

River Huff

SUMMARY

Mechanical engineering graduate student pursuing thermal systems work through supervised research, laboratory study, and capstone design. Builds and runs **CFD** and other **simulation models** for integrated data center cooling concepts, then examines thermal, fluid, and electrical interactions with careful attention to assumptions, boundary conditions, mesh quality, and validation evidence. Research has covered airflow modeling, liquid loop simulation, heat transfer, fluid dynamics, model verification, reduced order modeling, **predictive analytics**, and resilient system concepts. Academic collaboration with faculty and student design teams has strengthened technical communication, simulation planning, and engineering judgment. Work translates model results into practical design insight while connecting efficiency, reliability, and system level performance. Ready to contribute thoughtful analysis, clear documentation, and dependable collaboration within a thermal engineering team.

EDUCATION

Master of Science in Mechanical Engineering, Thermal and Fluid Systems
Colorado State University GPA: 4.0

2027
Fort Collins, CO

Coursework: Computational Fluid Dynamics, Heat Transfer, Fluid Dynamics, Numerical Analysis, Thermal Systems Design

TECHNICAL SKILLS

- **CFD Software:** Computational Fluid Dynamics, Airflow Modeling, Mesh Quality
- **Thermal Analysis:** Heat Transfer, Convection, Thermal Loads
- **Fluid Systems:** Fluid Dynamics, Liquid Cooling, Liquid Loop Simulation
- **Numerical Methods:** Numerical Analysis, Model Verification, Reduced Order Modeling
- **Programming:** Python, Data Analysis, Simulation Scripting
- **Predictive Analytics:** Predictive Analytics, Deep Learning, Efficiency Optimization
- **Electrical Modeling:** Electrical Performance, Electrical Loads, Load Interactions
- **Validation Methods:** Model Validation, Validation Evidence, Boundary Conditions
- **Data Center Systems:** Data Center Cooling, Integrated Thermal Systems, Cooling Architecture
- **Engineering Documentation:** Simulation Requirements, Technical Reporting, Reference Design Strategy

SKILLS

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|-----------------------|------------------------|--------------------------|---------------------------|
| • CFD | • System simulation | • Thermal analysis | • Deep learning |
| • Heat transfer | • Model validation | • Electrical performance | • Reference design |
| • Fluid dynamics | • Python | • Simulation models | • Technical documentation |
| • Data center cooling | • Predictive analytics | • Numerical analysis | |

EXPERIENCE

Thermal Systems Research Assistant
University Research Lab

September 2025 to Present
Fort Collins, CO

Supports supervised thermal systems research spanning data center airflow, liquid cooling test loops, CFD model development, validation, and technical reporting. Shares findings with faculty and student design teams, connecting simulation evidence with practical cooling architecture decisions.

- Built **CFD** airflow models for data center zones, clarifying temperature distribution and circulation behavior.
- Simulated liquid cooling loops with Python, supporting review of flow and heat transfer behavior.
- Checked mesh quality and boundary conditions, improving confidence in model verification discussions.
- Compared thermal and electrical load scenarios, informing resilient system concept decisions.
- Presented simulation findings to faculty and design teams, gaining clear technical agreement.
- Documented assumptions and validation evidence, creating traceable support for engineering review.

Data Center Cooling Researcher
Colorado State University Capstone Team

January 2026 to May 2026
Fort Collins, CO

Contributed to an integrated data center cooling concept that combined airflow, liquid loop, and electrical load scenarios. Coordinated modeling tasks with student designers and translated results into reference design recommendations focused on efficiency and resilience.

- Defined **simulation requirements** with faculty leads, aligning airflow and liquid loop studies with design questions.
- Modeled integrated cooling scenarios in **CFD**, revealing interactions between thermal and electrical loads.
- Evaluated **predictive analytics** outputs, helping compare efficiency and resilience across reference concepts.

- Validated model behavior against expected heat transfer trends, supporting defensible design conclusions.
- Coordinated review sessions with student designers, resolving assumptions before final analysis.
- Documented model limitations and results, giving reviewers clear context for design decisions.

Thermal Fluid Simulation Student

August 2024 to December 2025

Student Lab

Fort Collins, CO

Completed supervised laboratory studies in convection, fluid flow, heat exchangers, and numerical simulation. Applied structured measurement, model comparison, and technical reporting methods that built a strong foundation for thermal system analysis.

- Analyzed convection experiments with Python, connecting measured temperatures to heat transfer calculations.
- Simulated fluid flow cases, comparing numerical trends with supervised laboratory observations.
- Evaluated heat exchanger results, identifying assumptions that affected predicted **thermal performance**.
- Verified numerical models through mesh checks, residual review, and comparison with expected behavior.
- Coordinated laboratory data reviews with classmates, improving consistency across submitted analyses.
- Recorded methods and findings clearly, helping faculty assess modeling judgment and technical growth.

PROJECTS

Reduced Order Cooling Analytics 📅 2026

Created an academic reduced order analysis for cooling system optimization, linking simulation outputs with predictive analytics and practical efficiency comparisons.

Liquid Loop Resilience Study 📅 2025

Explored liquid loop behavior under varied thermal loads, connecting fluid performance with resilient data center cooling concepts.

LEADERSHIP & AWARDS

- Graduate Research Fellowship, 2025
- Engineering Research Poster Recognition, 2026
- Graduate Engineering Peer Mentor, 2025 to 2026

CERTIFICATIONS

- Coursera Thermodynamics Certificate 📅 2025
- Applied CFD Fundamentals, University Continuing Education 📅 2026

PROFESSIONAL AFFILIATIONS

- Thermal Fluids Graduate Seminar Coordinator, 2026
- Graduate Engineering Peer Mentor, 2025 to 2026

LANGUAGES

- English (Native)
- Spanish (Intermediate)

ADDITIONAL INFORMATION

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

REFERENCES

AVAILABLE ON REQUEST