Recruitment for Postdoctoral Researcher

1. Position

・Job type: Specially Appointed Research Fellow
・Division: Global Collaborative Research and Education Center for Integrated Flow Science (IFS-GCORE)
・Number of Positions: 1

2. Job Description/ Field of Specialization

We are seeking a highly motivated postdoctoral researcher to contribute to pioneering work in sustainable fuel combustion modeling. The focus will be on developing compact, predictive kinetic models for real-world sustainable aviation fuels (SAFs), including novel fuel blends such as ammonia–hydrocarbon mixtures. Candidates will work on the enhancement of the innovative kinetic modeling methodology through AI/ML integration, supporting the accurate modeling of combustion properties and pollutant formation for a wide range of fuels. Key areas of research include:

- Development of machine learning-assisted kinetic modeling frameworks for complex fuel mixtures.
- Investigation of pollutant formation mechanisms (e.g., PAHs, NOx, SOx) and mitigation strategies in sustainable combustion.
- Simulation and validation of ignition, flame propagation, and pollutant emissions using experimental data and computational fluid dynamics tools.
- Extension of the modeling approach to include low-temperature oxidation and ammonia co-firing for internal combustion engines.

This position is part of a larger initiative aimed at advancing clean combustion technologies and supporting decarbonization efforts in sectors such as aviation and heavy transport.

3. Required Qualifications and conditions:

- Applicants must hold a PhD in Chemical Engineering, Mechanical Engineering, Combustion Science, or a closely related discipline.
- Demonstrated expertise in combustion kinetics, chemical mechanism development, or surrogate fuel modeling is essential.
- Proficiency with kinetic modeling tools (e.g., Chemkin, Cantera), automatic mechanism generators, and related programming (e.g., Python, MATLAB) is strongly preferred.
- Experience with machine learning methods and their application in physical modeling is a significant asset.
- Prior experience in modeling pollutants (PAHs, NOx, SOx) and ammonia combustion chemistry is advantageous.
- Excellent communication skills and the ability to work independently and collaboratively in a multidisciplinary team are required.

4. Starting Date and Conditions of Employment

As early as possible after July 2025
・Type of Contract: Full-time, fixed-term contract
・Term: Renewed each fiscal year. Maximum period is March 31, 2030
・Probationary Period: 6 months.

5. Salary and Benefits:

・Annual Salary: to be determined in accordance with Tohoku University's employment regulations. Approximately 5,000,000-6,000,000 JPY per annum. Allowances for transport may be provided depending on circumstances.
・Insurance: Admission into the MEXT Mutual Aid Association; provision of unemployment insurance and worker's accident insurance
・Working Hours:
The discretionary labor system for professional work shall apply. Flexible Work Hours: The standard working hours are 8:30 – 17:15, but the actual working hours are at the discretion of each employee.
Holidays: Saturdays, Sundays, National Holidays, New Year's Holidays (Dec. 29 - Jan. 3)

6. Application deadline and required documents

・Deadline: Until filled
・Requested Documents :

I. Curriculum Vitae with photo
Postal address and email address should be included.
II. A list of research achievements (original papers, proceedings, books and commentaries, presentations at national and international conferences, patents, competitive grants received, etc.)
III. Electronic files in PDF format of three selected papers.
IV. Summary of research achievements (A4 1 page)

7. Application Method

All documents must be submitted in PDF format via the following form:
[URL]https://docs.google.com/forms/d/e/1FAIpQLSdYrJiEoMbtzuxcFcdtFsF2YjiTUEwo2n8JrkOC9MaT-LRxLQ/viewform?usp=header
If you experience technical difficulties with the online form, you may submit your application materials by email to the address below. In such cases, please use the subject line: "Postdoctoral Fellow Application – [Your Full Name]".
Email for alternative submission: [mani.sarathy@tohoku.ac.jp]
Note: Submitted materials will not be returned. Personal information will be used solely for the purpose of this recruitment.

8. Selection Process

Selection Process: After document review, an online interview will be conducted. Details of the interview will be communicated via e-mail.
Result: You will be notified of the screening results by e-mail.

For more information on the Institute of Fluid Science, visit:
https://www.ifs.tohoku.ac.jp/