

Date: 02/20/2026

**JSPS US AND CANADA ALUMNI ASSOCIATION SEMINAR PROGRAM
REPORT**

Organizer (Awardee)

Name: Baofeng Feng

Position & Affiliation: Professor, The University of Texas Rio Grande Valley

1. TITLE OF SEMINAR Mathematics of Turbulence and Shock Waves
2. DATE(S) 01/26/2026-01/27/2026
3. VENUE & CITY, STATE The University of Texas Rio Grande Valley, Edinburg-Brownsville, Texas
4. TARGETED RESEARCH AREAS (1) Turbulence (2) Nonlinear waves (3) Application of fluid dynamics
5. NUMBERS OF PARTICIPANTS TOTAL: <u>42</u> persons including <u>2</u> US and Canada Alumni Association members -US: <u>41</u> persons -CANADA: <u>0</u> persons -FROM OTHER COUNTRIES: <u>1</u> person(s) including <u>1</u> person(s) from Japan

NOTES FOR REPORT

-Executive Summary

With the support from JSPS Washington office and supplemental support from School of Mathematical and Statistical Sciences and College of Sciences of University of Texas Rio Grande Valley, the JSPS Alumni Association Seminar titled Mathematics of Turbulence and Shock Waves could be extended into a two-day event. We invited eight outstanding researchers including one Japanese researcher: Prof. Koji Ohkitani from Research Institute of Mathematical Sciences (RIMS), Kyoto University. The goals of the seminar are twofold. One is to strengthen and advance the existing collaborative researches; the other one is to provide new collaborative opportunities among researchers in USA and Japan. During these two-day seminar, the researchers from USA and Japan interacted and exchange ideas for the recent development of study of turbulence and shock waves. Three UTRGV faculty also made presentations for their most recent research related to fluid dynamics. Many graduate students and young researchers benefited a lot from this two-day seminar by learning cutting-edge research in fluid dynamics and knowing information of JSPS-supported research program and opportunities in Japan.

-Topics Discussed with Outcomes & Future Challenges

Prof. Ohkitani delivered two talks “A multi-dimensional extension of the Constantin-Lax-Majda model” and “Self-similar solutions to the 3D Navier-Stokes equations” on Jan. 26 and 27 at Edinburg and Brownsville campuses, respectively. In the first talk, a one-dimensional Constantin-Lax-Majda model is extended to higher spatial dimensions which is shown to be solvable and to form singularity. More interesting, in the second talk, Prof. Ohkitani presented a self-similar solution for the 3D Navier-Stokes equations obtained numerically by his group recently by using the explicit form of the linearized solution. However, he commented that it is still a long way to go in order to obtain the analytical self-similar solutions for the 3D Navier-Stokes equations.

Prof. Mark Hoefer, the Chair at the department of applied mathematics, University of Colorado Boulder, gave a review for the recent development of dispersive hydrodynamics. He presented a variety of developments and results in dispersive hydrodynamics utilizing modulation theory, numerical simulations, and experiment. Prof. Geng Chen from the University of Kansas, introduced the recent result on the vanishing viscosity limit from Navier-Stokes equations to the bounded variation solution of compressible Euler equations. This is a joint work with Profs. Kang and Vasseur at UT Austin. They solved a famous open problem for the Navier-Stokes equations.

Prof. Henrik Kalisch from the University of Bergen, Norway, delivered a very interesting talk titled “Neuroscience meets ocean engineering: How sound perception modeling can improve the performance of wave energy systems”. He has been working on a big project supported by Research Council of Norway and European Commission on how to convert water waves into energy. The team used Mega Roller to produce the electricity by the principle of resonance. They apply the machine learning method borrowing from what they know from Echo State Network (ESN) to improve the efficiency. In the last, Prof. Kalisch commented that it is a long way to go for the commercialization.

The invited speaker, Prof. Isaac Choutapalli from the Department of Mechanical Engineering, UTRGV, talked about the engineering design for aerospace and propulsion systems. His team explored two microstructured strategies aimed at AFRL-relevant missions: enhancing cruise efficiency of lifting surfaces and reducing skin-friction drag on non-lifting surfaces. They designed owl-inspired airfoils combining leading-edge tubercles, chordwise micro-barbules (100 μm high, 0.5 mm spacing), and a trailing-edge Gurney flap and tested the lift-to-drag ratio across Reynolds numbers from 69,000 to 138,000. At higher Reynolds numbers, they formed a distinct aerodynamic family with stronger lift carry-on toward stall, providing both efficiency and maneuver margin.

Monday, January 26, 2026

8:30-9:00 AM	Registration and Breakfast	Borderland Room
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Morning Session

9:30-10:00 AM	Welcome and opening remarks Baofeng Feng (Convener) Jaime Ortíz (Vice Provost for International Study Programs, UTRGV) Lucas Macri (Dean, COS, UTRGV) Engil Pereira (Associate Dean, COS, UTRGV) Sergey Grigorian (Director SMSS, UTRGV) Junji Urakawa (Director, JSPS Washington Office)	Borderland Room
9:30-10:00 AM	<i>JSPS Information Session</i> Junji Urakawa, Thet Win , JSPS Washington Office	Borderland Room
10:00-10:50 AM	Talk 1: <i>A multi-dimensional extension of the Constantin-Lax-Majda model</i> Talk 2: <i>Self-similar solutions to the 3D Navier-Stokes equations</i> Koji Ohkitani , Kyoto University, Japan.	Borderland Room
11:00-11:50 AM	<i>Developments in Dispersive Hydrodynamics</i> Mark Hoefer , University of Colorado Boulder.	Borderland Room
Noon-1:00 PM	Lunch break	Borderland Room

Afternoon Session

1:00-1:50 PM	<i>The L2 theory for compressible Euler equations and inviscid limit from Navier-Stokes equations</i> Geng Chen , University of Kansas	Borderland Room
1:50-2:40 PM	<i>Recent developments on singular stochastic PDEs: uniqueness, non-uniqueness, and global theory</i> Kazuo Yamazaki , University of Nebraska	Borderland Room
2:40-3:00 PM	Coffee Break	Borderland Room
3:00-3:50 PM	<i>Neuroscience meets ocean engineering: How sound perception modeling can improve the performance of wave energy systems</i> Henrik Kalisch , University of Bergen, Norway	Borderland Room
4:00-4:30 PM	<i>When Roughness Matters – Engineered Microstructures for Cruise Efficiency and Drag Reduction</i> Isaac Choutapalli , Center for Aerospace Research, UTRGV	Borderland Room
4:30-5:00 PM	<i>Multiple Phase Fluid Flow and Transport in Porous Media: Environmental Applications of Advection-Dispersion-Reaction Modeling for Water-Energy Nexus Research</i> Chu-Lin Cheng , SEEMS and CIVE, UTRGV	Borderland Room
5:00-5:30 PM	<i>Computational Hemodynamic Modeling in Pediatric Patients with Congenital Heart Disease</i> Weiguang Yang , Department of Mechanical, UTRGV	Borderland Room

Tuesday, January 27, 2026

14:15-14:45	<i>JSPS Information Session</i> Junji Urakawa, Thet Win , JSPS Washington Office	Salon Cassia BMAIN 2.402
14:45-15:00	Coffee Break	Salon Cassia BMAIN 2.402
15:00-16:00	<i>Self-similar solutions to the 3D Navier-Stokes equations</i> Koji Ohkitani , RIMS, Kyoto University, Japan	Salon Cassia BMAIN 2.402

Seminar Participants

Koji Ohkitani	RIMS, Kyoto University
Junji Urakawa	JSPS Washington Office
Thet Win	JSPS Washington Office
Mark Hoefler	University of Colorado Boulder
Henrik Kalisch	University of Bergen, Norway
Geng Chen	University of Kansas
Kazuo Yamazaki	University of Nebraska Lincoln
Jaime Ortiz	Vice Provost for ISP, UTRGV
Lucas Macri	Dean, College of Science, UTRGV
Engil Pereira	Associate Dean, College of Science, UTRGV
Sergey Grigorian	Director, SMSS, UTRGV
Isaac Choutapalli	Department of Mechanical Engineering, UTRGV
Chu-Lin Cheng	SEEMS, COS, UTRGV
Weiguang Yang	Department of Mechanical Engineering, UTRGV
Baofeng Feng	SMSS, UTRGV
Liet Vo	SMSS, UTRGV
Thoa Thieu	SMSS, UTRGV
Gifty Duah	UTRGV
Omar Sharif	SMSS, UTRGV
Madhavi Devanaboina	UTRGV
Mike Lindstrom	SMSS, UTRGV
Andrew Molen	UTRGV
Stephanie Cano	UTRGV
Andrew Alaniz	SMSS, UTRGV
Lawrence Rushdi	UTRGV
Alessandra Martinez	UTRGV
Erwin Suazo	SMSS, UTRGV
Gangadhara Boregowda	UTRGV
Megan Francis	UTRGV
Md Wasikur Rahman	UTRGV
Montserrat Lemus	UTRGV
Manohar Chakrabarti	SIBCS, UTRGV
Peggy Akabuah	UTRGV
Nguyen Buu Quan Bui	SMSS, UTRGV
Jinghao Yang	COE, UTRGV
Dambaru Bhatta	SMSS, UTRGV
Zhuanzhuan Ma	SMSS, UTRGV
Changyan Shi	SMSS, UTRGV
Yonghong Chen	SMSS, UTRGV
Bingyuan Liu	SMSS, UTRGV
Qi Lv	COE, UTRGV
Clarissa De Leon Lv	Department of Biology, UTRGV