

Multiple Postdoc Openings in Combustion Modeling and Control for Multi-Fuel Unmanned Aircraft Systems (UAS) at the University of Minnesota

The University of Minnesota seeks outstanding candidates for multiple postdoctoral associates to carry out research in combustion modeling and control to develop reciprocating engine-based hybrid propulsion systems for Unmanned Aircraft Systems (UAS). Positions are generally **up to two years** but can be further renewed, depending on funding. The target start date is **July 1, 2021**, but applications will be reviewed until the positions are filled.

Basic qualifications:

- A Ph.D. in Mechanical Engineering, Aerospace Engineering, or other closely-related discipline.
- Strong publication record as a first author in peer-reviewed journal papers.
- Ability and high self-motivation to work productively and ethically, both independently and as part of a diverse team.
- Excellent verbal and written communication skills in English
- Experience in helping to supervise undergraduate and/or graduate projects.

Description of the positions and the associated qualifications:

Positions	Combustion Modeling and Simulation	Combustion Control and Optimization
Description of Tasks and Duties	Develop fast algorithms for multi-fidelity LES/RANS, reduced-order models and real-time data assimilation techniques, through both physics-based modeling and machine learning	Design real-time control hardware and software to enable multi-fuel operation for UAS, including system modeling, real-time control hardware, sensing and optimization, and experimental testing.
Required Qualifications	<ul style="list-style-type: none"> • Demonstrated experience in the modeling and simulation of turbulent combustion. • Demonstrated coding experience with chemical kinetics using platforms such as Cantera, ChemKin, and FlameMaster. • Demonstrated experience with object-oriented programming using C++, Fortran 90, and MPI. 	<ul style="list-style-type: none"> • Demonstrated experience in control-oriented modeling, linear and nonlinear control design. • Demonstrated experience in control system implementation, including both hardware and software. • Demonstrated experience with real-time control experiments, data collection and analysis.
Preferred Qualifications	<ul style="list-style-type: none"> • Prior experience of coding in OpenFOAM and/or KIVA and/or UDF coding in CONVERGE CFD for combustion CFD. • Experience using OpenMP and/or CUDA and/or OpenACC. • Experience in open-source machine learning libraries such as PyTorch and TensorFlow 	<ul style="list-style-type: none"> • Experience with powertrain system modeling and control. • Experience with both model based and data driven control system design and optimization. • Experience with automotive/UAS powertrain instrumentation and testing.
Corresponding Lab (with link)	Computational Reactive Flow & Energy Lab (CRFEL)	Automotive Propulsion Control Laboratory (APCL)
Contact	Prof. Suo Yang (suo-yang@umn.edu)	Prof. Zongxuan Sun (zsun@umn.edu)

The postdocs will also have opportunities to participate in other exciting research conducted by both labs.

Application Materials:

- A detailed academic CV (including a list of publications).
- A brief statement that highlights the research interests and skills.
- One to three publications that you are most proud of.
- Contact details of two/three references.

How to Apply

Interested prospective candidates should email the above application materials to Prof. Suo Yang (suo-yang@umn.edu) or Prof. Zongxuan Sun (zsun@umn.edu) depending on applying to which position.

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