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| **Yuchen Jiang** |  jiangy@ornl.gov  |  [www.linkedin.com/in/ycjiang](http://www.linkedin.com/in/ycjiang)User with solid fill [www.ornl.gov/staff-profile/yuchen-jiang](http://www.ornl.gov/staff-profile/yuchen-jiang)  |
| katsche-technology-group-address-icon 790 Emory Valley Road, Oak Ridge, TN 37830 |  424-535-9091 |

**EDUCATION**

**Doctor of Philosophy**

University of California, Los Angeles

Mechanical Engineering, School of Engineering and Applied Science GPA: 3.86 09/2019-06/2023

Major: Fluid Mechanics; Minor: Heat and Mass Transfer

*Courses: Fusion Engineering and Design, Fundamental Fluid Dynamics, Convective Heat Transfer, Viscous and Turbulent Flow, Numerical Methods for Engineering Applications, Computational Aerodynamics, Numerical Methods for Incompressible Flow, Compressible Flows*

**Master’s Degree**

University of California, Los Angeles

Mechanical Engineering, School of Engineering and Applied Science GPA: 3.94 09/2018-03/2020

**Bachelor’s Degree**

Northwestern Polytechnical University

Flight Vehicle Propulsion Engineering, School of Power and Energy GPA: 3.82 09/2014-06/2018

Minor: Business Administration, School of Management

**PROJECT & WORK EXPERIENCE**

**Postdoctoral Research Associate – Computational Liquid Metal Fluids Engineer,** ORNL 09/2023-present

* Primary work: Development and application of a Multiphysics COMSOL model for fusion reactor design purposes
* Coaxial inlet/outlet liquid metal supply system design for a fusion reactor blanket

A customized COMSOL model was built and tested (work from UCLA, see below) to characterize the flow and pressure drop in a liquid metal blanket concept, solving LM MHD related problems (step 1)

Two different designs are being compared: conventional with separate inlet/outlet ducts and advanced with co-axial inlet/outlet ducts

* Code to code comparison of mixed convection phenomenon in a horizontal rectangular duct

A COMSOL model was further developed involving LM MHD and heat transfer (step 2)

The results from COMSOL for velocity, temperature, electric currents, electric potential, and pressure are being compared with ANSYS Fluent, CFX and OpenFOAM as an international collaboration effort

* MHD, heat transfer and thermal stress analysis for Li-cooled substrate in a slow Li flow divertor

An integrated multiphysics COMSOL model coupling LM MHD, heat transfer and solid mechanics was constructed and successfully coupled (step 3)

The maximum temperature, stress and displacement of the substrate were computed and compared with the material limits to examine the feasibility of so-called “slow Li flow divertor design”

* LDRD on Magnetohydrodynamic PbLi experimental facility design

Project focuses on the design of a test facility for qualification of fusion materials and estimation of pressure drop in a liquid metal blanket, with the completed multiphysics COMSOL model used for pre-experimental analysis

**Graduate Student Researcher,** UCLA 09/2019-06/2023

* Prediction of PbLi fluid flow and temperature field in a thermal convection loop (TCL):

A thermo-hydraulics code and a COMSOL model were developed and tested for TCL in ORNL

The COMSOL model was used to predict the flow circulation velocity and temperature field

The goal of the study is to help design and analyze the TCL numerically for experimental work

The study relates to the APMT sample corrosion experiment, with no specimen/different specimen shapes

* Optimization studies for a manifold of a liquid metal blanket of a fusion reactor:

A computational model in COMSOL was created to solve the LM MHD flow in expansion manifold

The model was validated through comparison to 2D and 3D MHD solutions, analytically and numerically

A total of 150 cases were finished for deriving correlations for 3D MHD pressure drop in inlet manifolds with different expansion angles θ, Ha and Re

* Characterization of the MHD flow and pressure drop in the access ducts of a liquid metal fusion blanket:

A computational model in COMSOL was created to simulate the LM MHD flow in a fringing field

A validation of the model’s ability to predict the MHD flow with varying magnetic field was performed

Different magnetic fields were used and the effect of full/reduced field on flow was studied

A total of 80 cases were finished for deriving correlations for 3D MHD pressure drop in an inlet access duct with different maximum gradient of magnetic field γ, Ha and Re

* Course project – 2D supersonic engine inlet simulation:

MATLAB was chosen to program and solve the two-dimensional Euler equations and finite volume method (FVM) was used to construct the problem

Spatial discretization was accomplished using two-dimensional Lax-Friedrichs method

The supersonic engine inlet was constructed, computed and compared with the experimental results featuring three oblique shocks in the duct, with four different meshes from coarse to fine

* Undergrad thesis – Design and optimization of NASA67 stator airfoil performance using CST method

ANSYS ICEM and CFX were utilized to construct the geometry, mesh and conduct simulations on the NASA67 airfoil for validation

Class function/Shape function Thickness distribution (CST) method and camber line formulation were implemented to construct a novel airfoil, with its performance evaluated and compared to NASA 67 using ANSYS

**SKILLS**

**Technical**:

* Software advantages: 5-year experience with COMSOL Multiphysics to perform CFD analysis on MHD flow and heat transfer problems, proficient with ANSYS Fluent, CFX, ICEM for design and optimization, familiar with UG, SolidWorks software for CAD
* Coding capability: undergraduate course on Fortran95, C language and MATLAB; master course on C++ (UCLA CS 31), online courses on Python (UC Berkeley CS 61A, CS61B)
* Excellent PPT slides skills, Microsoft Office, LATEX writing

**Nontechnical**:

* Collaboration, Time management, Verbal and written communication, Teamwork, Adaptability, Multi-tasking

**Interest:**

* Erhu (Level 8), guitar, ping-pong, billiard sports, singing

**PATENTS**

1. Yuchen Jiang (2nd author), "A Type of Wing Vibration Reduction Structure Based on the Application of Shape Memory Spring", China, 201710115379.4
2. Yuchen Jiang (2nd author), "Noninvasive Diabetes Detector Based on Acetone Recognition", China, 201720868245.5
3. Yuchen Jiang (6th author), "A New Type of Active Aeroelastic Wing", China, [201711200196.9](http://www.soopat.com/Patent/201711200196)

**PUBLICATIONS**

1. Y. Jiang, S. Smolentsev, J. Jun, B. Pint, C. Kessel, Prediction of PbLi fluid flow and temperature field in a thermal convection loop for qualification of fusion materials, International Journal of Heat and Mass Transfer, 172 (2021) 121198.

2. Y. Jiang, S. Smolentsev, Optimization studies for a manifold of a liquid metal blanket of a fusion reactor, Fusion Engineering and Design, 194 (2023) 113902.

3. Y. Jiang, S. Smolentsev, Characterization of the MHD flow and pressure drop in the access ducts of a liquid metal fusion blanket, Fusion Engineering and Design, 201 (2024) 114262.

4. Y. Jiang, S. Aduloju, S. Smolentsev, Design and analysis of the open-surface slow Li flow divertor and comparison to fast Li flow divertor, Fusion Science and Technology, accepted for publication.

5. S. Smolentsev, T. Rhodes, Y. Jiang, P. Huang, C. Kessel, Status and Progress of Liquid Metal Thermofluids Modeling for the U.S. Fusion Nuclear Science Facility, Fusion Science and Technology, 77(7–8) (2021) 745–760.

6. Y. Jiang, S. Smolentsev, Construction of 3D MHD pressure drop correlation and flow characterization in the contraction region of a fusion blanket manifold, Fusion Engineering and Design, revision submitted.

7. S. Smolentsev, S. Aduloju, Y. Fan, Y. Jiang, D. Suarez, Overview of magnetohydrodynamic studies for liquid metal systems of a fusion power reactor at Oak Ridge National Laboratory, Nuclear Science and Engineering, accepted.

7. Y. Jiang, Modeling and Simulation of a New Tethered Wind Power System, 2018 2nd International Conference on Green Energy and Applications (ICGEA), Singapore, (2018) 183-187.

8. Y. Jiang, M. Sun, R. Xiong, Design of a noninvasive diabetes detector based on acetone recognition, Journal of Physics: Conference Series, 2018 International Conference on Electronics, Communications and Control Engineering (ICECC) 6–8 March 2018, Avid College, Maldives, 1026 (2018) 012009.

9. Q. Dong, Y. Jiang, Enterprise Management Informationization Evolution Based on Nolan Model, China Management Informationization, 2017.12.

**HONORS AND AWARDS**

**Second-place winner of "Your Science in a Nutshell" lightning talk competition**,ORNL 06/2024

**Exchange Student Scholarship**, Technische Universität Braunschweig (TUBS), Institute of Jet Propulsion and Turbomachinery (IFAS) 02/2018

**Exchange Student Scholarship**, Michigan State University (MSU) 07/2016

**Exchange Student Scholarship**, The University of Tokyo 02/2016

**First Prize Award** of Challenge Cup Contest, NPU 02/2017

**First Prize Award** of National College Mathematical Contest in Modeling, Shaanxi Province, CSIAM 09/2016

**National Scholarship**, China Ministry of Education 09/2015

**First Prize Award** of Shaanxi Mathematical Contest, Shaanxi Mathematical Society 05/2015

**COMMUNITY & SOCIAL INVOLVEMENT**

**President of Oak Ridge Postdoctoral Executive (ORPEX) FY25 Board**, ORNL 10/2024-present

**Vice Chair**, Student Association Union 09/2016-06/2017

**Volunteer**, Sunshine Education Support Project 09/2014-09/2015