Minghan Chu

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Google Scholar

Education

- **Queen's University** — Kingston, Ontario
  Ph.D. in Mechanical Engineering — *Sep 2018 - Jun 2022*
  Quantification of Reynolds-averaged-Navier-Stokes Model Structural Hypothesis Uncertainty in Transitional Boundary Layer and Airfoil Flows.

  Model-form uncertainty quantification for transitional boundary layer flows.

- **University of Saskatchewan** — Saskatoon, Saskatchewan
  M.Sc. in Mechanical Engineering — *Sep 2014 - Sep 2018*
  Numerical analysis of turbulent boundary layers on rough walls using a near-wall RANS model

- **University of Saskatchewan** — Saskatoon, Saskatchewan
  B.Sc. in Mechanical Engineering — *Sep 2009 - Jun 2014*

Skills Summary

- **Languages**: Python and C++
- **Tools**: OpenFOAM, Matlab, ANSYS CFX, Paraview, Pointwise, Docker
- **CFD modeling methods**: Reynolds-averaged Navier-Stokes (RANS), large eddy simulation (LES)

Journal publications

- **1**: "Quantification of Reynolds-averaged-Navier-Stokes model form uncertainty in the transitional boundary layer and airfoil flows," *Minghan Chu, Xiaohua Wu, David E. Rival, Journal of Physics of Fluids*, 2022, vol. 34, no. 10.
- **2**: "Model form uncertainty quantification of Reynolds-averaged Navier-Stokes modeling of flows over a SD 7003 airfoil," *Minghan Chu, Xiaohua Wu, David E. Rival, Journal of Physics of Fluids*, 2022, vol. 34, no. 11.
- **3**: "Prediction of turbulent flow over a flat plate with a step change from a smooth to a rough surface using a near-wall RANS model," *Minghan Chu, D.J. Bergstrom. Journal of Fluids Engineering*, 2020, vol. 142, no. 1.
- **4**: "Uncertainty Quantification in Computational Fluid Dynamics: Physics and Machine Learning Based Approaches," *Minghan Chu arXiv*, 2023
- **5**: "Multi-fidelity Deep Learning-based methodology for epistemic uncertainty quantification of turbulence models," *Minghan Chu, Weicheng Qian arXiv*, 2023

Conference papers

- **CFD Society of Canada**: **Minghan Chu**, D.J. Bergstrom. Prediction of turbulent flow in a rough pipe using a near-wall RANS model. *2017 CFD Society of Canada, Windsor, Ontario.*
- **Bulletin of the American Physical Society**: **Minghan Chu**, D.J. Bergstrom. Prediction of turbulent flow over a flat plate with a step change from a smooth to a rough surface using a near-wall RANS model. *71th American Physical Society (APS) Division of Fluid Dynamics, Denver, Colorado.*

Experience

- **Cornell University** — Ithaca, United States
  Postdoctoral Associate — *Aug 2023 - present*
  - **Inversion of real-time boundary heat fluxes**: Applying (Ensemble) Kalman filter method to the inverse heat conduction problem
  - **Inversion of heat fluxes influenced by atmospheric boundary layer**: Incorporating the Iterative Ensemble Kalman filter (IEnKF) method with RANS/LES models to address the inverse problem in the flow over urban areas
- **University of Ottawa** — Ottawa, Canada
  Postdoctoral Researcher — *Feb 2023 - Aug 2023*
  - **Computational Modelling Of Tritium Transport Due To Ocular Aqueous Humor Production And Circulation**: RANS modeling of transport of tritiated water by Aqueous Humor as a transient advection-diffusion process
- **Pratt & Whitney Canada Corp.** — Missisauga, Canada
  Intern — *Sep 2019 - Dec 2019*
  - **Transitional flow over a low Reynolds number airfoil**: Using OpenFoAM and ANSYS CFX for simulating transitional flows around an airfoil. With careful calibrations, the accuracy of the predicted outcomes showed a substantial improvement when compared to the existing high-fidelity data.

References

- **Prof. Xiaohua Wu (Ph.D. supervisor), Canada Research Chair**
  Institute: Royal Military College of Canada
  Email: Xiaohua.Wu@rmc-cmr.ca
  Phone: 613 542-8612

- **Prof. Donald Bergstrom (M.Sc. supervisor)**
  Institute: University of Saskatchewan
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