English (Native)
- Spanish (Intermediate)

ADDITIONAL INFORMATION

Work Status : Authorized to work in United States. No sponsorship required.

REFERENCES

AVAILABLE ON REQUEST