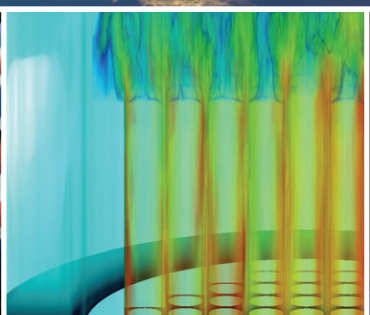
OFFICIAL PROGRAM

NURETH-16

16th International Topical Meeting on Nuclear Reactor Thermal Hydraulics

ANS

Patrick L. Pyszka - City of Chicago



Aug 30-Sept 4, 2015
Hyatt Regency
Chicago, IL

ANS Meetings

16th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-16)

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General Meeting Information

Plenary and Special Events and Sessions

NURETH-16 Technical Sessions

Additional

WELCOME TO NURETH-16

It is our great pleasure to welcome all the participants to the 16th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-16), held August 30 – September 4, 2015 in Chicago, IL, U.S.A.

Since the first meeting in 1980, NURETH series meetings are the largest international forums to present and discuss progress and advancement in research, development, and applications of the topics related to nuclear reactor thermal-hydraulics and related fields. The NURETH-16 meeting is organized by the Thermal Hydraulics Division (THD) of the American Nuclear Society (ANS) in cooperation with ANS Chicago Local Section along with many other international cosponsoring organizations.

NURETH-16 is a continuation of this outstanding NURETH series. It covers a wide range of topics of thermal-hydraulics associated with the different types of nuclear reactors of current and future generations. Almost one thousand (984) abstracts and over 750 draft papers were submitted. We would like to take this opportunity to express our sincere gratitude to the authors, reviewers and to the participants of this conference.

During the preparation of the conference, we heard about the sudden passing of our friend and colleague, Professor Mujid Kazimi, TEPCO Professor of Nuclear Engineering at Massachusetts Institute of Technology, on June 30, 2015. He was a renowned scholar, educator and researcher in nuclear technology, and leading expert in the design and analysis of nuclear power plants and the nuclear fuel cycle. With this faded light that shone so brightly for about 40 years on the thermal hydraulics community and nuclear society at large, the NURETH organizers on behalf of the community is dedicating NURETH-16 to Professor Mujid Kazimi (1947-2015). An ad-memoriam session will be held on Tuesday, September 1, 2015 featuring his contributions to making nuclear power safer, more reliable and available to all. Professor Kazimi will be missed by many. His death is a heavy loss to our community and to those who worked with him, knew him and loved him. May his soul rest in peace and his spirit live on among all of us.

The NURETH-16 technical program consists of 677 oral and poster presentations that will be delivered in five full days starting from Monday, August 31, 2015 through Friday, September 4, 2015. In the Monday morning Opening Plenary Session, Prof. B.R. Sehgal will discuss nuclear thermal-hydraulics research and development from the past to the current, immediately followed by the plenary panel session with leading nuclear engineering experts looking to the future. Twelve keynote lectures will be delivered by professionals in their respective fields of expertise on cutting edge science of interest to the audience. Publication of selected papers in archival journals will also be arranged.

NURETH-16 is also a venue for organizations to showcase their expertise in nuclear reactor technology, and for participants to enjoy several opportunities to meet sponsors who exhibit their products and services to the nuclear reactor thermal-hydraulics community.

We would like to thank all the reviewers, Session Organizers and Session Chairs/Co-Chairs for their time and effort in maintaining the high quality of the NURETH program. We would also like to express our sincere thanks to the members of the Technical Program Committee, Local Organizing Committee and ANS Chicago Local Section. Without their dedications NURETH-16 would not have been possible. Our sincere thanks are extended to all these members and volunteers.

Finally, we hope that all the participants will find the meeting very productive and your stay in Chicago very enjoyable.

Prof. M. Corradini

Prof. H. Ninokata

Prof. Y. Hassan

List of Past NURETH Meetings

1980	1st Saratoga Springs, USA	1993	6th Grenoble, FRANCE	2005	11th Avignon, FRANCE
1983	2nd Santa Barbara, USA	1995	7th Saratoga Springs, USA	2007	12th Pittsburgh, USA
1985	3rd Newport, USA	1997	8th Kyoto, JAPAN	2009	13th Kanazawa, JAPAN
1989	4th Karlsruhe, GERMANY	1999	9th San Francisco, USA	2011	14th Toronto, CANADA
1992	5th Salt Lake City, USA	2003	10th Seoul, KOREA	2013	15th Pisa, ITALY

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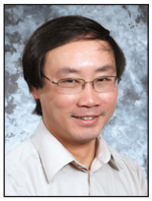

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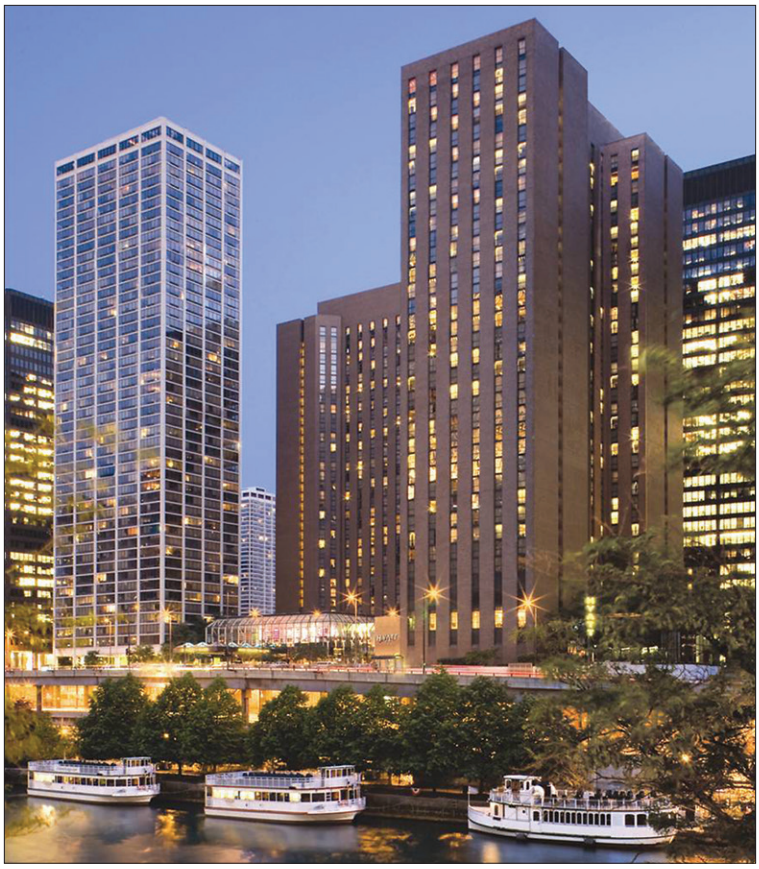
Junsoo Yoo
Yeon-Jong Yoo
Han Young Yoon
Seon-Hong Yoon
Su-Jong Yoon
Hiroyuki Yoshida
Ryuji Yoshikawa
Shinji Yoshikawa
Michael Young
Robert Youngblood
Hongxi Yu
Yiqi Yu
Kun Yuan
Peng Yuan
ByongJo Yun
Di Yun
Joseph Yurko
Robert Zboray
Omar Zerkak
Yudong Zha
Bin Zhang
Bo Zhang
Dalin Zhang
Hao Zhang
Hongbin Zhang
Youpeng Zhang
Yuxiang Zhang
Haihua Zhao
Ruichang Zhao
Dong Zheng
Ghani Zigh
Ling Zou



Meeting Information

The 16th International Topical Meeting on Nuclear Reactor Thermal Hydraulics will be held August 30 through September 4, in Chicago, IL. The meeting will be held at the Chicago Hyatt Regency Chicago, 151 East Wacker Drive, Chicago, IL 60601, telephone 844-620-0758.

Consent To Use Photographs And Videos

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For any questions or concerns about the use of your Image, please contact the ANS Meetings & Exhibits Department at meetings@ans.org.

Registration

Meeting registration and the speaker check-in desk will be located in the Regency Foyer at the Hyatt Regency Chicago, Sunday-Friday.

Meeting registration is required for all attendees and presenters. Name badges must be worn during all technical sessions and events.

Registration Hours:

Sunday, August 30
8:30 a.m.-6:00 p.m.

Monday, August 31
7:30 a.m.-5:00 p.m.

Tuesday, September 1
7:30 a.m.-5:00 p.m.

Wednesday, September 2
7:30 a.m.-5:00 p.m.

Thursday, September 3
7:30 a.m.-5:00 p.m.

Friday, September 4
7:30 a.m.-12:00 p.m.

Oral Presentation Guidelines

Each presentation is 20 minutes in length followed by five minutes of questions. Speakers are responsible to bring their own laptop or tablet. Presentation should be in PDF, PowerPoint or LateX format. Presentations should not contain any pre-recorded speech.

Speakers are encouraged to verify that their presentation works properly before the beginning of the session. A speakers' ready room is located at the New Orleans room (Hours: 9:00 a.m. - 5:00 p.m. Monday – Thursday, 9:00 a.m. – 12:00 p.m. Friday).

Speakers are asked to report to the Speaker's desk at registration and to prepare a biographical sketch in advance. The Biographical sketch should be submitted online (http://nureth16.anl.gov/meeting-information/) before Wednesday, August 26th or delivered to the session chairs.

ANS Conference Office

Sunday 11:00 a.m.- 5:00 p.m., Monday-Thursday 9:00 a.m.-5:00 p.m., Friday, 9:00 a.m.-12:00 p.m.

About ANS

To view the ANS Bylaws, Mission and Code of Ethics visit www.ans.org/about.

Schedule at a Glance

SUNDAY, AUGUST 30

8:30 a.m.-6:00 p.m.	Registration
9:00 a.m.-5:00 p.m.	NURETH-16: Workshops (includes a.m. and p.m. breaks)
6:00-8:00 p.m.	Opening Reception

MONDAY, AUGUST 31

7:30 a.m.-5:00 p.m.	Registration
8:30-10:00 a.m.	Opening Plenary—I
9:00 a.m.-5:00 p.m.	NURETH-16 Expo
10:00-11:30 a.m.	Opening Plenary—II
11:30 a.m.-1:30 p.m.	Lunch Break (lunch not provided)
1:30-3:35 p.m.	Technical Sessions
3:35-4:00 p.m.	Afternoon Break
4:00-6:30 p.m.	Technical Sessions
6:45-9:00 p.m.	Chicago Boat Tour and Dinner

TUESDAY, SEPTEMBER 1

7:30 a.m.-5:00 p.m.	Registration
8:00-9:00 a.m.	Keynote Sessions I, II, III
9:00-9:30 a.m.	Morning Break
9:00 a.m.-5:00 p.m.	NURETH-16 Expo
9:30 a.m.-12:00 p.m.	Technical Sessions
12:00-1:30 p.m.	Lunch Break (lunch not provided)
12:30-1:30 p.m.	Free Elsevier College of Skills Training Seminar
1:30-3:35 p.m.	Technical Sessions Including Special Session: Celebrating Mujid Kazimi's Legacy: *40 Years of Innovation in Nuclear Engineering*
1:30-3:35 p.m.	Technical Sessions
3:35-4:00 p.m.	Afternoon Break
4:00-6:30 p.m.	Technical Sessions
7:00-10:30 p.m.	Chicago Cubs Baseball Game

WEDNESDAY, SEPTEMBER 2

7:30 a.m.-5:00 p.m.	Registration
8:00-9:00 a.m.	Keynote Sessions IV, V, VI
9:00-9:30 a.m.	Morning Break
9:00 a.m.-12:00 p.m.	NURETH-16 Expo
9:00 a.m.-4:00 p.m.	Poster Session—I
9:30 a.m.-12:00 p.m.	Technical Sessions
12:00-1:30 p.m.	Lunch Break (lunch not provided)
1:30-3:35 p.m.	Technical Sessions
3:35-4:00 p.m.	Afternoon Break
4:00-6:05 p.m.	Technical Sessions
5:45-10:00 p.m.	Reception and Dinner at the Art Institute of Chicago

THURSDAY, SEPTEMBER 3

7:30 a.m.-5:00 p.m.	Registration
8:00-9:00 a.m.	Keynote Sessions VII, VIII, IX
9:00-9:30 a.m.	Morning Break
9:00 a.m.-4:00 p.m.	Poster Session—II
9:30 a.m.-12:00 p.m.	Technical Sessions
12:00-1:30 p.m.	Lunch Break (lunch not provided)
1:30-3:35 p.m.	Technical Sessions
3:35-4:00 p.m.	Afternoon Break
4:00-6:30 p.m.	Technical Sessions

FRIDAY, SEPTEMBER 4

7:30 a.m.-12:00 p.m.	Registration
7:45 a.m.-2:30 p.m.	Tour of Argonne National Laboratory
8:00-9:00 a.m.	Keynote Sessions X, XI, XII
9:00-9:30 a.m.	Morning Break
9:30 a.m.-12:00 p.m.	Technical Sessions
1:00-1:15 p.m.	Poster Awards Ceremony
1:00-3:00 p.m.	Closing Plenary

NURETH-16 - HONORS AND AWARDS PROGRAM

NURETH-16 has a vibrant awards program for authors, conforming to the tradition of NURETH. Given the large amount of full papers received, this program has been expanded significantly. The NURETH-16 author recognition program comprises three types of awards. The evaluation for all awards was based solely on the quality of the submitted manuscripts. Papers accepted for both oral presentation and poster presentation were considered.

BEST PAPER AWARDS

All papers submitted to NURETH-16 were peer-reviewed by some of world's foremost experts in nuclear thermal-hydraulics, with an average of 2.5 reviews per paper. As part of each review, reviewers were asked to score each paper based on four criteria (Originality, Correctness and Completeness, Presentation, and Overall Impression). The scores were averaged among multiple reviews.

The five papers with the highest review scores for each track have then been submitted to the Honors and Awards Committee of NURETH-16. The Committee will select a "Best paper award" winner for each of the 7 paper tracks based solely on the quality of the submitted manuscripts. Winners will be announced at the conference banquet on Wednesday, September 2.

YOUNG PROFESSIONAL AWARDS

In addition to the Best Paper awards, the NURETH-16 Honors and Awards Committee will select up to three papers for young professional awards.

In order for a paper to be eligible for the competition, the first author needs to be a young professional according to the definition of ANS (36 years old or younger OR 5 years or less from graduation). Graduate students are eligible. Authors were also required to opt-in at paper submittal. Full-length papers were peer-reviewed with the same criteria as any other submitted paper and published in the NURETH-16 Proceedings.

The ten eligible papers across all tracks that during the review process yielded the highest scores were submitted to the Honors and Awards committee for evaluation. The winners will also be announced at the conference banquet on Wednesday, September 2.

STUDENT SCHOLARSHIPS

The purpose of this Student Program is to encourage the active participation of students in NURETH-16 by submitting high-quality technical papers on the various aspects of nuclear thermal-hydraulics. NURETH-16 will award 8 travel fellowships ($500 each for travel expenses) for the top student papers, undergraduate or graduate.

To qualify for the program, the student must be the first author of a full-length paper that has been accepted into one of the NURETH-16 technical tracks. Full-length papers were peer reviewed with the same criteria as any other submitted paper and published in the NURETH-16 Proceedings. In addition, the top reviewed papers (i.e., highest review scores) were reviewed by the NURETH-16 Honors and Awards Committee to select the winners.

The winners are announced on the conference website (http://nureth16.anl.gov/students/) and they will be recognized at the NURETH-16 opening reception on Sunday, August 30th, 2015 (Regency Ballroom). Students participating in this program will register and present their technical paper during the appropriate NURETH-16 technical session.

NURETH16- HONORS AND AWARDS COMMITTEE

Below is the composition of the Honors and Awards Committee:
Chair: Hee Cheon No *(KAIST, Chair)*
Vice-Chairs: W. David Pointer *(ORNL)*, Sama Bilbao y Leon *(VCU)*

Members at large: Maria Avramova *(North Carolina State Univ.)*, Emilio Baglietto *(MIT)*, Igor Bolotnov *(North Carolina State Univ.)*, Hideki Kamide *(JAEA)*, Eung Soo Kim *(Seoul National Univ.)*, Kyung Doo Kim *(KAERI)*, Seungjin Kim *(Penn State Univ.)*, Tae-Soon Kwon *(KAERI)*, John Luxat *(McMaster Univ.)*, Annalisa Manera *(Univ. of Michigan)*, Robert Martin *(BWX Technologies)*, David Novog *(McMaster Univ.)*, Alessandro Petruzzi *(NINE)*, Shripad Revankar *(Purdue Univ.)*, DuWayne Schubring *(Univ. of Florida)*, Jinho Song *(KAERI)*, Jun Sugimoto *(Kyoto Univ)*, Chul-Hwa Song *(KAERI)*, Adrian Tentner *(ANL)*, and Brian Woods *(Oregon State Univ.)*

NURETH-16 Tracks: Oral sessions

The NURETH-16 oral sessions are organized into eight tracks corresponding to the original call for papers. Below is a full list of tracks and corresponding sessions.

Papers submitted to each track *(including papers later selected for poster presentation)* received an average of approximately 2.5 reviews per paper. Considering the large amount of full draft papers received *(exceeding 750)*, organizing the review process was a herculean task. This was made possible by the dedicated service of the review organizers for each track, listed below.

They have the sincere thanks and appreciation of the Technical Program Committee. This conference would have not been possible without them.

Track 1: Fundamental Thermal-Hydraulics

Review Organizers: Seungjin Kim *(Pennsylvania State University)*, Caleb Brooks *(University of Illinois)*, Takashi Hibiki *(Purdue University)*, Wade Marcum *(Oregon State University)*, M. Rohde *(UDelft)*, Yang Liu *(Virginia Tech)*, Tatsuya Hazuku *(Tokyo University of Marine Science and Technology)*, Qiao Wu *(Oregon State University)*, Hisashi Ninokata *(Politecnico di Milano)*, Philippe Bardet *(George Washington University)*, Annalisa Manera *(University of Michigan)*, Rong Situ *(James Cook University)*, Xiaojing Liu *(SJTU)*, Paolo Ferroni *(Westinghouse)*, and DuWayne Schubring *(University of Florida)*

Sessions (in alphabetic order)

Track 1: Boiling and Condensation Fundamentals – I (Wednesday September 2 9:30 am, Toronto)
Track 1: Boiling and Condensation Fundamentals – II (Wednesday September 2 1:30 pm, Toronto)
Track 1: Boiling and Condensation Fundamentals – III (Friday September 4 9:30 am, Toronto)
Track 1: Experimental Measurement Techniques and Flow Visualization – I (Monday August 31 4:00 pm, Regency C)
Track 1: Experimental Measurement Techniques and Flow Visualization – II (Tuesday September 1 9:30 am, Regency C)
Track 1: Flow-Induced Vibration in Reactor Components (Thursday September 3 4:00 pm, Toronto)
Track 1: Fundamental Thermal-Hydraulics: General-I (Monday August 31 1:30 pm, Atlanta)
Track 1: Fundamental Thermal-Hydraulics : General-II (Thursday September 3 4:00 pm, Atlanta)
Track 1: Interfacial Area Transport (Database, Modeling, Measurement Techniques) (Monday August 31 1:30 pm, Watertower)
Track 1: Multifield Two-Phase Flow Modeling – I (Thursday September 3 9:30 am, Atlanta)
Track 1: Multifield Two-Phase Flow Modeling – II (Friday September 4 9:30 am, Atlanta)
Track 1: Natural Circulation, Passive Safety Systems and Related Phenomena – I (Wednesday September 2 1:30 pm, Watertower)
Track 1: Natural Circulation, Passive Safety Systems and Related Phenomena – II (Thursday September 3 9:30 am, Watertower)
Track 1: Natural Circulation, Passive Safety Systems and Related Phenomena – III (Friday September 4 9:30 am, Watertower)
Track 1: Subchannel Fluid Dynamics and Heat Transfer (Tuesday September 1 4:00 pm, Comiskey)
Track 1: Two-Phase Flow and Heat Transfer Fundamentals – I (Monday August 31 4:00 pm, Watertower)
Track 1: Two-Phase Flow and Heat Transfer Fundamentals – II (Tuesday September 1 9:30 am, Watertower)
Track 1: Two-Phase Flow and Heat Transfer Fundamentals – III (Tuesday September 1 4:00 pm, Watertower)
Track 1: Two-Phase Flow and Heat Transfer Fundamentals – IV (Wednesday September 2 9:30 am, Watertower)
Track 1: Two-Phase Flow and Heat Transfer Fundamentals – V (Wednesday September 2 4:00 pm, Watertower)
Track 1: Two-Phase Flow and Heat Transfer Fundamentals - VI (Thursday September 3 1:30 pm, Watertower)

Track 2: Computational Thermal-Hydraulics

Review Organizers: Stavros Tavoularis *(University of Ottawa)*, Emilio Baglietto *(MIT)*, Dave Aumiller *(BMPC)*, Tomasz Kozlowski *(UIUC)*, Ivan Catton *(UCLA)*, Marco Pellegrini *(IAE)*, Afaque Shams *(NRG)*, Brian Jackson *(TerraPower)*, Yann Bartosiewic *(University of Louvain)*, Nathaniel Salpeter *(TerraPower)*, Yiqi Yu *(ANL)*, Annalisa Manera *(University of Michigan)*, Ferry Roelofs *(NRG)*, Sofiane Behnamadouche *(EdF)*, Kurshad Muftuoglu *(GE Hitachi)*, David Novog *(McMaster University)*, DuWayne Schubring *(University of Florida)*, and Si Young Lee *(SRNL)*

Sessions (in alphabetic order)

Track 2: Accuracy and Uncertainty Analysis (Wednesday September 2 1:30 pm, Comiskey)
Track 2: Computational Fluid Dynamics – I (Monday August 31 1:30 pm, Comiskey)
Track 2: Computational Fluid Dynamics – II (Monday August 31 4:00 pm, Comiskey)
Track 2: Computational Fluid Dynamics – III (Wednesday September 2 9:30 am, Comiskey)
Track 2: Computational Fluid Dynamics – IV (Thursday September 3 4:00 pm, Comiskey)
Track 2: Computational Fluid Dynamics – V (Friday September 4, 9:30 am, Comiskey)
Track 2: Computational Multi-Fluid Dynamics – I (Tuesday September 1 9:30 am, Buckingham)
Track 2: Computational Multi-Fluid Dynamics – II (Tuesday September 1 4:00 pm, Buckingham)
Track 2: Computational Thermal-Hydraulics : General (Thursday September 3 4:00 pm, Watertower)
Track 2: Containment Analysis (with V&V) (Tuesday September 1 9:30 am, Comiskey)
Track 2: Core Thermal Hydraulics and Subchannel Analysis (Monday August 31 4:00 pm, Wrigley)
Track 2: Multiscale Multiphysics Applications in Thermal Hydraulics – I (Monday August 31 4:00 pm, Regency D)
Track 2: Multiscale Multiphysics Applications in Thermal Hydraulics – II (Tuesday September 1 4:00 pm, Regency D)
Track 2: Plant System Code Development (Friday September 4 9:30 am, Wrigley)

Track 3: Verification and Validation

Review Organizers: Hiroyuki Ohshima *(JAEA)*, Han Young Yoon *(KAERI)*, Bao-Wen Yang *(XJTU)*, Kyung Doo Kim *(KAERI)*, Sang-Ki Moon *(KAERI)*, Guanghui Su *(XJTU)*, S. J. Kim *(Hanyang University)*, Phil Sharpe *(GE Hitachi Nuclear Energy)*, T. S. Kwon *(KAERI)*, Yanhua Yang *(SNPTC/SJTU)*, Hideo Nakamura *(JAEA)*, Michio Murase *(INSS)*, Jeffrey Lane *(Zachry Nuclear Engineering)*, Suizheng Qiu *(XJTU)*, and Takashi Takata *(JAEA)*

Sessions (in alphabetic order)
Track 3: Boiling and Condensation Heat Transfer (Thursday September 3 9:30 am, Toronto)
Track 3: CHF and Post CHF Heat Transfer, Flooding and CCFL (Monday August 31 1:30 pm, Gold Coast)
Track 3: Computational Fluid Dynamics V&V – I (Monday August 31 4:00 pm, Atlanta)
Track 3: Computational Fluid Dynamics V&V – II (Tuesday September 1 9:30 am, Atlanta)
Track 3: Computational Fluid Dynamics V&V – III (Tuesday September 1 1:30 pm, Atlanta)
Track 3: Experiments and Data Bases for Assessment and Validation (including of 3D Models) (Wednesday, September 2 9:30 am, Buckingham)
Track 3: Plant System Code Validation – I (Tuesday September 1 9:30 am, Wrigley)
Track 3: Plant System Code Validation – II (Tuesday September 1 4:00 pm, Wrigley)
Track 3: Plant System Code Validation – III (Wednesday September 2 9:30 am, Wrigley)
Track 3: Validation & Verification: General (Thursday September 3 1:30 pm, Gold Coast)

Track 4: Operation and Safety of Existing Reactors

Review Organizers: Kurshad Muftuoglu *(GE Hitachi)*, Tomasz Kozlowski *(UIUC)*, Xiaojing Liu *(SJTU)*, Bao Truong *(TerraPower)*, Alessandro Petruzzi *(NINE)*, Cesare Frepoli *(FPoliSolutions)*, Haihua Zhao *(INL)*, and Milorad Dzodzo *(Westinghouse)*

Sessions (in alphabetic order)
Track 4: Addressing Scaling Issues (Monday August 31 1:30 pm, Regency D)
Track 4: BEPU Analysis and Challenges in Licensing (Tuesday September 1 1:30 pm, Watertower)
Track 4: Instabilities and Nonlinear Dynamics (Wednesday September 2 1:30 pm, Regency C)
Track 4: NPP Transient and Accident Analysis – I (Monday August 31 1:30 pm, Wrigley)
Track 4: NPP Transient and Accident Analysis – II (Tuesday September 1 1:30 pm, Wrigley)
Track 4: NPP Transient and Accident Analysis – III (Wednesday September 2 1:30 pm, Wrigley)
Track 4: NPP Transient and Accident Analysis – IV (Wednesday September 2 4:00 pm, Wrigley)
Track 4: Operation & Safety of Existing Reactors: General I (Wednesday September 2 1:30 pm, Atlanta)
Track 4: Operation & Safety of Existing Reactors: General II (Wednesday September 2 4:00 pm, Atlanta)

Track 5: Severe Accidents

Review Organizers: Akira Tokuhiro *(Purdue University)*, Luis Herranz *(CIEMAT)*, David Novog *(McMaster University)*, Don Todd *(Angstrom Tech LLC)*, Pradip Saha *(GE Hitachi)*, N. Kolev *(Siemens)*, Thomas Schulenberg *(KIT)*, I. K. Park *(KAERI)*, E. M. Komen *(NRG)*, and M. Hanninen *(VTT)*

Sessions (in alphabetic order)
Track 5: Advanced Design Features for Severe Accident Mitigation (Thursday September 3 9:30 am, Buckingham)
Track 5: Debris Bed Cooling (Tuesday September 1 4:00 pm, Atlanta)
Track 5: Fuel Coolant Interaction, Modeling and Experiments – I (Thursday September 3 9:30 am, Comiskey)
Track 5: Fuel Coolant Interaction, Modeling and Experiments – II (Thursday September 3 1:30 pm, Comiskey)
Track 5: Hydrogen and Fission Product Behavior (Wednesday September 2 9:30 am, Atlanta)
Track 5: Modeling and Experiments of Severe Accidents – I (Monday August 31 1:30 pm, Buckingham)
Track 5: Modeling and Experiments of Severe Accidents – II (Tuesday September 1 1:30 pm, Buckingham)
Track 5: Modeling and Experiments of Severe Accidents – III (Wednesday September 2 1:30 pm, Buckingham)
Track 5: Modeling and Experiments of Severe Accidents – IV (Wednesday September 2 4:00 pm, Buckingham)
Track 5: Modeling and Experiments of Severe Accidents – V (Thursday September 3 1:30 pm, Buckingham)
Track 5: Modeling and Experiments of Severe Accidents – VI (Thursday September 3 4:00 pm, Buckingham)
Track 5: Natural Convection and Mixing Phenomena, Modeling and Experiments (Wednesday September 2 4:00 pm, Comiskey)
Track 5: Severe Accidents: General (Monday August 31 4:00 pm, Buckingham)

Track 6: Thermal Hydraulics in Advanced Reactors

Review Organizers: Elvis Dominguez-Ontiveros *(ORNL)*, Kevin Robb *(ORNL)*, Ferry Roelofs *(NRG)*, Martin Rohde *(UDelft)*, Xu Cheng *(KIT)*, Maria Avramova *(NCSU)*, Thomas Fanning *(ANL)*, and Xiaojing Liu *(SJTU)*

Sessions (in alphabetic order)
Track 6: Thermal Hydraulics of Advanced Reactors: General (Wednesday September 2 1:30 pm, Gold Coast)
Track 6: Thermal Hydraulics in High-Temperature Gas-Cooled Reactors – I (Thursday September 3 4:00 pm, Gold Coast)
Track 6: Thermal Hydraulics in High-Temperature Gas-Cooled Reactors – II (Friday September 4 9:30 am, Gold Coast)
Track 6: Thermal Hydraulics in Lead-Cooled and Lead-Bismuth-Cooled Fast Reactors (Thursday September 3 1:30 pm, Atlanta)
Track 6: Thermal Hydraulics in Salt-Cooled High-Temperature Reactors (Thursday September 3 9:30 am, Wrigley)
Track 6: Thermal Hydraulics in Small Modular Reactors – I (Tuesday September 1 1:30 pm, Gold Coast)
Track 6: Thermal Hydraulics in Small Modular Reactors – II (Wednesday September 2 4:00 pm, Gold Coast)
Track 6: Thermal Hydraulics in Sodium-Cooled Fast Reactors (General) – I (Monday August 31 4:00 pm, Gold Coast)
Track 6: Thermal Hydraulics in Sodium-Cooled Fast Reactors (Transient Models and Validation) – II (Tuesday September 1 4:00 pm, Gold Coast)
Track 6: Thermal Hydraulics in Sodium-Cooled Fast Reactors (Severe

Accidents and Sodium-Water Reactions) – III (Wednesday September 2 9:30 am, Gold Coast)
Track 6: Thermal Hydraulics in Sodium-Cooled Fast Reactors (Verification and Validation) – IV (Thursday September 3 9:30 am, Gold Coast)
Track 6: Thermal Hydraulics in Supercritical Water Reactors (Thursday September 3 1:30 pm, Wrigley)

Track 7: Special Topics

Review Organizers: Justin Thomas *(ANL)*, Dominique Bestion *(CEA)*, Ferry Roelofs *(NRG)*, Ed Komen *(NRG)*, Paolo Ferroni *(Westinghouse)*, Tanju Sofu *(ANL)*, Marco Pellegrini *(IAE)*, Martin Rohde *(UDelft)*, Yassin Hassan *(TAMU)*, Rodolfo Vaghetto *(TAMU)*, David Aumiller *(BMPC)*, Katrien Van Tichelen *(SCK-CEN)*, Daniel Wells *(EPRI)*, Kurshad Muftuoglu *(GE Hitachi)*, Per Peterson *(UCB)*, Rui Hu *(ANL)*, Igor Bolotnov *(NCSU)*, Chul-Hwa Song *(KAERI)*, Hisashi Ninokata *(Politecnico di Milano)*, Bao-Wen Yang *(XJTU)*, Jinho Song *(KAERI)*, Y.H. Jeong *(KAIST)*, H. Kim *(KHU)*, I.C. Bang *(UNIST)*, J.I. Lee *(KAIST)*, Peipei Chen *(SNPTC)*, Jun Sugimoto *(Kyoto University)*, Randall Gauntt *(SNL)*, Xiaojing Liu *(SJTU)*, Steve Lomperski *(ANL)*, S. Basu *(NRC)*, S. J. Kim *(Hanyang University)*,and F. Barre *(IRSN)*

Sessions (in alphabetic order)
Track 7: Addressing the GSI-191: Progress in Methodologies and Technologies – I (Wednesday September 2 4:00 pm, Regency B)
Track 7: Addressing the GSI-191: Progress in Methodologies and Technologies – II (Thursday September 3 1:30 pm, Regency B)
Track 7: Advancements in SFR Thermal Hydraulics (Wednesday September 2 4:00 pm, Tonronto)
Track 7: Advancements in Subchannel Analysis (Wednesday September 2 9:30 am, Regency A)
Track 7: Advances in Enhancement, Understanding and Prediction of CHF and Quenching – I (Monday August 31 1:30 pm, Regency C)
Track 7: Advances in Enhancement, Understanding and Prediction of CHF and Quenching – II (Tuesday September 1 1:30 pm, Regency C)
Track 7: Advances in System Thermal-Hydraulics Modeling and Code Development (Friday September 4 9:30 am, Regency C)
Track 7: CASL---Thermal-Hydraulics Activities in the Consortium for Advanced Simulation of LWRS (Thursday September 3 1:30 pm, Toronto)
Track 7: CFD Benchmark of NESTOR High Fidelity PWR Rod Bundle Data at In-Core Conditions (Monday August 31 4:00 pm, Regency A)
Track 7: CFD Modeling of Fuel Assemblies: From High Fidelity to Low Resolution Models (Tuesday September 1 4:00 pm, Regency B)
Track 7: Corium Research Platform: Past and Future – I (Wednesday September 2 1:30 pm, Regency A)
Track 7: Corium Research Platform: Past and Future – II (Thursday September 3 4:00 pm, Regency A)
Track 7: Critical Heat Flux in Fuel Bundle: Modeling, Prediction, and Experimental Measurements – I (Thursday September 3 9:30 am, Regency A)
Track 7: Critical Heat Flux in Fuel Bundle: Modeling, Prediction, and Experimental Measurements – II (Friday September 4 9:30 am, Regency AB)
Track 7: Design, Analysis and Testing of Micro-, Mini- and Other Small-Diameter Channel Heat Exchangers (Thursday September 3 4:00 pm, Regency C)
Track 7: Heat Transfer in Supercritical Flows (Tuesday September 1 1:30 pm, Regency D)
Track 7: Hydrogen Management after Fukushima – I (Monday August 31 4:00 pm, Regency B)
Track 7: Hydrogen Management after Fukushima – II (Tuesday September 1 9:30 am, Regency B)
Track 7: Important Severe Accident Research Issues after Fukushima Accidents (Wednesday September 2 4:00 pm, Regency C)
Track 7: Investigation of Reflood Phenomena in Partially Blocked Core with Fuel Relocation (Monday August 31 1:30 pm, Regency A)
Track 7: Issues and Advances in Thermal Hydraulic Research of FHRs (Tuesday September 1 9:30 am, Regency D)
Track 7: Modeling and Experiments of IVR and Core Catcher Strategies (Tuesday September 1 4:00 pm, Regency C)
Track 7: NEAMS Sponsored Advances in Thermal Hydraulics Modeling and Simulation (Tuesday September 1 9:30 am, Regency A)
Track 7: OECD/NEA Benchmark Study of the Accident at the Fukushima Dai-ichi Nuclear Power Plant – I (Wednesday September 2 9:30 am, Regency C)
Track 7: OECD/NEA Benchmark Study of the Accident at the Fukushima Dai-ichi Nuclear Power Plant – II (Thursday September 3 9:30 am, Regency C)
Track 7: OECD/NEA Benchmark Study of the Accident at the Fukushima Dai-ichi Nuclear Power Plant – III (Thursday September 3 1:30 pm, Regency C)
Track 7: Passive Safety System and Accidents Measures (Tuesday September 1 9:30 am, Gold Coast)
Track 7: Realistic BWR LOCA Evaluation: Methodology Development and Application (Tuesday September 1 1:30 pm, Comiskey)
Track 7: Research Progress of Large Advanced PWR Program in China (Friday September 4 9:30 am, Buckingham)
Track 7: The NURESAFE European Project: Multiscale Thermal Hydraulic Analysis – I (Wednesday September 2 9:30 am, Regency B)
Track 7: The NURESAFE European Project: Multiscale Thermal Hydraulic Analysis – II (Thursday September 3 9:30 am, Regency B)
Track 7: Thermal Hydraulic Experiments and Numerical Analysis in Support of MYRRHA – I (Monday August 31 1:30 pm, Regency B)
Track 7: Thermal Hydraulic Experiments and Numerical Analysis in Support of MYRRHA – II (Tuesday September 1 1:30 pm, Regency B)
Track 7: Thermal Hydraulic Experiments and Numerical Analysis in Support of MYRRHA – III (Wednesday September 2 1:30 pm, Regency B)

Track 8: Panels

Panel Organizers: Emilio Baglietto *(MIT)*, Sofiane Benhamadouche *(EdF)*, Sama Bilbao-y-Leon *(VCU)*, Nam T. Dinh *(NCSU)*

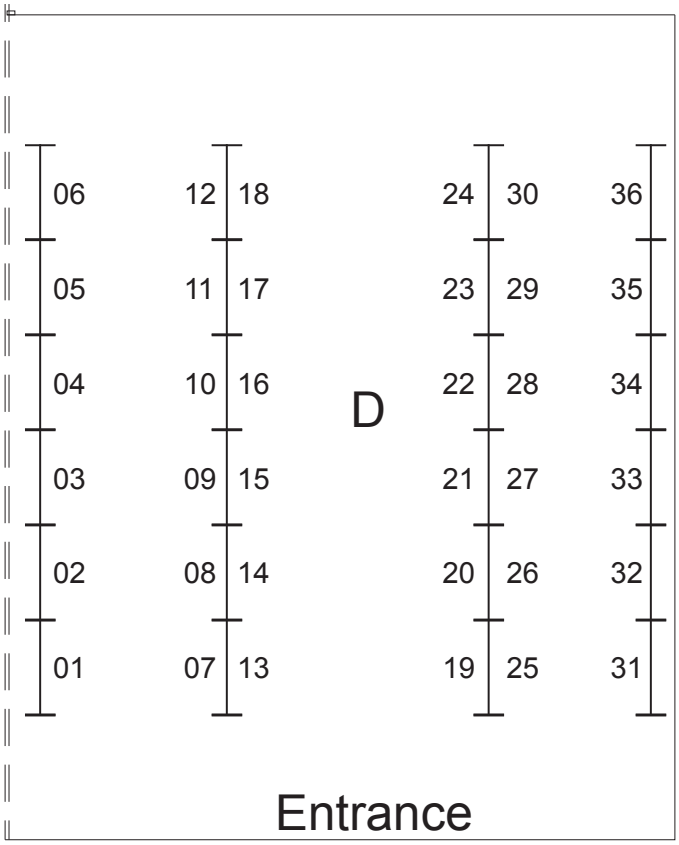
Sessions (in alphabetic order)
Track 8: Advancements in the Prediction of DNB with CFD – Panel (Thursday September 3 4:00 pm, Regency B)
Track 8: Data, Data Science, and Data-Driven Thermal-Hydraulics – Panel (Tuesday September 1 4:00 pm, Regency A)
Track 8: HPC Applications in Nuclear Engineering: Opportunities and Challenges – Panel (Wednesday September 2 4:00 pm, Regency A)
Track 8: Thermal-Hydraulics Education – Panel (Thursday September 3 1:30 pm, Regency A)

NURETH-16 POSTER SESSIONS

The NURETH-16 poster sessions provide an opportunity for independent review of posters summarizing selected full papers. NURETH-16 features two poster sessions, held in the Regency D ballroom:

Poster Session I	**Wednesday, September 2**	**9:00 am – 4:00 pm**
Poster Session II	**Thursday, September 3**	**9:00 am – 4:00 pm**

We note that the review process for poster papers was identical to oral presentation, and conducted by the same reviewer pool. A full list of posters is available later in this program, with the assigned location in the Regency D ballroom (see below for a layout).



Posters are numbered sequentially in the program, preceded by a letter (W for Wednesday or T for Thursday), which indicates the day of the week they will be presented at.

Poster presenters should hang their posters in the Regency D ballroom before their assigned poster session begins (9 am). The assigned locations are listed in this program. All posters are to be removed shortly after the conclusion of the session.

Poster boards will be provided with a total area of 48" x 96". The recommended poster size is 36" by 48" (3 feet x 4 feet) or a standard A0 sheet in the landscape orientation.

Poster presenters are recommended to remain near their posters to interact with the attendees during the coffee breaks (9:00 – 9:30 am and 3:35 – 4:00 pm) and during lunch (12:30 – 1:30 pm).

Posters will be judged by attendees and the top poster for each session will be selected based on the number of votes received.

POSTER SESSION COMPETITION AND RAFFLE

Do not forget to visit the NURETH-16 poster sessions and mark your favorite poster on your entry into the raffle each day for a chance to win fabulous prizes!

Review the posters, mark the number of your favorite poster on your raffle ticket and drop it off at the raffle stand in the registration area. You may entry a vote for each poster session.

The poster receiving the most votes each day will receive one of the NURETH-16 best poster awards. The winner will be announced at the Closing Plenary on Friday September 4, 1:00 pm (Regency AB). At the same time the raffle winner will be selected.

You may submit a vote for each poster session.

Daily Schedule

Sunday, August 30		Location
8:30 a.m.-6:00 p.m.	**Registration**	Regency Foyer
9:00 a.m.-5:00 p.m.	**NURETH-16: Workshops** *(includes am and pm breaks)*	
	• Verification, Validation and Uncertainty Quanitification Methodologies Quantification for Multi-Physics Simulations: Overview, Methods and Current Plans for Major R&D Programs *(full day)*	Wrigley
	• Measurement Uncertainty Quantification *(full day)*	Buckingham
	• CFD Modeling of Contemporary Nuclear Reactor Fuel Bundles with STAR-CCM+ *(half day-a.m.)*	Gold Coast
	• GOTHIC™ – Overview, Status and Applications *(half day-p.m.)*	Gold Coast
6:00-8:00 p.m.	**Opening Reception**	Regency ABC

Monday, August 31		Location
7:30 a.m.-5:00 p.m.	**Registration**	Regency Foyer
8:30-10:00 a.m.	**Opening Plenary—I**	Regency ABC
9:00 a.m.-5:00 p.m.	**NURETH-16 Expo**	Acapulco
10:00-11:30 a.m.	**Opening Plenary—II**	Regency ABC
12:00-1:30 p.m.	**Lunch Break (lunch not provided)**	
1:30-3:35 p.m.	**Technical Sessions**	
	• Track 7: Investigation of Reflood Phenomena in Partially Blocked Core with Fuel Relocation	Regency A
	• Track 7: Thermal Hydraulic Experiments and Numerical Analysis in Support of MYRRHA—I	Regency B
	• Track 7: Advances in Enhancement, Understanding and Prediction of CHF and Quenching—I	Regency C
	• Track 4: Addressing Scaling Issues	Regency D
	• Track 2: Computational Fluid Dynamics—I	Comiskey
	• Track 3: CHF and Post CHF Heat Transfer, Flooding and CCFL	Gold Coast
	• Track 1: Interfacial Area Transport (Data Base, Modeling, Measurement Techniques)	Watertower
	• Track 5: Modeling and Experiments of Severe Accidents—I	Buckingham
	• Track 1: Fundamental Thermal-Hydraulics: General—I	Atlanta
	• Track 4: NPP Transient and Accident Analysis—I	Wrigley
3:35-4:00 p.m.	**Afternoon Break**	Regency Foyer
4:00-6:30 p.m.	**Technical Sessions**	
	• Track 7: CFD Benchmark of NESTOR High Fidelity PWR Rod Bundle Data at In-Core Conditions	Regency A
	• Track 7: Hydrogen Management after Fukushima—I	Regency B
	• Track 1: Experimental Measurement Techniques and Flow Visualization—I	Regency C
	• Track 2: Multiscale Multiphysics Applications in Thermal Hydraulics—I	Regency D
	• Track 2: Computational Fluid Dynamics—II	Comiskey
	• Track 6: Thermal Hydraulics in Sodium-Cooled Fast Reactors (General)—I	Gold Coast
	• Track 1: Two-Phase Flow and Heat Transfer Fundamentals—I	Watertower
	• Track 5: Severe Accidents: General	Buckingham
	• Track 3: Computational Fluid Dynamics V&V—I	Atlanta
	• Track 2: Core Thermal Hydraulics and Subchannel Analysis	Wrigley
6:45-9:00 p.m.	**Chicago Boat Tour and Dinner**	Trump Boat Dock Chicago River

Tuesday, September 1		Location
7:30 a.m.-5:00 p.m.	**Registration**	Regency Foyer
8:00-9:00 a.m.	**Keynote Session—I** • Nuclear Safety and Thermal Hydraulics: Personal Thoughts and Some Recent Progress	Regency A
8:00-9:00 a.m.	**Keynote Session—II** • Thermal Hydraulics in FHRs: Key Similarities and Differences with LWRs	Regency B
8:00-9:00 a.m.	**Keynote Session—III** • On the Use of (U)RANS and LES Approaches for Turbulent Incompressible Single Phase Flows in Nuclear Engineering Applications	Regency C
9:00-9:30 a.m.	**Morning Break**	Regency Foyer
9:00 a.m.-5:00 p.m.	**NURETH-16 Expo**	Acapulco
9:30 a.m.-12:00 p.m.	**Technical Sessions**	
	• Track 7: NEAMS Sponsored Advances in Thermal Hydraulics Modeling and Simulation	Regency A
	• Track 7: Hydrogen Management after Fukushima—II	Regency B
	• Track 1: Experimental Measurement Techniques and Flow Visualization—II	Regency C
	• Track 7: Issues and Advances in Thermal Hydraulic Research of FHRs	Regency D
	• Track 2: Containment Analysis (with V&V)	Comiskey
	• Track 7: Passive Safety System and Accidents Measures	Gold Coast
	• Track 1: Two-Phase Flow and Heat Transfer Fundamentals—II	Watertower
	• Track 2: Computational Multi-Fluid Dynamics—I	Buckingham
	• Track 3: Computational Fluid Dynamics V&V—II	Atlanta
	• Track 3: Plant System Code Validation—I	Wrigley
12:00-1:30 p.m.	**Lunch Break (lunch not provided)**	
12:30-1:30 p.m.	**Free Elsevier College of Skills Training Seminar**	Regency C
1:30-3:35 p.m.	**Special Session: Celebrating Mujid Kazimi's Legacy:** *40 Years of Innovation in Nuclear Engineering*	Regency A
1:30-3:35 p.m.	**Technical Sessions**	
	• Track 7: Thermal Hydraulic Experiments and Numerical Analysis in Support of MYRRHA—II	Regency B
	• Track 7: Advances in Enhancement, Understanding and Prediction of CHF and Quenching—II	Regency C
	• Track 7: Heat Transfer in Supercritical Flows	Regency D
	• Track 7: Realistic BWR LOCA Evaluation: Methodology Development and Application	Comiskey
	• Track 6: Thermal Hydraulics in Small Modular Reactors—I	Gold Coast
	• Track 4: BEPU Analysis and Challenges in Licensing	Watertower
	• Track 5: Modeling and Experiments of Severe Accidents—II	Buckingham
	• Track 3: Computational Fluid Dynamics V&V—III	Atlanta
	• Track 4: NPP Transient and Accident Analysis—II	Wrigley
3:35-4:00 p.m.	**Afternoon Break**	Regency Foyer
4:00-6:30 p.m.	**Technical Sessions**	
	• Track 8: Data, Data Science, and Data-Driven Thermal-Hydraulics – Panel	Regency A
	• Track 7: CFD Modeling of Fuel Assemblies: From High Fidelity to Low Resolution Models	Regency B
	• Track 7: Modeling and Experiments of IVR and Core Catcher Strategies	Regency C
	• Track 2: Multiscale Multiphysics Applications in Thermal Hydraulics—II	Regency D
	• Track 1: Subchannel Fluid Dynamics and Heat Transfer	Comiskey
	• Track 6: Thermal Hydraulics in Sodium-Cooled Fast Reactors (Transient Models and Validation)—II	Gold Coast
	• Track 1: Two-Phase Flow and Heat Transfer Fundamentals—III	Watertower
	• Track 2: Computational Multi-Fluid Dynamics—II	Buckingham
	• Track 5: Debris Bed Cooling	Atlanta
	• Track 3: Plant System Code Validation—II	Wrigley
7:00-10:30 p.m.	**Chicago Cubs Baseball Game**	Wrigley Field

Wednesday, September 2		Location
7:30 a.m.-5:00 p.m.	**Registration**	Regency Foyer
8:00-9:00 a.m.	**Keynote Session—IV** • System Thermal Hydraulics for DBA Analysis and Simulation: Status of Tools and Methods and Directions for Future R&D	Regency A
8:00-9:00 a.m.	**Keynote Session—V** • CFD Validation Experiments: What's the Difference?	Regency B
8:00-9:00 a.m.	**Keynote Session—VI** • Severe Accident Research in Japan after Accident at Fukushima Daiichi NPS	Regency C
9:00-9:30 a.m.	**Morning Break**	Regency Foyer
9:00 a.m.-12:00 p.m.	**NURETH-16 Expo**	Acapulco
9:00 a.m.-4:00 p.m.	**Poster Session—I**	Regency D
9:30 a.m.-12:00 p.m.	**Technical Sessions**	
	• Track 7: Advancements in Subchannel Analysis	Regency A
	• Track 7: The NURESAFE European Project: Multiscale Thermal Hydraulic Analysis—I	Regency B
	• Track 7: OECD/NEA Benchmark Study of the Accident at the Fukushima Dai-ichi Nuclear Power Plant—I	Regency C
	• Track 1: Boiling and Condensation Fundamentals—I	Toronto
	• Track 2: Computational Fluid Dynamics—III	Comiskey
	• Track 6: Thermal Hydraulics in Sodium-Cooled Fast Reactors (Severe Accidents and Sodium-Water Reactions)—III	Gold Coast
	• Track 1: Two-Phase Flow and Heat Transfer Fundamentals—IV	Watertower
	• Track 3: Experiments and Data Bases for Assessment and Validation (including of 3D Models)	Buckingham
	• Track 5: Hydrogen and Fission Product Behavior	Atlanta
	• Track 3: Plant System Code Validation—III	Wrigley
12:00-1:30 p.m.	**Lunch Break (lunch not provided)**	
1:30-3:35 p.m.	**Technical Sessions**	
	• Track 7: Corium Research Platform: Past and Future—I	Regency A
	• Track 7: Thermal Hydraulic Experiments and Numerical Analysis in Support of MYRRHA—III	Regency B
	• Track 4: Instabilities and Nonlinear Dynamics	Regency C
	• Track 1: Boiling and Condensation Fundamentals—II	Toronto
	• Track 2: Accuracy and Uncertainty Analysis	Comiskey
	• Track 6: Thermal Hydraulics of Advanced Reactors: General	Gold Coast
	• Track 1: Natural Circulation, Passive Safety Systems and Related Phenomena—I	Watertower
	• Track 5: Modeling and Experiments of Severe Accidents—III	Buckingham
	• Track 4: Operation and Safety of Existing Reactors: General—I	Atlanta
	• Track 4: NPP Transient and Accident Analysis—III	Wrigley
3:35-4:00 p.m.	**Afternoon Break**	Regency Foyer
4:00-6:05 p.m.	**Technical Sessions**	
	• Track 8: HPC Applications in Nuclear Engineering: Opportunities and Challenges–Panel	Regency A
	• Track 7: Addressing the GSI-191: Progress in Methodologies and Technologies—I	Regency B
	• Track 7: Important Severe Accident Research Issues after Fukushima Accidents	Regency C
	• Track 7: Advancements in SFR Thermal Hydraulics	Toronto
	• Track 5: Natural Convection and Mixing Phenomena, Modeling and Experiments	Comiskey
	• Track 6: Thermal Hydraulics in Small Modular Reactors—II	Gold Coast
	• Track 1: Two-Phase Flow and Heat Transfer Fundamentals—V	Watertower
	• Track 5: Modeling and Experiments of Severe Accidents—IV	Buckingham
	• Track 4: Operation and Safety of Existing Reactors: General—II	Atlanta
	• Track 4: NPP Transient and Accident Analysis—IV	Wrigley
5:45-10:00 p.m.	**Reception and Dinner at the Art Institute of Chicago**	Art Institute of Chicago

Thursday, September 3		Location
7:30 a.m.-5:00 p.m.	**Registration**	Regency Foyer
8:00-9:00 a.m.	**Keynote Session—VII** • Issues and Challenges on Advanced Thermal-Hydraulic Safety Research	Regency A
8:00-9:00 a.m.	**Keynote Session—VIII** • DNS Assisted Modeling of Bubbly Flows in Vertical Channels	Regency B
8:00-9:00 a.m.	**Keynote Session—IX** • A Regulator's Perspective on the State-of-the-Art in Nuclear Thermal-Hydraulics	Regency C
9:00-9:30 a.m.	**Morning Break**	Regency Foyer
9:00 a.m.-4:00 p.m.	**Poster Session—II**	Regency D
9:30 a.m.-12:00 p.m.	**Technical Sessions**	
	• Track 7: Critical Heat Flux in Fuel Bundles: Modeling, Prediction, and Experimental Measurements—I	Regency A
	• Track 7: The NURESAFE European Project: Multiscale Thermal Hydraulic Analysis—II	Regency B
	• Track 7: OECD/NEA Benchmark Study of the Accident at the Fukushima Dai-ichi Nuclear Power Plant—II	Regency C
	• Track 3: Boiling and Condensation Heat Transfer	Toronto
	• Track 5: Fuel Coolant Interaction, Modeling and Experiments—I	Comiskey
	• Track 6: Thermal Hydraulics in Sodium-Cooled Fast Reactors (Verification and Validation)—IV	Gold Coast
	• Track 1: Natural Circulation, Passive Safety Systems and Related Phenomena—II	Watertower
	• Track 5: Advanced Design Features for Severe Accident Mitigation	Buckingham
	• Track 1: Multifield Two-Phase Flow Modeling—I	Atlanta
	• Track 6: Thermal Hydraulics in Salt-Cooled High-Temperature Reactors	Wrigley
12:00-1:30 p.m.	**Lunch Break (lunch not provided)**	
1:30-3:35 p.m.	**Technical Sessions**	
	• Track 8: Thermal-Hydraulics Education–Panel	Regency A
	• Track 7: Addressing the GSI-191: Progress in Methodologies and Technologies—II	Regency B
	• Track 7: OECD/NEA Benchmark Study of the Accident at the Fukushima Dai-ichi Nuclear Power Plant—III	Regency C
	• Track 7: CASL—Thermal-Hydraulics Activities in the Consortium for Advanced Simulation of LWRS	Toronto
	• Track 5: Fuel Coolant Interaction, Modeling and Experiments—II	Comiskey
	• Track 3: Validation & Verification: General	Gold Coast
	• Track 1: Two-Phase Flow and Heat Transfer Fundamentals—VI	Watertower
	• Track 5: Modeling and Experiments of Severe Accidents—V	Buckingham
	• Track 6: Thermal Hydraulics in Lead-Cooled and Lead-Bismuth-Cooled Fast Reactors	Atlanta
	• Track 6: Thermal Hydraulics in Supercritical Water Reactors	Wrigley
3:35-4:00 p.m.	**Afternoon Break**	Regency Foyer
4:00-6:30 p.m.	**Technical Sessions**	
	• Track 7: Corium Research Platform: Past and Future—II	Regency A
	• Track 8: Advancements in the Prediction of DNB with CFD–Panel	Regency B
	• Track 7: Design, Analysis and Testing of Micro-, Mini- and Other Small-Diameter Channel Heat Exchangers	Regency C
	• Track 1: Flow-Induced Vibration in Reactor Components	Toronto
	• Track 2: Computational Fluid Dynamics—IV	Comiskey
	• Track 6: Thermal Hydraulics in High-Temperature Gas-Cooled Reactors—I	Gold Coast
	• Track 2: Computational Thermal Hydraulics: General	Watertower
	• Track 5 Modeling and Experiments of Severe Accidents—VI	Buckingham
	• Track 1: Fundamental Thermal-Hydraulics: GeneraI—II	Atlanta

Friday, September 4		Location
7:30 a.m.-12:00 p.m.	**Registration**	Regency Foyer
7:45 a.m.-2:30 p.m.	**Tour of Argonne National Laboratory**	Argonne National Lab
8:00-9:00 a.m.	**Keynote Session—X** • Status and Challenges in Nuclear Reactor Thermal Hydraulics Research in China	Regency AB
8:00-9:00 a.m.	**Keynote Session—XI** • Progress of Thermal Hydraulic Evaluation Methods and Experimental Studies on a Sodium Cooled Fast Reactor and Its Safety	Regency C
8:00-9:00 a.m.	**Keynote Session—XII** • U.S. DOE Severe Accident Research Following the Fukushima Daiichi Accidents	Toronto
9:00-9:30 a.m.	**Morning Break**	Regency Foyer
9:30 a.m.-12:00 p.m.	**Technical Sessions**	
	• Track 7: Critical Heat Flux in Fuel Bundle: Modeling, Prediction and Experimental Measurements—II	Regency AB
	• Track 7: Advances in System Thermal-Hydraulics Modeling and Code Development	Regency C
	• Track 1: Boiling and Condensation Fundamentals—III	Toronto
	• Track 2: Computational Fluid Dynamics—V	Comiskey
	• Track 6: Thermal Hydraulics in High-Temperature Gas-Cooled Reactors—II	Gold Coast
	• Track 1: Natural Circulation, Passive Safety Systems and Related Phenomena—III	Watertower
	• Track 7: Research Progress of Large Advanced PWR Program in China	Buckingham
	• Track 1: Multifield Two-Phase Flow Modeling—II	Atlanta
	• Track 2: Plant System Code Development	Wrigley
1:00-1:15 p.m.	**Poster Awards Ceremony**	Regency AB
1:00-3:00 p.m.	**Closing Plenary**	Regency AB

NURETH-16: WORKSHOPS

Sunday, August 30, 2015 • 9:00–5:00 p.m.

Four workshops are offered. You must be registered for the NURETH-16 conference to attend.
The cost for each workshop is $50.00 and includes materials and coffee breaks. Lunch is not included.

- Verifcation, Validation and Uncertainty Quantification for Multi-Physics Simulations: Overview, Methods and Current Plans for Major R&D Programs (full day), T. Kozlowski *(University of Illinois),* Hany Abdel Khalik *(Purdue),* Jacques Fontaine *(EDF)*, David Aumiller *(Bechtel),* Thomas Downar *(Michigan),* Kostadin Ivanov *(NCSU),* Maria Avramova *(NCSU),* Cristian Rabiti *(INL),* Richard Schultz *(INL),* Stephen Lomperski *(ANL),* **Wrigley, Full Day (9 a.m.-4:30 p.m.)**
- Measurement Uncertainty Quantification (full day), B. Smith *(Utah State University),* D. Neal *(LaVision Inc)* **Buckingham, Full Day (9 a.m.-4:00 p.m.)**
- CFD Modeling of Contemporary Nuclear Reactor Fuel Bundles with STAR-CCM+, Eric Volpenhein, *(CD-Adapco, US),* J. Ryan *(CD-Adapco, US),* E. Baglietto *(MIT, US),* T. Fedozzi *(CD-Adapco, US),* **Gold Coast, Half Day (9 a.m.-12:00 p.m.)**
- GOTHIC™ – Overview, Status and Applications, Jeffrey Lane *(Zachry/NAI),* Davide Papini *(PSI),* Gonzalo Jiménez *(UPM),* Tobias Strömgren *(Westinghouse Electric Company),* Mark Lanza *(Zachry/NAI)* **Gold Coast, Half Day (1:00 p.m.-5:00 p.m.)**

OPENING RECEPTION

Location: Regency ABC

Sunday, August 30, 2015 • 6:00–8:00 p.m.

Opening reception at the Hyatt Regency Chicago

This event is included in your registration fee.

OPENING PLENARY—I

Location: Regency ABC

Monday, August 31, 2015 • 8:30–10:00 a.m.

Chairs: Prof. Michael Corradini *(Univ of Wisconsin, Madison)*, Prof. Hisashi Ninokata *(Politecnico di Milano)*

8:30–8:45 a.m.

Welcome messages and logistic information

Speakers:

Dr. Mark Peters, Steering Committee Chair, Associate Laboratory Director *(Argonne National Laboratory)*

Prof. DuWayne Schubring, ANS-THD Chair *(University of Florida)*

8:45–10:00 a.m.

Synergy Between Thermal Hydraulics and LWR Safety: Past, Present and Future

Speaker:

Prof. Bal Raj Sehgal *(KTH)*

OPENING PLENARY—II

Current Trends in Nuclear Energy: Impact, Challenges and Opportunities for Thermal Hydraulics Research and Development

Chairs: Prof. Yassin Hassan *(Texas A&M Univ)*, Prof. Michael Corradini *(Univ of Wisconsin, Madison)*

10:00–11:30 a.m.

Panelists:

Dr. Moon Hwan Kim, President *(KINS)*

Mr. Alex Larzelere, Co-chair - Advanced Computing Tech Team and Director - Modeling and Simulation Energy Innovation Hub *(US DOE)*

Dr. Stephanie Coffin, Deputy Director - Division of Systems Analysis *(US NRC)*

Dr. Nadege Buforn, Group Leader – Fast Thermal-Hydraulic Transients Group *(EdF)*

Mr. Zeses Karoutas, Chief Engineer - Global Fuel Engineering *(WEC)*

NURETH EXPO

Location: Acalpulco

Monday, August 31 - Wednesday, September 2

Visit the Acapulco room of the International Suites from 9:00 a.m. – 5:00 p.m. on Monday and Tuesday, and 9:00 a.m. until 12:00 p.m. on Wednesday to see the latest work and products from related industry vendors!

Participating companies of the NURETH16 exhibition include CD-Adapco, LaVision, RBI, and more.

CHICAGO BOAT TOUR AND DINNER

Location: Trump Tower Boat Dock

Monday, August 31 • 6:45 p.m.

The boat boards at Trump Tower, an easy walk from the Hyatt. Exit the Hyatt and head west on Wacker Drive. Cross the street at Michigan Avenue and walk along the river to Wabash. Turn right at Wabash and take the bridge over the river. When you arrive at Trump Tower, take the stairs down to the loading dock on the river. There is an elevator located at the northwest corner of the Trump Tower if needed.

Enjoy a narrated tour of Chicago's riverfront, while savoring authentic Chicago-style deep-dish pizza from one of the city's classic pizzerias. Weather permitting, we will also go out into the lake for a spectacular nighttime view of the city.

The boat will launch promptly at 7:00 pm and will return to Trump Tower at 9 pm.

Tickets are available on a first come, first served basis.

http://nureth16.anl.gov/special-events/

TUESDAY KEYNOTE SESSION—I

Location: Regency A

Tuesday, September 1 • 8:00-9:00 a.m.

Session Chair: Michael Corradini *(Univ of Wisconsin, Madison)*

Speaker:

George Yadigaroglu *(ETH-Zurich)*

Nuclear Safety and Thermal Hydraulics: Personal Thoughts and Some Recent Progress

TUESDAY KEYNOTE SESSION—II

Location: Regency B

Tuesday, September 1 • 8:00-9:00 a.m.

Session Chair: Xiaodong Sun *(The Ohio State Univ)*

Speaker:

Per F. Peterson *(Univ of California, Berkeley)*

Thermal Hydraulics in FHRs: Key Similarities and Differences with LWRs

TUESDAY KEYNOTE SESSION—III

Location: Regency C

Tuesday, September 1 • 8:00-9:00 a.m.

Session Chair: Yassin Hassan *(TAMU)*

Speaker:

Sofiane Benhamadouche *(EdF R&D)*

On the Use of (U)RANS and LES Approaches for Turbulent Incompressible Single Phase Flows in Nuclear Engineering Applications

FREE ELSEVIER COLLEGE OF SKILLS TRAINING SEMINAR

Location: Regency C

Tuesday, September 1 • 12:30-1:30 p.m.

Speaker:

Clare LeHane *(Elsevier)*

A guide to publishing your research: writing, reviewing and ethical issues in journal publishing.

Publishing research in well known scientific journals is one way that researchers build reputation in their community and allow the wide dissemination of their work. This presentation will go through the history of journal publishing, introduce best practice tips and hints when writing a paper, highlight the editorial process, and detail the main ethical issues that face authors, reviewers, editors and publishers on a day-to-day basis.

This seminar is offered to you at no additional charge.

SPECIAL SESSION

Celebrating Mujid Kazimi's Legacy: 40 Years of Innovation in Nuclear Engineering

Location: Regency A

Tuesday, September 1 • 1:30-3:35 p.m.

Session Organizer: Jacopo Buongiorno *(MIT)*

Session Chair: Jacopo Buongiorno *(MIT)*

Panelists:

- Prof. Michael Corradini *(Univ of Wisconsin, Madison)* "Development of a Societal-Risk Goal for Nuclear Power Safety," Caleb Roh, Vicki Bier, Michael Corradini, Shuji Liu *(Univ of Wisconsin, Madison)*, Robert Youngblood *(INL)*, Gregory Hammond *(AFIT)*
- Dr. Pradip Saha *(GE Hitachi)* "Subchannel Analysis of Boiling Two-Phase Flow in Rod Bundles – Status and Challenges"
- Prof. Yassin Hassan *(TAMU)* "Examples of Experiments and Needs for Validation of Computational Fluid Dynamics for Nuclear Applications"
- Prof. Hisashi Ninokata *(Politecnico di Milano)* "Current R&D Efforts Towards Delineating Fukushima Daiichi NPS Accident"

CHICAGO CUBS BASEBALL GAME

Location: Wrigley Field

Tuesday, September 1 • 7:00-10:30 p.m.

Watch the Chicago Cubs take on the Cincinnati Reds in a night game at historic Wrigley Field.

Each ticket includes a fare card for the Red Line subway train that will take you right to Wrigley Field in about 30 minutes. Exit the Hyatt and head west on Wacker Drive. Turn left onto State Street and continue down past the elevated train tracks at Lake Street, and enter the subway by taking the stairs down at the entrance just prior to the Chicago Theater. Take the red line train towards Howard. Exit on Addison (7th stop). Wrigley Field will be visible upon exiting at Addison. Head west on Addison to the entrance of the park at Clark Street.

The ballpark gates open at 5:05 pm, and the game starts at 7:05 pm.

http://nureth16.anl.gov/special-events/

WEDNESDAY KEYNOTE SESSION—IV

Location: Regency A

Wednesday, September 2 • 8:00-9:00 a.m.

Session Chair: Yassin Hassan *(TAMU)*

Speaker:

Dominique Bestion *(CEA)*

System Thermal Hydraulics for DBA Analysis and Simulation Status of Tools and Methods and Direction for Future R&D

WEDNESDAY KEYNOTE SESSION—V

Location: Regency B

Wednesday, September 2 • 8:00-9:00 a.m.

Session Chair: Nam T. Dinh *(NCSU)*

Speaker:

Barton Smith *(Utah State Univ)*

CFD Validation Experiments: What's the Difference?

WEDNESDAY KEYNOTE SESSION—VI

Location: Regency C

Wednesday, September 2 • 8:00-9:00 a.m.

Session Chair: Hisashi Ninokata *(Politecnico di Milano)*

Speaker:

Jun Sugimoto *(Kyoto Univ)*

Severe Accident Research in Japan after Accident at Fukushima Daiichi NPS

POSTER SESSION—I

Location: Regency D

Session Organizer: Elia Merzari *(ANL)*

Wednesday, September 2 • 9:00 a.m.-4:00 p.m.

Session Chairs: Elia Merzari *(ANL),* Hee Cheon No *(KAIST)*

The NURETH-16 poster sessions provide an opportunity for independent review of posters summarizing selected full papers.

See page 17 for the poster session overview.

RECEPTION AND DINNER AT THE ART INSTITUTE OF CHICAGO

Location: Art Institute of Chicago

Wednesday, September 2, 5:45-10:00 p.m.

Enjoy an elegant evening at the Art Institute of Chicago, the second-largest art museum in the United States and housing a collection of over 260,000 works of art. The evening will begin with a cocktail reception and gallery viewing, of the Impressionists collection, followed by dinner in Griffin Court in the museum's modern wing.

Our banquet speaker will be Dr. Marius Stan, Argonne senior computational energy scientist and actor in the television series, "Breaking Bad", who will present "Science and Cinema".

The museum is only a short walk along Michigan Avenue from the Hyatt Regency, or you can take a taxi from the Hyatt. Exit the Hyatt and head west on Wacker Drive. Make a left on Michigan Avenue. Follow Michigan Avenue down for 0.6 miles until you reach the Art Institute entrance stairs, flanked by two bronze lion statues.

If you have special transportation needs, please indicate these when you pick up your registration materials.

If you would prefer a vegetarian meal, please indicate this at registration.

The Art Institute dinner is included only with full registration (no one-day attendees, no students, no emeritus) - be sure to bring your badge or ticket or equivalent.

http://nureth16.anl.gov/special-events/

THURSDAY KEYNOTE SESSION—VII

Location: Regency A

Thursday, September 3 • 8:00-9:00 a.m.

Session Chair: Hee Cheon No *(KAIST)*

Speaker:

Chul-Hwa Song *(KAERI)*

Issues and Challenges on Advanced Thermal-Hydraulic Safety Research

THURSDAY KEYNOTE SESSION—VIII

Location: Regency B

Thursday, September 3 • 8:00-9:00 a.m.

Session Chair: W. David Pointer *(ORNL)*

Speaker:

Gretar Tryggvason *(Univ of Notre Dame)*

DNS Assisted Modeling of Bubbly Flows in Vertical Channels

THURSDAY KEYNOTE SESSION—IX

Location: Regency C

Thursday, September 3 • 8:00-9:00 a.m.

Session Chair: Sama Bilbao y Leon *(Virginia Commonwealth University)*

Speaker:

Stephen M. Bajorek *(US NRC)*

A Regulator's Perspective on the State-of-the-Art in Nuclear Thermal-Hydraulics

POSTER SESSION—II

Location: Regency D

Session Organizer: Elia Merzari *(ANL)*

Thursday, September 3 • 9:00 a.m.-4:00 p.m.

Session Chairs: W. David Pointer *(ORNL),* Sama Bilbao y Leon *(VCU)*

The NURETH-16 poster sessions provide an opportunity for independent review of posters summarizing selected full papers.

See page 17 for the poster session overview.

TOUR OF ARGONNE NATIONAL LABORATORY

Location: Argonne National Laboratory, Lemont, Il

Friday, September 4, 7:45 a.m.-2:30 p.m.

This guided tour will take you to several sites within Argonne, including:

- The Natural Convection Shutdown Heat Removal Test Facility, where users can evaluate performance capabilities of decay heat removal systems
- The MAX Fluid Dynamics facility, providing high-resolution data for development of fluid flow/heat transfer computational tools
- The Advanced Photon Source, including the Experiment Hall, with a presentation at the beamline where high-energy x-rays are used to conduct in situ examination of polycrystalline materials under thermo-mechanical loading for nuclear energy applications
- Argonne's Nuclear Energy Exhibit, where you will learn about the facilities and experiments at Argonne that were the foundation of the current commercial nuclear industry and of future advanced reactor designs

Registrants will be contacted by e-mail regarding tour and site access requirements for both US citizens and those who are not US citizens.

Bus transportation from the Hyatt Regency will board at 7:45 am from the Hyatt West Tower Stetson Avenue entrance. The bus will depart promptly at 8 am. You will need your passport and visa or U.S. driver's license to enter the Argonne campus. Lunch will be served at Argonne.

The bus will return to the Hyatt by about 2:30 p.m.

http://nureth16.anl.gov/special-events/

FRIDAY KEYNOTE SESSION—X

Location: Regency AB

Friday, September 4 • 8:00-9:00 a.m.

Session Chair: Elia Merzari *(ANL)*

Speaker:

Xu Cheng *(KIT/SJTU)*

Status and Challenges of Nuclear Thermal-Hydraulics Research in China

FRIDAY KEYNOTE SESSION—XI

Location: Regency C

Friday, September 4 • 8:00-9:00 a.m.

Session Chair: Hisashi Ninokata *(Politecnico di Milano)*

Speaker:

Hideki Kamide *(JAEA)*

Progress of Thermal Hydraulic Evaluation Methods and Experimental Studies on a Sodium-Cooled Fast Reactor and Its Safety

FRIDAY KEYNOTE SESSION—XII

Location: Toronto

Friday, September 4 • 8:00-9:00 a.m.

Session Chair: Michael Corradini *(University of Wisconsin, Madison)*

Speaker:

Mitchell T. Farmer *(ANL)*

U.S. DOE Severe Accident Research Following the Fukushima Daiichi Accidents

CLOSING PLENARY

Location: Regency AB

Friday, September 4 • 1:00-3:00 p.m.

Chairs: Prof. Hisashi Ninokata *(Politecnico di Milano),* Prof. Nam T. Dinh *(NCSU)*

1:00-1:15 p.m.

Poster Awards Ceremony

1:15-2:45 p.m.

Highlights of NURETH-16: the Conference in Retrospect–Panel

Panelists:

- Prof. Yassin Hassan *(TAMU)*
- Prof. Nam T. Dinh *(NCSU)*
- Dr. Chul-Hwa Song *(KAERI)*
- Dr. David Aumiller *(BMPC)*
- Mr. Ferry Roelofs *(NRG)*

2:45 -3:00 p.m.

Announcement of NURETH-17 and Closing

Technical Sessions

1:30-3:35 p.m.

Track 7: Investigation of Reflood Phenomena in Partially Blocked Core with Fuel Relocation

Session Organizers: Chul-Hwa Song *(KAERI)*, Francois Barre *(IRSN)*

Session Chairs: Chul-Hwa Song *(KAERI)*, Yanhua Yang *(SNPTC)*

Regency A: 1:30-3:10 p.m.

1:30 p.m.

The R&D PERFROI Project on Thermal Mechanical and Thermal Hydraulics Behaviors of a Fuel Rod Assembly during a Loss of Coolant Accident, Georges Repetto, Cristina Dominguez, Benoit Durville, Sebastien Carnemolla *(Institut de Radioprotection et de Surete Nucleaire)*, Nicolas Tardif *(LGCIE INSA Lyon)*, Damien Campello *(LaMCoS-INSA Lyon)*, Michel Gradeck *(Laboratoire d'Energétique et de Mécanique Théorique et Appliquée)*

1:55 p.m.

Experimental Study for Effects of Ballooning and Power Peak on a Coolability of Fuel Rod Bundle, Jongrok Kim, Sang-Ki Moon, Jongrok-Kuk Park, Chul-Hwa Song *(KAERI)*

2:20 p.m.

Core Coolability in Loss of Coolant Accident: The COAL Experiments, Georges Repetto, Christophe Marquie, Benoit Bruyere, Tony Glantz *(Institut de Radioprotection et de Surete Nucleaire)*

2:45 p.m.

Extended Study of Coolability of VVER Bundle with Ballooned Region, Imre Nagy, Zoltán Hózer, Tamás Novotny, Péter Windberg, András Vimi *(Hungarian Academy of Sciences)*

Track 7: Thermal Hydraulic Experiments and Numerical Analysis in Support of MYRRHA—I

Session Organizer: Katrien Van Tichelen *(SCK-CEN)*

Session Chairs: Katrien Van Tichelen *(SCK-CEN)*, Ferry Roelofs *(NRG)*

Regency B: 1:30-3:35 p.m.

1:30 p.m.

Thermal-Hydraulic Study of the LBE-Cooled Fuel Assembly in the MYRRHA Reactor: Experiments and Simulations, Julio Pacio *(KIT)*, Heleen Doolaard, Ferry Roelofs *(NRG)*, Katrien Van Tichelen *(SCK/CEN)*, Thomas Wetzel *(KIT)*

1:55 p.m.

Experimental Investigation of the Pressure Loss Characteristics of the Full-Scale MYRRHA Fuel Bundle in the COMPLOT LBE Facility, Graham Kennedy, Katrien Van Tichelen *(SCK/CEN)*, Heleen Doolaard *(NRG)*

2:20 p.m.

Fuel Pin Bundle Experimental Characterization in HLM Large Pool System, Daniele Martelli *(Univ of Pisa)*, Mariano Tarantino *(ENEA)*, Nicola Forgione *(Univ of Pisa)*, Ivan Di Piazza *(ENEA)*, Gianluca Barone, Morena Angelucci *(Univ of Pisa)*, Pietro Agostini *(ENEA)*

2:45 p.m.

Experimental Fuel Pin Bundle Characterization in the NACIE-UP HLM Facility, Ivan Di Piazza *(ENEA Brasimone R.C.)*, Morena Angelucci, Nicola Forgione *(Univ of Pisa)*, Giuseppe Polazzi, Valerio Sermenghi, Mariano Tarantino, Daniel Giannotti, Lorenzo Laffi, Stefano Cati *(ENEA)*

3:10 p.m.

CFD Pre-Test Analysis of the Fuel Pin Bundle Simulator Experiment in the NACIE-UP HLM Facility, Ivan Di Piazza *(ENEA Brasimone R.C.)*, Ranieri Marinari *(Univ of Pisa)*

Track 7: Advances in Enhancement, Understanding and Prediction of CHF and Quenching—I

Session Organizers: I.C. Bang *(UNIST)*, S. J. Kim *(HanyangUniv)*

Session Chairs: I. C. Bang *(UNIST)*, Rui Hu *(ANL)*

Regency C: 1:30-3:35 p.m.

1:30 p.m.

Development of CHF Mapping Method for Fin Structured Surface, Jinyoung Choi, Hee C. No *(KAIST)*

1:55 p.m.

Effects of Various Thin Film Coating Techniques on Pool Boiling Heat Transfer, Gwang Hyeok Seo, Hong Hyun Son, Uiju Jeong, Gyoodong Jeun, Sung Joong Kim *(Hanyang Univ)*

2:20 p.m.

Effect of Oxide Layer Thickness on the Pool Boiling Critical Heat Flux of Pre-Oxidized RPV Material, Hong Hyun Son, Uiju Jeong, Gwang Hyeok Seo, Gyoodong Jeon, Sung Joong Kim *(Hanyang Univ)*

2:45 p.m.

Effects of Coating Structure by Al_2O_3 Nanoparticles Deposition on Critical Heat Flux of R123 in Flow Boiling, Seok Bin Seo, In Cheol Bang *(UNIST)*

3:10 p.m.

Quenching Performance in Nanofluids and Nanoparticles-Deposited Surfaces, Kyung Mo Kim, In Cheol Bang *(UNIST)*

Track 4: Addressing Scaling Issues

Session Organizer: Milorad Dzodzo *(Westinghouse)*

Session Chairs: Milorad Dzodzo *(Westinghouse)*, Pradip Saha *(GE Hitachi Nuclear Energy)*

Regency D: 1:30-3:35 p.m.

1:30 p.m.

The Dynamical System Scaling Methodology, Jose N. Reyes, Jr. *(NuScale Power, LLC)*

1:55 p.m.

The Dynamical System Scaling Methodology: Comparing Dimensionless Governing Equations with the H2TS and FSA Methodologies, Jose N. Reyes, Jr. *(NuScale Power, LLC)*, Cesare Frepoli *(FPoliSolutions LLC)*, Joseph P. Yurko *(NuScale Power, LLC)*

2:20 p.m.

Scaling Analysis for DVI Line Break Accident of APR1400 based on ATLAS Experiment, Erol Bicer, Alin Tatu *(KEPCO International Nuclear Graduate School)*, Heeran Ko *(Korea Hydro & Nuclear Power Co., LTD)*, Taewan Kim *(KEPCO International Nuclear Graduate School)*

2:45 p.m.

Core Exit Temperature Response during an SBLOCA Event in the Ascó NPP, Jordi Freixa, Víctor Martínez-Quiroga, Francesc Reventós *(Technical Univ of Catalonia)*

3:10 p.m.

Analysis of Kv in Power-to-Volume Scaling. Application to a SBLOCA Transient, Andrea Querol Vives, Sergio Gallardo, Gumersindo Verdu *(Univ Politècnica de València)*

Track 2: Computational Fluid Dynamics—I

Comiskey: 1:30-3:35 p.m.

Session Organizers: Elia Merzari *(ANL)*, Sofiane Benhamadouche *(EDF R&D)*

Session Chairs: Sofiane Benhamadouche *(EDF R&D)*, Igor Bolotnov *(NCSU)*

1:30 p.m.

Large Eddy Simulation of Non-Isothermal Turbulent Flow Past a Circular Cylinder, Sasan Salkhordeh *(Univ of Pittsburgh)*, Anirban Jana *(Pittsburgh Supercomputing Center)*, Mark L. Kimber *(Univ of Pittsburgh)*

1:55 p.m.

Overview of the TRIOCFD Code: Main Features, V&V Procedures and Typical Applications to Nuclear Engineering, Pierre-Emmanuel Angeli, Ulrich Bieder, Gauthier Fauchet *(CEA)*

2:20 p.m.

Wall Resolved Large Eddy Simulation of a Flow Through a Square-Edged Orifice in a Round Pipe at RE=25000, Sofiane Benhamadouche, Wadih James Maalouf, Mario Arenas *(EDF R&D)*

2:45 p.m.

Large-Scale Simulation of Nuclear Reactors: Issues and Perspectives, Elia Merzari, Aleks Obabko, Paul Fischer, Noah Halford, Justin Walker, Andrew Siegel, Yiqi Yu *(ANL)*

3:10 p.m.

Modeling of Fluctuating Fluid Forces Exerted on the Walls of a Concentric Annular Pipe Using Large Eddy Simulation, Saptarshi Bhattacharjee *(CEA/Aix-Marseille Univ)*, Guillaume Ricciardi *(CEA)*, Stephane Viazzo *(Aix-Marseille Univ)*

Track 3: CHF and Post CHF Heat Transfer, Flooding and CCFL

Session Organizers: S. J. Kim *(Hangyang Univ)*, Michio Murase *(INSS)*

Session Chair: Sung Joong Kim *(Hanyang Univ)*

Gold Coast: 1:30-3:35 p.m.

1:30 p.m.

ORFEOTM—A CHF Correlation Form Applied to GAIA, AREVA's Advanced PWR Fuel Assembly Design, Ole Wieckhorst *(AREVA GmbH)*, Richard L. Harne, Mihnea S. Anghelescu *(AREVA Inc.)*, Harry Gabriel *(AREVA GmbH)*, Olivier Martinie *(AREVA SAS)*

1:55 p.m.

COBRA-TF Evaluation and Application for PWR Steamline Break DNB Analysis, Yixing Sung, Vefa Kucukboyaci, Liping Cao *(Westinghouse)*, Robert Keith Salko *(ORNL)*

2:20 p.m.

Study on Critical Heat Flux with Non-Uniform Axial Heat Flux Distributions During Lifetime in Reactor Core, Dawei Zhao, Wenxing Liu, Yuanfeng Zan, Wanyu Xiong, Zumao Yang *(RETH, Nuclear Power Inst of China)*

2:45 p.m.

A Validation of Westinghouse Mechanistic and Empirical Dryout Prediction Methods Under Realistic BWR Transient Conditions, Oscar Puebla Garcia *(Deloitte Consulting S.L.)*, Jean-Marie Le Corre *(Westinghouse Electric Sweden)*

3:10 p.m.

An Updated Approach to the Prediction of Dryout and Void Fraction for RBWR Bundles, Xingang Zhao, Koroush Shirvan, Yingwei Wu, Mujid S. Kazimi *(MIT Univ)*

Track 1: Interfacial Area Transport (Database, Modeling, Measurement Techniques)

Session Organizer: Yang Liu *(Virginia Tech)*

Session Chairs: Yang Liu *(Virginia Tech)*, Shao-Wen Chen *(National Tsinghua Univ)*

Watertower: 1:30-3:35 p.m.

1:30 p.m.

Evaluation of Interfacial Area Transport Equation in Coupled Two-Fluid Model Computation, J. P. Schlegel *(Missouri Univ Sci Tech)*, T. Hibiki *(Purdue Univ)*, X. Shen *(Kyoto Univ)*, S. Appathurai, H. Subramani *(Chevron Energy Technology Co.)*

1:55 p.m.

Interfacial Area Density Measurement using a Three-Layer Wire-Mesh Sensor, H.-M. Prasser, S. Stucki *(ETH Zurich)*, T. Betschart *(Paul Scherrer Inst)*, J. Eisenberg *(ETH Zurich)*

2:20 p.m.

Statistical Characteristics of Free Falling Water Film, A. A. Nikoglou, E. P. Hinis, S. E. Simopoulos *(National Technical Univ of Athens)*

2:45 p.m.

Evaluating Performance of Two Group Interfacial Area Transport Equation for Large Diameter Pipes, A. Dave, A. Manera *(Univ of Michigan)*, M. Beyer, D. Lucas *(Helmholtz-Zentrum Dresden-Rossendorf)*

3:10 p.m.

CFD Prediction of Subcooled Boiling with Advanced Mechanistic Models of Interfacial Area Transport Equation, V. T. Nguyen *(Hanoi Univ of Science and Technology)*, C.-H. Song *(KAERI)*,C. T. Tran *(Vietnam Atomic Energy Inst)*

Track 5: Modeling and Experiments of Severe Accidents—I

Session Organizer: Luis Herranz *(CIEMAT)*

Session Chair: Tran Chi Thanh *(VINATOM)*, Hideo Nakamura *(JAEA)*

Buckingham: 1:30-3:10 p.m.

1:30 p.m.

Melcor Analysis of Early Containment Venting Risk in a Severe Accident Scenario of Boiling Water Reactor, Huimin Zhang, Zheng Huang, Weimin Ma *(KTH)*

1:55 p.m.

Development of an In-Vessel Severe Accident Analysis Code MIDAC, Longze Li, Yapei Zhang, Wenxi Tian, G. H. Su, Suizheng Qiu *(Xi'an Jiaotong Univ)*

2:20 p.m.

Phenomenological Modeling Approach to Anisotropic Ablation in Molten Core Concrete Interactions, Kyoungmin Kang, Michael L. Corradini *(Univ of Wisconsin, Madison)*

2:45 p.m.

Melt-Concrete Interface Heat Transfer Models and Coolability Models: KWU PWR Analyses with MELCOR/CORCON and CORQUENCH, Adolf Rydl, Bernd Jaeckel *(Paul Scherrer Inst)*, Jens-Uwe Kluegel, Pascal Steiner *(Kernkraftwerk Goesgen)*

Track 1: Fundamental Thermal-Hydraulics: General—I

Session Organizers: Xiaojing Liu *(SJTU)*, Martin Rohde *(Udelft)*

Session Chairs: JeongIk Lee *(KAIST)*, Domenico Paladino *(PSI)*

Atlanta: 1:30-3:35 p.m.

1:30 p.m.

Numerical Studies of CO_2 Leak Modeling in Sodium-CO_2 Heat Exchanger in the SFR Coupled with the S-CO_2 Brayton Cycle, Hwa-Young Jung, Jeong Ik Lee *(KAIST)*, Myung-Hwan Wi *(KAERI)*

1:55 p.m.

Numerical Modeling of the Two-Phase Underexpanded Reactive CO_2-into-Sodium Jets in the Frame of Sodium Nuclear Fast Reactors, Daniele Vivaldi *(CEA)*, Frederic Gruy *(Ecole Nationale Supérieure des Mines de Saint Etienne)*, Christophe Perrais *(CEA)*

2:20 p.m.

Development and Verification of Behavior of Tritium Analytic Code (BOTANIC), Min Young Park, Eung Soo *(Seoul Natl Univ)*

2:45 p.m.

Development of a Mechanistic Evaluation Method for Wastage Environment Under Sodium-Water Reaction Accident, Akihiro Uchibori, Hiroyuki Ohshima *(JAEA)*

3:10 p.m.

Effects of Surface Orientation on Wall Heat Flux Partitioning During Nucleate Pool Boiling of Saturated Water at Atmospheric Pressure, Satbyoul Jung, Hyungdae Kim *(Kyung Hee)*

Track 4: NPP Transient and Accident Analysis—I

Session Organizer: Xiaojing Liu *(SJTU)*

Session Chairs: Xiaojing Liu *(Shanghai Jiao Tong Univ)*, Jovica Riznic *(CNSC)*

Wrigley: 1:30-3:35 p.m.

1:30 p.m.

TRACE/PARCS Analysis of ATWS with Instability for a MELLLA+ BWR/5, Lap-Yan Cheng *(BNL)*, Peter Yarsky *(NRC)*, Joo Seok Baek, Arantxa Cuadra, Arnold Aronson, David Diamond *(BNL)*

1:55 p.m.

Use of White Noise in TRACE/PARCS Analysis of ATWS with Instability, Tarek Zaki, Peter Yarsky *(NRC)*

2:20 p.m.

Axial Conduction Nodalization for TRACE/PARCS Analysis of ATWS with Instability, Peter Yarsky, Matthew Hardgrove *(NRC)*

2:45 p.m.

Sensitivity to TMIN in TRACE/PARCS Analysis of ATWS with Instability, Peter Yarsky *(NRC)*

3:10 p.m.

Control Rod Drop Transient: Uncertainty and Sensitivity Analysis of Thermal-Hydraulic Variables using a 3D Model with TRACE V5.0P3/PARCS 3.0, Carles Mesado Melia, Marina Garcia Fenoll, Rafael Miro Herrero *(ISIRYM)*, Gumersindo Verdu *(UPV)*

Technical Sessions

4:00-6:30 p.m.

Track 7: CFD Benchmark of NESTOR High Fidelity PWR Rod Bundle Data at In-Core Conditions

Session Organizers: Daniel Wells *(EPRI)*, Yassin Hassan *(TAMU)*

Session Chairs: Suresh Yagnik *(EPRI)*, Eric Volpenhein *(CD-ADAPCO)*

Regency A: 4:00-6:30 p.m.

4:00 p.m.

Overview of CFD Round Robin Benchmark of the High Fidelity Fuel Rod Bundle NESTOR Experimental Data, Daniel M. Wells *(EPRI)*, Pierre Peturaud *(Independent Contractor)*, Suresh Kumar Yagnik *(EPRI)*

4:25 p.m.

Application of CD-ADAPCO Best Practices to NESTOR OMEGA MVG Benchmark Exercises Using STAR-CCM+, Eric Volpenhein, Robert Brewster *(CD-Adapco)*, Emilio Baglietto *(MIT)*, Cassandra Carpenter *(CD-Adapco)*, Jeffry Smith *(Toyota Racing Development)*

4:50 p.m.

Validation of AREVA's Best Practices in the Round Robin CFD Benchmark, Mathieu G. Martin, Thomas Keheley *(AREVA Inc)*, Klaus Vogel, Kevin Goodheart *(AREVA GmbH)*, Anca Hatman *(AREVA Inc)*, Alexandre Chatelain *(AREVA NP SAS)*

5:15 p.m.

Westinghouse CFD Modeling and Results for EPRI NESTOR CFD Round Robin Exercise of PWR Rod Bundle Testing, Michael E. Conner, Zeses Karoutas, Yiban Xu *(Westinghouse)*

5:40 p.m.

Pressure Drop Predictions Using Code_Saturne in NESTOR CFD Benchmark, Sofiane Benhamadouche *(EdF R&D)*

6:05 p.m.

CFD Methodologies for a PWR Fuel Rod Assembly, Ted Blowe, Shin Kyu Kang, Yassin Hassan *(Texas A&M)*

Track 7: Hydrogen Management after Fukushima—I

Session Organizer: Ed Komen *(NRG)*

Session Chairs: Nabiha Chaumeix *(CNRS/ICARE)*, Ed Komen *(NRG)*

Regency B: 4:00-6:30 p.m.

4:00 p.m.

Hydrogen Management Strategies and Analysis Codes Implemented by the OECD Member Countries, Zhe Liang *(Canadian Nuclear Laboratories)*, Martin Sonnenkalb *(Gesellschaft für Anlagen- und Reaktorsicherheit)*, Ahmed Bentaib *(Institut de Radioprotection et de Sûreté Nucléaire)*, Marco Sangiorgi *(EC JRC)*

4:25 p.m.

Hydrogen Risk Assessment—CFD Model Validation and Reactor Scale Application, D. C. Visser, N. B. Siccama, E. M. J. Komen *(NRG)*, T. L. J. Keij, J. G. T. te Lintelo *(EPZ)*

4:50 p.m.

Hydrogen Combustion Benchmark Using Experiment in Double-Compartment Experimental Vessel, Giovanni Manzini *(RSE SpA)*, Ivo Kljenak *(Jozef Stefan Inst)*, Lubica Kubisova *(Nuclear Regulatory Authority of the Slovak Republic)*, Mantas Povilaitis *(Lithuanian Energy Inst)*

5:15 p.m.

Validation of Two Turbulent Flame-Speed Closure Models for Slow and Fast Hydrogen Deflagration, Tadej Holler *(Jožef Stefan Inst)*, Varun Jain, Ed M. J. Komen *(Nuclear Research and Consultancy Group)*

5:40 p.m.

Operational Experience of Ceramic Honeycomb Passive Autocatalytic Recombiner as a Hydrogen Mitigation System, Chang-Hyun Kim, Je-Joong Sung, Sang-Jun Ha *(KHNP)*, Phil-Won Seo *(Ceeracomb, Co., Ltd.)*

6:05 p.m.

Validation and Application of the REKO-DIREKT Code for the Simulation of Passive Auto-Catalytic Recombiners (PARs) Operational Behavior, Ernst-Arndt Reinecke, S. Kelm *(FzJ)*, M. Klauck *(RWTH Aachen Univ)*, P.-M. Steffen *(FzJ)*, H.-J. Allelein *(RWTH Aachen Univ)*

Track 1: Experimental Measurement Techniques and Flow Visualization—I

Session Organizer: Philippe Bardet *(GWU)*

Session Chairs: Wade Marcum *(Oregon State Univ)*, Stephen Lomperski *(ANL)*

Regency C: 4:00-6:30 p.m.

4:00 p.m.

Investigations on Centrifugal Pumps under Air Entrainment Conditions, Thomas Schäfer, André Bieberle, Uwe Hampel *(HZDR)*

4:25 p.m.

Study of Two-Phase Pipe Flow using the Axial Wire-Mesh Sensor, Arto Ylonen, Juhani Hyvarinen *(Lappeenranta Univ of Technology)*

4:50 p.m.

Measurement of Wall Temperature Fluctuations During Thermal Mixing of Non-Isothermal Water Streams, Henryk Anglart, Mattia Bergagio, Stellan Hedberg, Stefan Rydstrom *(KTH)*, Wiktor Frid *(Swedish Radiation Safety Authority)*

5:15 p.m.

Distributed Temperature Sensor Testing in Liquid Sodium, Craig D. Gerardi, Nathan Bremer, Darius D. Lisowski, Stephen W. Lomperski *(ANL)*

5:40 p.m.

Tomographic Reconstructions and Predictions of Radial Void Distribution in BWR Fuel Bundle with Part-Length Rods, Magnus Ahnesjö, Peter Andersson *(Uppsala Univ)*, Jean-Marie Le Corre, Stig Andersson *(Westinghouse Electric Sweden)*

6:05 p.m.

Mesh Sensor for High Temperature High Pressure Applications, John Kickhofel, Horst-Michael Prasser *(ETHZ)*, Karthick Selvam, Eckhart Laurien, Hermann Huber *(Univ of Stuttgart)*

Track 2: Multiscale Multiphysics Applications in Thermal Hydraulics—I

Session Organizers: Yann Bartosiewicz *(Univ of Louvain)*, Ferry Roelofs *(NRG)*

Session Chairs: W. David Pointer *(ORNL)*, Nam T. Dinh *(NCSU)*

Regency D: 4:00-6:30 p.m.

4:00 p.m.

Application and Validation of AREVA's Advanced Thermal-Hydraulic Methods and Codes for PWR Level III Crud Risk Assessment, Santosh Bhatt *(Areva Inc.)*, John Jones, Ryan Swanson, Stephen Palzewicz *(AREVA Inc.)*, Lanfranco Monti *(AREVA NP SAS)*, Galina Sieber *(AREVA GmbH)*

4:25 p.m.

Comparison of Overlapping and Separate Domain Coupling Methods, Timothy Paul Grunloh, Annalisa Manera *(Univ of Michigan)*

4:50 p.m.

Multi-Scale Thermal-Hydraulic Analysis of Safety Systems of Advanced PWRs using the CUPID Code, Han Young Yoon *(KAERI)*, Hyoung Kyu Cho *(Seoul Natl Univ)*, Jae Jun Jeong *(Pusan National Uniy)*, Chul-Hwa Song, Ik Kyu Park *(KAERI)*

5:15 p.m.

Towards a Coupled Simulation of Thermal Hydraulics and Neutronics in a Simplified PWR with a 3x3 Pin Assembly, Anni Schulze, Hans-Josef *(RWTH Aachen Univ)*, Stephan Kelm *(FzJ)*

5:40 p.m.

Analysis of Improved Fuel Rod Modeling in Coupled Thermal-Hydraulics/Neutronics Calculations, Ana Jambrina Gomez, Mine Yilmaz, Maria N. Avramova, Kostadin N. Ivanov *(Penn State)*

6:05 p.m.

A Control Theory Approach to Adaptive Stepsize Selection for Coupled CFD and CRUD Chemistry Simulations, Daniel J. Walter, Victor Petrov, Annalisa Manera *(Univ of Michigan)*, Brian Kendrick *(LANL)*

Track 2: Computational Fluid Dynamics—II

Session Organizers: Stavros Tavoularis *(Univ of Ottawa)*, Si Young Lee *(SNL)*

Session Chairs: Mike Steer *(Terrapower)*, Thomas Hoehne *(HZDR)*

Comiskey: 4:00-6:30 p.m.

4:00 p.m.

Phase-Field Modeling of Binary Eutectic Alloy Solidification With Convection, Stefan Meyer, Ivan Otic, Xu Cheng *(KIT)*

4:25 p.m.

Assessment of OpenFOAM CFD Toolbox for Gravity driven Turbulent Mixing Flows in a Reactor Pressure Vessel, Riccardo Puragliesi *(Scherrer Inst)*, Qing Zhou *(CEA)*, Omar Zerkak, Andreas Pautz *(Scherrer Inst)*

4:50 p.m.

Validation of CFD-Codes for Natural Convection and Condensation Phenomena in Containments with German THAI-Experiments, Joern Stewering, Berthold Schramm, Martin Sonnenkalb *(Gesellschaft fuer Anlagen- und Reaktorsicherheit)*

5:15 p.m.

Investigation of Plenum-to-Plenum Heat Transfer and Gas Dynamics under Natural Circulation in a Scaled Down Dual Channel Module Mimicking Prismatic VHTR Core with using CFD, Muthanna H. Al Dahhan *(Missouri Univ of Science and Technology)*, P. Jain *(ORNL)*, S. Usman *(Missouri Univ of Science and Technology)*, Rizwan Uddin *(Univ of Illinois)*, I. A. Said *(Missouri Univ of Science and Technology)*, M. M. Kao *(Univ of Illinois)*, M. M. Taha *(Missouri Univ of Science and Technology)*

5:40 p.m.

Thermal-Hydraulic Design and CFD Analysis of Fuel Assembly for China Lead-Based Research Reactor, Tao Zhou, Zengfang Ge, Shuyong Liu, Yunqing Bai, Yong Song *(Chinese Academy of Sciences)*

6:05 p.m.

Numerical Analysis of Core Thermal-Hydraulic for Sodium-Cooled Fast Reactors, Alain Conti, Antoine Gerschenfeld, Yannick Gorsse, Thierry Cadiou, Romain LaVastre *(CEA)*

Track 6: Thermal Hydraulics in Sodium-Cooled Fast Reactors (General)—I

Session Organizers: Thomas Fanning *(ANL)*, Ferry Roelofs *(NRG)*

Session Chairs: Ferry Roelofs *(NRG)*, Hideki Kamide *(JAEA)*

Gold Coast: 4:00-6:05 p.m.

4:00 p.m.

Liquid Metal Heat Transfer Under Low Peclet Number Conditions, Hiroyasu Mochizuki *(Univ of Fukui)*

4:25 p.m.

Experimental Study of Gas Entrainment from Surface Swirl, Brahim Moudjed, Lionel Rossi, Roland Riva, Jacques Excoffon *(CEA)*

4:50 p.m.

Analysis of Natural Circulation Tests in the Experimental Fast Reactor JOYO, Kunihiko Nabeshima, Norihiro Doda, Takero Mori, Hiroaki Ohira, Hiroyuki Ohshima *(JAEA)*, Takashi Iwasaki *(NESI Inc.)*

5:15 p.m.

Development of Optical Fiber Instrumentation for use in Sodium Cooled Fast Reactors, Matthew T. Weathered, Mark Anderson *(Univ of Wisconsin, Madison)*

5:40 p.m.

Numerical Analyses on the Safety Aspects of KASOLA Test Facility, Hristo V. Hristov, Thorsten Hollands *(GRS)*, Maxime Haselbauer, Wadim Jaeger, Wolfgang Hering *(KIT)*

Track 1: Two-Phase Flow and Heat Transfer Fundamentals—I

Session Organizers: Seungjin Kim *(Penn State)*, Annalisa Manera *(Univ of Michigan)*

Session Chairs: Jacopo Buongiorno *(MIT)*, DuWayne Schubring *(Univ of Florida)*

Watertower: 4:00-6:30 p.m.

4:00 p.m.

Transient Convective Boiling: Analysis of Experimental Results, Nicolas Baudin *(IRSN)*, Catherine Colin *(IMFT)*, Pierre Ruyer *(IRSN)*, Julien Sebilleau *(IMFT)*

4:25 p.m.

Experimental and Analytical Study of Flashing Flow Through Steam Generator Tube Cracks, Shripad T. Revankar *(Purdue Univ)*, Jovica R. Riznic *(Canadian Nucl Safety Comm)*

4:50 p.m.

Development and Validation of A New Drift Flux Model in Rod Bundle Geometries, Ikuo Kinoshita, Toshihide Torige *(Inst of Nulcear Safety System, Inc.)*, Minoru Yamada *(MHI Nuclear Eng Co.,Ltd.)*, Takashi Hibiki *(Purdue Univ)*

5:15 p.m.

Uncertainty Analysis of Delayed Equilibrium Model *(DEM)* using the CIRCE Methodology, Jean-Marie Seynhaeve *(UCLouvain)*, Agnes De Crecy *(CEA)*, Yann Bartosiewicz *(UCLouvain)*

5:40 p.m.

Experimental and Numerical Investigation on Single Air Bubble Rising in Narrow Rectangular Channel, Liqin Zhang, Yanping Huang, Mingliang Song, Yuanfeng Zan, Junfeng Wang, Yanlin Wang *(Nuclear Power Inst of China)*

6:05 p.m.

Thermal Hydraulics Analysis for Cooling Tower Performance, Si Young Lee, Alfred J. Garrett *(SRNL)*

Track 5: Severe Accidents: General

Session Organizers: Ed Komen *(NRG)*, Sama Bilbao y Leon *(VCU)*

Session Chairs: Mitchell T. Farmer *(ANL)*, Jun Sugimoto *(Kyoto Univ)*

Buckingham: 4:00-6:05 p.m.

4:00 p.m.

First Results of the Simulation of the Fukushima-Daiichi Unit 3 Accident for an Assessment of the Applicability and Capability of the Code ATHLET-CD, Christoph Bratfisch, Mathias Hoffmann, Marco K. Koch *(RUB)*

4:25 p.m.

PHEBUS FPT-1 Simulation, using MELCOR: Blockage Model Analysis, Jun Wang, Michael L. Corradini, Troy C. Haskin *(Univ of Wisconsin, Madison)*

4:50 p.m.

Analysis of the FeCrAl Accident Tolerant Fuel Concept Benefits during BWR Station Blackout Accidents, Kevin R. Robb *(ORNL)*

5:15 p.m.

Determination of In-Vessel Retention under Molten Corium Pool Attack, D. Home, M. Chai *(AMEC Foster Wheeler)*

5:40 p.m.

Effect of Particle Spreading on Coolability of Ex-Vessel Debris Bed, S. E. Yakush *(Russian Academy of Sciences)*, A. Konovalenko, S. Basso, P. Kudinov *(KTH)*

Track 3: Computational Fluid Dynamics V&V—I

Session Organizer: Hiroyuki Ohshima *(JAEA)*

Session Chair: JeongIk Lee *(KAIST)*

Atlanta: 4:00-6:05 p.m.

4:00 p.m.

Transient Convection from Forced to Natural with Flow Reversal for CFD Validation, Blake W. Lance, Barton L. Smith *(Utah State Univ)*

4:25 p.m.

Large-Eddy Simulation of Thermal Striping in PLAJEST Experiment with Trio U, Pierre-Emmanuel Angeli *(CEA)*

4:50 p.m.

CFD Simulations of Erosion of a Stratified Layer by a Buoyant Jet in a Large Vessel, Fatih Sinan Sarikurt, Yassin A. Hassan *(Texas A&M)*

5:15 p.m.

Analysis of Panda Spray Experiments Performed in Two Interconnected Vessels with OpenFOAM, Nejdet Erkan, Koji Okamoto *(Univ of Tokyo)*

5:40 p.m.

CFD and Experimental Analysis of Single Phase Buoyancy Driven Counter-Current Flow in a Pipe, Frederic Sebilleau, Raad Issa, Simon P. Walker *(Imperial College London)*, Anuj Kumar Kansal, Naresh Kumar Maheshwari *(BARC)*

Track 2: Core Thermal Hydraulics and Subchannel Analysis

Session Organizers: David Aumiller *(BMPC)*, Yiqi Yu *(ANL)*

Session Chairs: Pradip Saha *(GE Hitachi Nuclear Energy)*, David Aumiller *(Bechtel Marine Propulsion Corp)*

Wrigley: 4:00-6:30 p.m.

4:00 p.m.

Hot Fuel Element Thermal-Hydraulic Modeling in the Jules Horowitz Reactor Nominal and LOFA Conditions, Reijo Pegonen, Henryk Anglart *(KTH Royal Inst of Technology)*, Serge Bourdon, Christian Gonnier *(CEA, DEN, DER, SRJH)*

4:25 p.m.

Determination of the Pressure Loss Coefficient at the Control-Rod Guide Tube Flow-Hole for a PWR Nuclear Fuel Assembly by using CFD and Bernoulli Solutions, Dong-Yuan Sheng *(Westinghouse Electric Sweden AB)*, Marcus Seidl *(E.ON Kernkraft GmbH)*

4:50 p.m.

Evaluation of 1-D Void and Pressure Drop Models over a Wide Range of Fuel Bundle Geometries and Operating Conditions, Manuel Auliano *(Norwegian Univ Sci Tech)*, Jean-Marie Le Corre *(Westinghouse Electric Sweden)*

5:15 p.m.

On the Analytical Solutions and Numerical Verifications of Two-Phase Water Faucet Problem, Ling Zou, Haihua Zhao, Hongbin Zhang *(INL)*

5:40 p.m.

Development of Burnup Dependent Fuel Rod Model in CTF, Mine Ozdemir Yilmaz, Maria N. Avramova *(Penn State)*

6:05 p.m.

Design of High Power Density Annular Fuel Rod Core for Advanced Heavy Water Reactor, Abhijit Pandurang Deokule *(Homi Bhabha National Inst)*, Alok Kumar Vishnoi, Arnab Dasgupta, Umasankari Kannan, Dinesh Chandraker, Pallipatu Krishnan Vijayan *(BARC)*

Technical Sessions

9:30 a.m.-12:00 p.m.

Track 7: NEAMS Sponsored Advances in Thermal Hydraulics Modeling and Simulation

Session Organizer: Justin Thomas *(ANL)*

Session Chair: W. David Pointer *(ORNL)*

Regency A: 9:30 a.m.-12:00 p.m.

9:30 a.m.

URANS Simulations of Thermal Stratification in a Large Enclosure for Severe Accident Scenarios, L.B. Carasik *(Texas A&M)*, F. Sebilleau, S. P. Walker *(Imperial College London)*, Y. A. Hassan *(Texas A&M)*

9:55 a.m.

A High-Order System Thermal-Hydraulics Model for Advanced Reactor Safety Analyses, Rui Hu *(ANL)*

10:20 a.m.

Coupled Calculations of SAS4A/SASSYS-1 and STAR-CCM+ for the SHRT-45R Test in EBR-II, Klaus Huber *(KIT)*, Justin W. Thomas *(ANL)*

10:45 a.m.

Steady and Unsteady Calculations on Thermal Striping Phenomena in Triple-Parallel Jet, Y. Q. Yu, E. Merzari, J. W. Thomas, A, Obabko *(ANL)*

11:10 a.m.

Erosion of a Large-Scale Gaseous Stratified Layer by a Turbulent Round Jet S—Simulations with URANS and LES Approaches, A. Kraus, S. Aithal, A. Obabko, E. Merzari *(ANL)*, A. Tomboulides *(Western Macedonia Univ)*, Paul Fischer *(Univ of Illinois)*

11:35 a.m.

Verification and Validation of Nek5000 for T-Junction, Matis, SIBERIA, and Max Experiments, Aleksandr Obabko *(ANL)*, Paul Fischer *(ANL/Univ of Illinois)*, Oana Marin, Elia Merzari *(ANL)*, W. David Pointer *(ORNL)*

Track 7: Hydrogen Management after Fukushima—II

Session Organizer: Ed Komen *(NRG)*

Session Chairs: Ed Komen *(NRG)*, Nabiha Chaumeix *(CNRS/ICARE)*

Regency B: 9:30 a.m.-12:00 p.m.

9:30 a.m.

Simulation of Hydrogen Distribution in the Containment during a Severe Accident with Fast Hydrogen-Steam Release, D. Papini, M. Andreani, B. Ničeno, H.-M. Prasser*(Paul Scherrer Institut)*, P. Steiner, J.-U. Klügel *(Kernkraftwerk Gösgen-Däniken AG)*

9:55 a.m.

Re-Evaluation of PAR Concept in German PWR with Revised PAR Model, M. Sonnenkalb, S. Band, H. Nowack, S. Schwarz *(GRS mbH)*

10:20 a.m.

Combined Effects of Cooler and Spray Activation on the Hydrogen Distribution in the Presence of a Jet Flow, D. Paladino, R. Kapulla, G. Mignot, S. Paranajpe *(PSI)*

10:45 a.m.

Hydrogen Safety: Laminar and Turbulent Flame Speed of Spherical Flame in a Fan-Stirred Closed Vessel, J. Goulier, N. Chaumeix *(CNRS/ICARE)*, N. Meynet, A. Bentaïb *(IRSN)*

11:10 a.m.

Passive Autocatalytic Recombiners (PAR) Induced Ignition and the Resulting Hydrogen Deflagration Behaviour in LWR Containments, Sanjeev Gupta, Teja Kanzleiter, Gerhard Poss *(Becker Technol GmbH)*

11:35 a.m.

A First Orienting Investigation of the Interaction of Cable Fire Products with Passive Auto-Catalytic Recombiners (PARs), Ernst-Arndt Reinecke *(FzJ)*, Ahmed Bentaib *(IRSN)*, Jürgen Dornseiffer *(FzJ)*, Daniel Heidelberg *(RWTH Aachen Univ)*, Frank Morfin *(CNRS)*, Pascal Zavaleta *(IRSN)*, Hans-Josef Allelein *(RWTH Aachen Univ/FzJ)*

Track 1: Experimental Measurement Techniques and Flow Visualization—II

Session Organizer: Philippe Bardet *(GWU)*

Session Chairs: Philippe Bardet *(GWU)*, Craig Gerardi *(ANL)*

Regency C: 9:30 a.m.-12:00 p.m.

9:30 a.m.

Computational Fluid Dynamics Modeling and Validation of Swirling Flow in a Pipe with Classic Twisted Tape, Minseop Song, So Hyun Park, Eung Soo Kim *(Seoul Natl Univ)*

9:55 a.m.

Flow Characterization within a Sphere-Packed Bed using PIV Measurement, Z. J. Hong, L. Xiong, N. X. Wang, W. Zhou *(Chinese Academy of Sciences)*

10:20 a.m.

System Analysis and Isothermal Separate Effect Experiments of the Accident Behavior in PWR Spent Fuel Storage Pools, H. Chahi, W. Käestner, S. Alt *(Univ of Applied Sciences Zittau/Görlitz)*

10:45 a.m.

Local Parameters of Air-Water Two-Phase Flow at a Vertical T-Junction, G. Monrós-Andreu, R. Martinez-Cuenca, S. Torró, S. Chiva *(Univ Jaume I)*

11:10 a.m.

A Separate-Effect Test Facility for CFD-Grade Measurements of the RCCS Upper Plenum, Thien Nguyen, Victor Petrov, Annalisa Manera *(Univ of Michigan)*

11:35 a.m.

High Resolution Experiments of Velocity and Concentration Fluctuations in a Jet Flow, Victor Petrov, Thien Duy Nguyen, Daniel Nunez, Akshay Dave, Annalisa Manera *(Univ of Michigan)*

Track 7: Issues and Advances in Thermal Hydraulic Research of FHRs

Session Organizers: Per Peterson *(Univ of California, Berkeley)*, Xiaodong Sun *(Ohio State Univ)*

Session Chairs: Per Peterson *(University of California Berkeley)*, Xiaodong Sun *(The Ohio State Univ)*

Regency D: 9:30 a.m.-12:00 p.m.

9:30 a.m.

Development of the FHR Advanced Natural Circulation Analysis (FANCY) Code, Z. Guo, N. Zweibaum *(Univ of California, Berkeley)*, M. Shao *(LBNL)*, L. R. Huddar, P. F. Peterson *(Univ of California, Berkeley)*, S. Qiu *(Xi'an Jiaotong Univ)*

9:55 a.m.

Experimental Study of DRACS Thermal Performance in a Low-Temperature Test Facility, Q. Lv, H. C. Lin, X Sun, R. N. Christiansen, T. E. Blue *(Ohio State)*, G. Yoder, D. Wilson *(ORNL)*, P. Sabharwall *(INL)*

10:20 a.m.

Experimental Strategy for the Determination of Heat Transfer Coefficients in Pebble-Beds Cooled by Fluoride Salts, L. Huddar, P. F. Peterson *(Univ of California, Berkeley)*, R. O. Scarlat *(Univ of Wisconsin, Madison)*, Z. Guo *(Xi'ian Jiaotong Univ/Univ of California, Berkeley)*

10:45 a.m.

Thermal Analysis of Pebble-Bed Reactors based on a Tightly Coupled Mechanical-Thermal Model, Yanheng Li, Wei Ji *(RPI)*

11:10 a.m.

Design, Fabrication and Startup Testing in the Compact Integral Effects Test Facility in Support of Fluoride-Salt-Cooled, High-Temperature Reactor Technology, N. Zweibaum, J. E. Bickel, Z. Guo, J. C. Kendrick, P. F. Peterson *(Univ of California, Berkeley)*

11:35 a.m.

Validation of Best Estimate Models for Fluoride-Salt-Cooled, High-Temperature Reactors Using Data from the Compact Integral Effects Test (CIET 1.0) Facility, N. Zweibaum, Z. Guo *(Univ of California/Xi'an Jiaotong Univ)*, L. R. Huddar, P. F. Peterson *(Univ of California, Berkeley)*

Track 2: Containment Analysis (with V&V)

Session Organizer: Marco Pellegrini *(IAE)*

Session Chairs: Francesco D'Auria *(Univ of Pisa)*, Marco Pellegrini*(IAE)*

Comiskey: 9:30 a.m.-12:00 p.m.

9:30 a.m.

Nuclear Reactor Containment Flows—Modelling of Stably Stratified Layer Erosion by a Turbulent Jet, L. Ishay, G. Ziskind *(Ben-Gurion Univ of the Negev)*, U. Bieder *(CEA)*, A. Rashkovan *(NRCN)*

9:55 a.m.

Containment Analysis of Fukushima Daiichi Unit 1 Power Station using GOTHIC, O. E. Ozdemir, T. L. George, M. Marshall *(Zachry Nuclear Engineering, Inc.)*

10:20 a.m.

Study of the Influence of the Design Parameters and Initial Condition of Passive Containment Cooling System, Yan Wang, Yaoli Zhang, Zhiwei Zhou *(Tsinghua Univ)*, Yanning Yang *(State Nuclear Power Technology Research and Development Centre)*

10:45 a.m.

A Lumped Parameter Modeling for Mixing and Stratification in a BWR Mark I Pressure Suppression Pool, O. E. Ozdemir, T. L. George *(Zachry Nuclear Eng, Inc.)*

11:10 a.m.

Evaluation of Passive Containment Cooling with an Advanced Water Film Model in a Lumped-Parameter Code, Xi Huang, Xu Cheng *(KIT)*, Walter Klein-Hessling *(GRS)*

11:35 a.m.

Synthesis of the OECD/NEA-PSI CFD Benchmark Exercise, M. Andreani, A. Badillo, R. Kapulla, B. Smith *(PSI)*

Track 7: Passive Safety System and Accidents Measures

Session Organizer: I. C. Bang *(UNIST)*

Session Chairs: I. C. Bang *(UNIST)*, Jose Reyes, Jr. *(NuScale)*

Gold Coast: 9:30 a.m.-12:00 p.m.

9:30 a.m.

Using NASA's GFSSP Code for Steady State and Transient Modeling of Gas Cooled Reactor Passive Safety Systems, Wesley C. Williams *(Louisiana State Univ)*, Jeffrey McLean *(CDI Corp.)*

9:55 a.m.

Feasibility Study of Hybrid Heat Pipe with Control Rod as Passive In-Core Cooling System for Advanced Nuclear Power Plant, Yeong Shin Jeong, Kyung Mo Kim, In Guk Kim, In Cheol Bang *(UNIST)*

10:20 a.m.

Optimization Methodology for Large Scale Fin Geometry on the Steel Containment of a Public Acceptable Simple SMR (PASS), Do Yun Kim, Hee Cheon No, Ho Sik Kim *(KAIST)*

10:45 a.m.

Preliminary Design of the I²S-LWR Containment System, Mingjun Wang *(Xi'an Jiaotong Univ/Univ of Michigan)*, Annalisa Manera *(Univ of Michigan)*, Matthew J. Memmott *(Brigham Young Univ)*, John C. Lee *(Univ of Michigan)*, Suizheng Qiu *(Xi'an Jiaotong Univ)*

11:10 a.m.

Experimental Study and Validation of MARS Code for CCFL in Passive Emergency Core Cooling System (PECCS) of Public Acceptable Simple SMR (PASS) System, Ho Sik Kim, Mun Won Song, Hee Cheon No *(KAIST)*

11:35 a.m.

Heat Removal Capacity of Heat Pipe Designs for In-Core Passive Decay Heat Removal System, Kyung Mo Kim, In Guk Kim, Yeong Shin Jeong, In Cheol Bang *(UNIST)*

Track 1: Two-Phase Flow and Heat Transfer Fundamentals—II

Session Organizers: Seungjin Kim *(Penn State Univ)*, Annalisa Manera *(Univ of Michigan)*

Session Chairs: Seungjin Kim *(Penn State)*, Justin Talley *(Bechtel Marine Propulsion Corp)*

Watertower: 9:30 a.m.-12:00 p.m.

9:30 a.m.

Rayleigh-Taylor Instability of Viscous Flow with Heat and Mass Transfer, Byoung Jae Kim, Kyung Doo Kim *(KAERI)*

9:55 a.m.

Qualification of CHF Test Facility at Stern Laboratories using Mitsubishi PWR Fuel, Y. Sato, J. Takeuchi *(MHI)*, D. Komiyama, Y. Uno *(Mitsubishi Nuclear Fuel Co., Ltd.)*, R. A. Fortman, G. I. Hadaller *(Stern Laboratories Inc.)*

10:20 a.m.

Measurements of the Vertical Distribution of the Void Fraction using X-Ray Attenuation for Different Flow Regimes in a Horizontal Pipe, L. Rossi, R. De Fayard, S. Kassab *(CEA)*

10:45 a.m.

An Experimental Study of Air-Water Pool Entrainment in High Gas Flux Region, Peng Zhang, Peipei Chen, Wei Li, Zhi Di, Lei Zhang, Xiao Hu, Yaheng Zou, Zhi Di *(SNPTC)*

11:10 a.m.

Thermal-Hydraulic Study of Siphon Breaking Phenomenon on a Two-Phase Gas/Liquid Flow, P.-A. Douxchamps, C. Diakodimitris, C. Mandy, C. Angulo *(Tractebel Eng)*

11:35 a.m.

Experimental Investigation of the High Performance Steam Injector Operation, Shuichiro Miwa, Yuto Takeya, Hiroto Endo, Michitsugu Mori *(Hokkaido Univ)*

Track 2: Computational Multi-Fluid Dynamics—I

Session Organizer: Emilio Baglietto *(MIT)*

Session Chairs: Adrian Tentner *(ANL)*, Ling Zou *(INL)*

Buckingham: 9:30 a.m.-11:35a.m.

9:30 a.m.

Numerical Modeling of Horizontal Annular Flows using a Droplet Entrainment Model, Thomas Hoehne *(HZDR)*

9:55 a.m.

Progress on Computation of Boiling Flow in Fuel Assemblies with NEPTUNE_CFD, Cyril Baudry, Nicolas Merigoux, Jerome Lavieville, Stephane Mimouni, Mathieu Guingo *(EdF)*

10:20 a.m.

Modeling of Two-Phase Flow in a BWR Fuel Assembly with a Highly-Scalable CFD Code, Adrian Tentner, Prasad Vegendla, Aleks Obabko, Oana Marin, Elia Merzari *(ANL)*

10:45 a.m.

Status and Challenges of CFD-Modelling for Poly-Disperse Bubbly Flows, Dirk Lucas, E. Krepper, R. Rzehak, Y. Liao, T. Ma, T. Ziegenhein *(HZDR)*

11:10 a.m.

A Novel Approach for Turbulence Modeling of Wavy Stratified Two-Phase Flow, Matthias Benz, Thomas Schulenberg *(KIT)*

Track 3: Computational Fluid Dynamics V&V—II

Session Organizer: Hiroyuki Ohshima *(JAEA)*

Session Chairs: Yann Bartosiewicz *(Univ of Louvain)*, Barton Smith *(Utah State Univ)*

Atlanta: 9:30 a.m.-12:00 p.m.

9:30 a.m.

Validation of ANSYS CFX for Gas and Liquid Metal Flows with Conjugate Heat Transfer Within the European Project THINS, A. Aleksandrov Papukchiev, S. Buchholz *(GRS mbH)*

9:55 a.m.

The Development of Surface Vortices in Strongly Rotating Flow in a Cylindrical Vessel: Numerical Simulation, F. Bloemeling *(TUEV NORD Nuclear)*, S. Richter, M. Schlueter *(Hamburg Univ of Technology)*

10:20 a.m.

A Methodology for Characterizing Representativeness in Power Plant Performance Indicator Measurements with CFD Simulations, U. Otgonbaatar, E. Baglietto, N. Todreas *(MIT)*

10:45 a.m.

Tailored Experiments for Validation of CFD with FSI for Nuclear Applications, Eric Lillberg, Kristian Angele, Gustav Lundqvist *(Vattenfall AB)*, Nicholas Edh *(Forsmarks Kraftgrupp AB)*

11:10 a.m.

Software Quality Assurance and V&V Procedure During the Development Stages of EdF CFD Tool Code_SATURNE: Focus on Verification Tests, J. Fontaine, M. Ferrand, E. Le Coupanec *(EdF)*

11:35 a.m.

On the Liquid Metal Heat Transfer in Annular Channels: Review, Proposal and Validation of Empirical Models, W. Jaeger, W. Hering, M. Lux *(KIT)*

Track 3: Plant System Code Validation—I

Session Organizers: Kyung Doo Kim *(KAERI)*, Yanhua Yang *(SNPTC/SJTU)*

Session Chairs: Yanhua Yang *(SNPTC)*, Shripad Revankar *(Purdue Univ)*

Wrigley: 9:30 a.m.-12:00 p.m.

9:30 a.m.

Assessment Study of RELAP5/SCDAP Capability to Reproduce Liquid Metal Tall Facility Thermal Hydraulic Behaviour, F. Fiori, Z. W. Zhou *(Tsinghua Univ)*

9:55 a.m.

Validation of CATHARE Code on the 3D ROSA-LSTF Pressure Vessel, S. Carnevali, P. Bazin *(CEA)*

10:20 a.m.

Recommendations of Two-Phase Critical Non-Flashing Flow Mixture Calculations in One-Dimensional System Code RELAP5, Lukasz Sokolowski *(Inspecta Nuclear AB)*, Tomasz Kozlowski *(Univ of Illinois)*

10:45 a.m.

Comparison of MARS-KS to COBRA-TF for Models and Correlations in Pre-CHF Regime, Min-Gil Kim, Wonwoong Lee, Jeong Ik Lee *(KAIST)*, Young Seok Bang *(KINS)*

11:10 a.m.

Preliminary Results of a Comparative Assessment of ATHLET-CD and MELCOR by Simulating the Experiment PHEBUS FPT1, Christian Bratfisch, Marco K. Koch *(Ruhr-Univ Bochum)*

11:35 a.m.

Towards a Consolidated Approach for the Validation of Plant System Codes and Models: Case Study for a BWR Fast Depressurization Event, A. Epiney, S. Canepa, O. Zerkak, H. Ferroukhi *(PSI)*

Technical Sessions

1:30 -3:35 p.m.

Track 7: Thermal Hydraulic Experiments and Numerical Analysis in Support of MYRRHA—II

Session Organizer: Katrien Van Tichelen *(SCK-CEN)*

Session Chair: Graham Kennedy *(SCK-CEN)*

Regency B: 1:30-3:35 p.m.

1:30 p.m.

Experimental Results from a Water Scale Model for the Thermal-Hydraulic Analysis of a HLM Reactor, Chiara Spaccapaniccia, Philippe Planquart, Jean-Marie Buchlin *(von Karman Inst)*, Matteo Greco, Fabio Mirelli, Katrien Van Tichelen *(SCK/CEN)*

1:55 p.m.

CFD Benchmark for a Heavy Liquid Metal Fuel Assembly, H. J. Doolaard, A. Shams, F. Roelofs *(NRG)*, K. Van Tichelen, S. Keijers *(SCK/CEN)*, J. De Ridder, J. Degroote, J. Vierendeels *(Ghent Univ)*, I. Di Piazza, R. Marinari *(ENEA)*, E. Merzari, A. Obabko, P. Fischer *(ANL)*

2:20 p.m.

Tracking of Fuel Particles After Pin Failure in Nominal, Loss-of-Flow and Shutdown Conditions in the MYRRHA Reactor,S. Buckingham, P. Planquart *(von Karman Inst)*, K. Van Tichelen *(SCK/CEN)*

2:45 p.m.

Pre-Test Computational Fluid Dynamics and System Thermal Hydraulics Calculations of the E-SCAPE Scaled LBE Pool Facility, M. Greco, F. Mirelli, S. Keijers, K. Van Tichelen *(SCK/CEN)*

3:10 p.m.

MyrrhaFoam: A CFD Model for the Study of the Thermal Hydraulic Behavior of MYRRHA, Lilla Koloszar, Sophia Buckingham *(Von Karman Inst)*, Steven Keijers *(SCK/CEN)*, S. He Wang *(The Univ of Sheffield)*

Track 7: Advances in Enhancement, Understanding and Prediction of CHF and Quenching—II

Session Organizers: I. C. Bang *(UNIST)*, S. J. Kim *(Hanyang Univ)*

Session Chair: Sung Joong Kim *(Hanyang Univ)*, Domenico Paladino *(PSI)*

Regency C: 1:30-3:10 p.m.

1:30 p.m.

Research on Flow Characteristics for the Optimal Design of Experiment for the Typical Pressured Water Reactor, G. L. Chen, Z. J. Zhang, Z. F. Tian, X. M. Dong *(Harbin Engineering Univ)*

1:55 p.m.

Critical Heat Flux Enhancement Mechanism by Surface Modification based on Hydrodynamic Instability Model, Han Seo, In Cheol Bang *(UNIST)*

2:20 p.m.

Trend Analysis for Low Pressure Low Flow Tube CHF, Xirui Liu, Bao-Wen Yang, Yudong Zha *(Xi'an Jiaotong Univ)*

2:45 p.m.

Development of a Mechanistic Critical Heat Flux Correlation, Jeffrey Luitjens, Qiao Wu *(Oregon State Univ)*

Track 7: Heat Transfer in Supercritical Flows

Session Organizers: Xiaojin Liu *(SJTU)*, Martin Rohde *(UDelft)*

Session Chairs: Xiaojing Liu *(Shanghai Jiao Tong Univ)*, Shuisheng He *(Univ of Sheffield)*

Regency D: 1:30-3:35 p.m.

1:30 p.m.

Fluid-Structure Interaction in a Wire-Wrapped Rod Bundle Cooled with Supercritical Water, D. C. Visser, A. Shams, V. R. Bhimanadam *(NRG)*

1:55 p.m.

Natural Convection Driven Heat Transfer in Fluids with Strongly Variable Properties: A Particle Image Velocimetry Study, V. Valori, G. E. Elsinga, M. Rohde, M. J. Tummers, J. Westerweel, T. H. J. J. van der Hagen *(TU Delft)*

2:20 p.m.

Development and Validation of a Scaling Method for Supercritical Fluid Heat Transfer, X. J. Liu, Xu Cheng *(Shanghai Jiao Tong Univ)*

2:45 p.m.

Experimental Study on the CO_2 to Water Heat Exchanger Performance Near the CO_2 Critical Point, Yoonhan Ahn, Seungjoon Baik, Jeong Ik Lee *(KAIST)*

3:10 p.m.

Direct Numerical Simulation of Fluid Flow at Supercritical Pressure in a Vertical Channel, W. Wang, S. He *(Univ of Sheffield)*

Track 7: Realistic BWR LOCA Evaluation: Methodology Development and Application

Session Organizer: Kurshad Muftuoglu *(GE Hitachi)*

Session Chair: Kurshad Muftuoglu *(GE Hitachi)*

Comiskey: 1:30-3:35 p.m.

1:30 p.m.

BWR-4 LOCA Modeling with RELAP5, K. Nikitin, P. Mueller, J. Martin, W. van Doesburg *(BKW Energie AG)*, D. Hiltbrand *(Studsvik)*

1:55 p.m.

RELAP5 BWR-4 Model Development and Validation for NPP Mühleberg *(KKM)*, P. Mueller, K. Nikitin, W. van Doesburg *(BKW Energie AG)*, D. Hiltbrand *(Studsvik)*

2:20 p.m.

TRACG Application on BWR/2 LOCA, G. Li, L. Klebanov, P. Sharpe, K. Muftuoglu, C. Heck *(GE Hitachi)*

2:45 p.m.

KKM TRACG LOCA, Samuel Lafountain, Baris Sarikaya, Jordan Hagaman, Phil Sharpe, Dan Pappone, Kurshad Muftuoglu *(GE Hitachi)*, Willem van Doesburg, Konstantin Nikitin *(BKW)*

3:10 p.m.

KKM TRACG Validation, Samuel Lafountain, Baris Sarikaya *(GE Hitachi)*, Willem van Doesburg, Konstantin Nikitin *(BKW)*

Track 6: Thermal Hydraulics in Small Modular Reactors—I

Session Organizer: Maria Avramova *(North Carolina StateUniv)*

Session Chairs: Robert Martin *(BWX Technologies)*, Wade Marcum *(Oregon State Univ)*

Gold Coast: 1:30-3:35 p.m.

1:30 p.m.

Ocean-Based Passive Decay Heat Removal in the Offshore Floating Nuclear Plant (OFNP), J. Zhang, J. Buongiorno, M. Golay, N. Todreas *(MIT)*

1:55 p.m.

Study of Safety and International Development of Small Modular Reactors (SMR), S. Buchholz, A.- K. Kruessenberg, A. Schaffrath *(GRS GmbH)*

2:20 p.m.

Experimental Research on Non-Condensable Gases Effects in Passive Decay Heat Removal System, Liu Yang, Jia Hai-jun *(Tsinghua Univ)*

2:45 p.m.

Compact Steam Generator for Nuclear Application, G. Haratyk, K. Shirvan, M. S. Kazimi *(MIT)*

3:10 p.m.

Passive Decay Heat Removal Capability of Fixed Bed Nuclear Reactor Fuel Chamber, Muhammad Rizaal, Koji Okamoto, Nejdet Erkhan *(Univ of Tokyo)*

Track 4: BEPU Analysis and Challenges in Licensing

Session Organizer: Haihua Zhao *(INL)*

Session Chairs: Haihua Zhao *(INL)*, Joseph Yurko *(FPoliSolutions)*

Watertower: 1:30-3:35 p.m.

1:30 p.m.

Non-Parametric Order Statistics: Providing Assurance of Nuclear Safety, M. A. Shockling *(Westinghouse)*

1:55 p.m.

Reevaluation of Station Blackout Risk of OPR-1000 Nuclear Power Plant Applying Combined Approach of Deterministic and Probabilistic Method, Dong Gu Kang, Seung-Hoon Ahn *(KINS)*

2:20 p.m.

10 CFR 50.46c Rulemaking: A Novel Approach in Restating the LOCA Problem for PWRs, Cesare Frepoli, Joseph P. Yurko *(FPoliSolutions LLC)*, Ronaldo H. Szilard, Curtis L. Smith, Robert Youngblood *(INL)*

2:45 p.m.

Sampling Variance and Bias of Wilks' Conservative Estimate of Confidence Intervals, J. P. Hessling *(SP Technical Research Inst of Sweden)*, P. Hedberg *(Swedish Radiation Safety Authority)*

3:10 p.m.

Uncertainty and Sensitivity Analysis of the OECD/NEA KALININ-3 Benchmark, I. Pasichnyk *(GRS GmbH)*, S. Nikonov *(VNIIAES)*, W. Zwermann, K. Velkov *(GRS GmbH)*

Track 5: Modeling and Experiments of Severe Accidents—II

Session Organizer: Luis Herranz *(CIEMAT)*

Session Chairs: Pavel Kudinov *(Royal Inst of Technology)*, Xu Cheng *(KIT/SJTU)*

Buckingham: 1:30-3:35 p.m.

1:30 p.m.

Capability of ASTEC V2.1 to Simulate a Severe Accident in a Nuclear Power Plant —Application to a TMI-2-Like Accident Scenario, P. Drai, P. Chatelard, L. Laborde, L. Piar, F. Fichot, G. Brillant *(IRSN)*

1:55 p.m.

Enhancements in MAAP5.03+ MCCI and Corium Coolability Models and Benchmarks against OECD CCI Tests, Quan Zhou, Chan Y. Paik, Paul B. McMinn *(Fauske & Associates, LLC)*

2:20 p.m.

Effects of Porous Superhydrophilic Surfaces on Flow Boiling Critical Heat Flux in IVR Accident Scenarios, Reza Azizian, Thomas McKrell, Kresna Atkhen *(EdF)*, Jacopo Buongiorno *(MIT)*

2:45 p.m.

Thermal Effects of Material Discontinuities and Oxidation on Graphite Matrix in HTGRs, Dan Gould, Hanwen Liu, Hitesh Bindra *(Kansas State Univ)*

3:10 p.m.

Simulation of LIVE-L4 with ATHLET-CD, T. Hollands, C. Bals *(GRS)*

Track 3: Computational Fluid Dynamics V&V—III

Session Organizer: Hiroyuki Ohshima *(JAEA)*

Session Chairs: Hiroyuki Ohshima *(JAEA)*, Matjaz Leskovar *(Jozef Stefan Inst)*

Atlanta: 1:30-3:35 p.m.

1:30 p.m.

CFD Analysis of Non-Axial Flow in Fuel Assemblies, U. Bieder *(CEA)*

1:55 p.m.

Verification, Validation and Application of NEPTUNE_CFD to Two-Phase Pressurized Thermal Shocks, N. Mérigoux, J. Laviéville, S. Mimouni, M. Guingo, C. Baudry, S. Bellet *(EdF)*

2:20 p.m.

Multiphase RANS Simulations of Turbulent Bubbly Flows, M. Colombo, M. Fairweather *(Univ of Leeds)*, S. Lo, A. Splawski *(CD-adapco)*

2:45 p.m.

Application of RPI Model: Prediction of Subcooled Boiling and DNB in Vertical Pipes, Rui Zhang, Wenwen Zhang, Tenglong Cong, Wenxi Tian, G. H. Su, Suizheng Qiu *(Xi'an Jioatong Univ)*

3:10 p.m.

Verification of Interface-Tracking Method with Manufactured Solution, Kei Ito, Hiroyuki Ohshima *(JAEA)*, Tomoaki Kunugi *(Kyoto Univ)*

Track 4: NPP Transient and Accident Analysis—II

Session Organizer: Xiaojing Liu *(SJTU)*

Session Chairs: David Aumiller *(Bechtel Marine Propulsion Corp)*, Kostadin Ivanov *(Penn State)*

Wrigley: 1:30-3:35 p.m.

1:30 p.m.

Analysis of LOCA Scenarios in the NIST Research Reactor Before and After Fuel Conversion, Joo Seok Baek, Lap-Yan Cheng, David Diamond *(BNL)*

1:55 p.m.

OSCARD Coupling Software for Main Steam Line Break Fault Analysis—Assessment of the Mixing Phenomena in the Vessel, Jérémie Galarin, Hugues Neyret-Duperray, Ouardia Touazi, Simon Pelissier *(EdF)*

2:20 p.m.

Comparison of Thermal Hydraulic Analysis Methods (Codes) for the University of Florida Training Reactor (UFTR), D. Springfels, K. A. Jordan, D. Schubring *(Univ of Florida)*

2:45 p.m.

Conclusions on Boron Precipitation following a Large Break Loss of Coolant Accident, K. Umminger, B. Schoen, S. P. Schollenberger *(AREVA GmbH)*

3:10 p.m.

Analysis of the SBLOCA on the Improved CPR1000 with Passive Systems, Zijiang Yang, Xiaofei Xiong, Junli Gou, Jianqiang Shan, Guomin Zhang, Li Ge *(Xi'an Jiaotong Univ)*

Technical Sessions

4:00-6:30 p.m.

Track 8: Data, Data Science, and Data-Driven Thermal-Hydraulics – Panel

Session Organizer: Nam T. Dinh *(NCSU)*

Session Chair: Nam T. Dinh *(NCSU)*

Regency A: 4:00-6:30 p.m.

Panelists:

- Igor Bolotnov *(NCSU)*
- Phillipe Bardet *(George Washington Univ)*
- Pavel Kudinov *(Royal Inst of Technology)*
- Kyung Doo Kim *(KAERI)*
- Gretar Trygvasson *(Univ of Notre Dame)*
- Richard Schultz *(ISU)*
- Francesco D'Auria *(Univ of Pisa)*
- William (David) Pointer *(ORNL)*

Track 7: CFD Modeling of Fuel Assemblies: From High Fidelity to Low Resolution Models

Session Organizer: Ferry Roelofs *(NRG)*

Session Chairs: Ferry Roelofs *(NRG)*, Andreas Class *(KIT)*

Regency B: 4:00-6:30 p.m.

4:00 p.m.

CFD Simulations to Determine the Effects of Deformations on Liquid Metal Cooled Wire Wrapped Fuel Assemblies, Eugeny Sosnovsky *(Varian Medical Systems)*, Emilio Baglietto *(MIT)*, Steven Keijers, Katrien van Tichelen *(SCK/CEN)*, Thiago Cardoso de Souza, Heleen Doolaard, Ferry Roelofs *(NRG)*

4:25 p.m.

Analysis of Pressure Drop in Rod Bundles in Heavy Liquid Metal, A. Batta, A. Class *(KIT)*

4:50 p.m.

Calibration of High Fidelity Bare Rod Bundle Simulations for Various Prandtl Fluids, T. Cardoso de Souza, A. Shams, F. Roelofs *(NRG)*, T. Kwiatkowski *(National Center for Nuclear Research)*

5:15 p.m.

Investigating Reactor Components with the Coarse-Grid-Methodology, M. Viellieber A. Class *(IKET)*

5:40 p.m.

Scaling Considerations About LWR Core Thermal Hydraulics, D. Bestion, L. Matteo *(CEA)*

6:05 p.m.

High-Fidelity Numerical Reference Simulation of the Flow Through an Infinite Wire-Wrapped Assembly, A. Shams, F. Roelofs, E. M. J. Komen *(NRG)*

Track 7: Modeling and Experiments of IVR and Core Catcher Strategies

Session Organizer: Yong Hoon Jeong *(KAIST)*

Session Chairs: Yong Hoon Jeong *(KAIST)*, Henryk Anglart *(KTH)*

Regency C: 4:00-6:30 p.m.

4:00 p.m.

Detailed Analysis of Geometry Effect on Two Phase Natural Circulation Flow under IVR-ERVC, R. Park, K. S. Ha, H. Y. Kim *(KAERI)*

4:25 p.m.

Analysis of APR1400 Core Degradation under Cavity-Flooded Condition using MELCOR, Kukhee Lim, Yongjin Cho *(KINS)*

4:50 p.m.

Effect of Wettability and Two-Phase Flow Conditions on Flow Boiling CHF Enhancement for Slug Flow, Hae Min Park, Yong Hoon Jeong *(KAIST)*

5:15 p.m.

Heat Removal Characteristics of IVR-ERVC Cooling System Using Gallium Liquid Metal, Seong Dae Park, Hyo Heo, In Cheol Bang *(UNIST)*

5:40 p.m.

CHF Measurement for Downward Facing SUS 304 and Carbon Steel Plates under Atmospheric and Pool Boiling Conditions, Dong Hoon Kam, Hae Min Park, Young Jae Choi, Yong Hoon Jeong *(KAIST)*

Track 2: Multiscale Multiphysics Applications in Thermal Hydraulics—II

Session Organizers: Yann Bartosiewicz *(Univ of Louvain)*, Ferry Roelofs *(NRG)*

Session Chairs: Maria Avramova *(North Carolina State Univ)*, Annalisa Manera *(Univ of Michigan)*

Regency D: 4:00-6:05 p.m.

4:00 p.m.

Unprotected Transient Analyses of Natural Circulation LBE-Cooled Accelerator Driven Sub-Critical System, Gang Wang, Zhen Wang, Ming Jin, Yunqing Bai, Yong Song *(Chinese Academy of Sciences)*

4:25 p.m.

Testing Coupled MCNP6/CTF on an Assembly Level Problem with an Acceleration Technique, A. Bennett, K. Ivanov, M. Avramova *(PSU)*

4:50 p.m.

Multiscale Analysis of Forced and Natural Convection Including Heat Transfer Phenomena in the TALL-3D Experimental Facility, A. Papukchiev *(GRS GmbH)*, C. Geffray *(Technische Univ Muenchen)*, M. Jeltsov, K. Kööp, P. Kudinov, D. Grischenko *(KTH)*

5:15 p.m.

Validation and Application of the 3D Neutron Transport MPACT within CASL VERA-CS, Brendan Kouchunas, Thomas J. Downar, Dan Jabaay *(Univ of Michigan)*, Benjamin Collins, Shane Stimpson, Andrew Godfrey, Kang Seog Kim, Jess Gehin *(ORNL)*, Scott Palmtag *(Core Physics Inc.)*, Fausto Franceschini *(Westinghouse)*

5:40 p.m.

Modeling of the Groundwater Transport Around a Deep Borehole Nuclear Waste Repository, N. Lubchenko, E. A. Bates, E. Baglietto, M. J. Driscoll, M. Rodriguez-Buño *(MIT)*, R. Podgorney *(INL)*

Track 1: Subchannel Fluid Dynamics and Heat Transfer

Session Organizers: DuWayne Schubring *(Univ. of Florida)*, Hisashi Ninokata *(Politecnico di Milano)*

Session Chairs: Hisashi Ninokata *(Politecnico di Milano)*, Bao-Wen Yang *(Xi'an Jiao Tong Univ)*

Comiskey: 4:00-6:05 p.m.

4:00 p.m.

Numerical Investigation of Buoyancy-Aided Flow in Rod-to-Wall Gap Regions, Y. Duan, S. He *(Univ of Sheffield)*

4:25 p.m

RANS Simulation of Turbulent Swept Flow over a Wire in a Channel for Core Thermal Hydraulic Design, Byung-Hyun You, Yong Hoon Jeong *(KAIST)*, Yacine Addad *(Khalifa Univ)*

4:50 p.m.

Experimental and Computational Study of Ribbed Cladding for PWR Rod Bundles Heat Transfer Enhancement, L. A. Carrilho, M. B. Dzodzo *(Westinghouse)*, J. A. Khan *(Univ of South Carolina)*

5:15 p.m.

High Resolution Thermal Mixing at Westinghouse ODEN Loop, L. David Smith III, Paul F. Joffre *(Westinghouse)*, Jean-Marie Le Corre, Fredrik Waldemarsson, Anders Hallehn, Henrik Tejne *(Westinghouse Electric Co. Sweden AB)*

5:40 p.m.

An Initial Uncertainty Analysis on the Critical Heat Flux Evaluation for a Small-Scale Pressurized Nuclear Reactor using the COBRA Code, J. P. Duarte, J. R. C. Piqueira *(Univ of São Paulo)*, P. F. Frutuoso e. Melo *(Federal Univ of Rio de Janeiro)*

Track 6: Thermal Hydraulics in Sodium-Cooled Fast Reactors (Transient Models and Validation)—II

Session Organizers: Thomas Fanning *(ANL)*, Ferry Roelofs *(NRG)*

Session Chairs: W. David Pointer *(ORNL)*, Stephane Mimouni *(EDF R&D)*

Gold Coast: 4:00-6:05 p.m.

4:00 p.m.

EBR-II Passive Safety Demonstration Tests Benchmark Analyses—Phase 2, L. Briggs *(ANL)*, S. Monti *(IAEA)*, W. Hu *(China Inst of Atomic Energy)*, D. Sui *(North China Electric Power Unit)*, G. H. Su *(Xi'an Jiatong Univ)*, L. Maas *(Inst for Radiological Protection and Nuclear Safety)*, B. Vezzoni *(KIT)*, U. Partha Sarathy *(IGCAR)*, A. Del Nevo *(ENEA)*, A. Petruzzi *(Nuclear and Industrial Eng.)*, R. Zanino *(Politecnico di Torino)*, H. Ohira *(JAEA)*, H. Mochizuki *(RINE)*, K. Morita *(Kyushu Univ)*

4:25 p.m.

Simulations of the EBR-II Tests SHRT-17 and SHRT-45R, T. Sumner, A. Moisseytsev *(ANL)*

4:50 p.m.

Qualification of a RELAP5-3D© System Code Nodalization of EBR-II, A. Del Nevo *(ENEA)*, E. Martelli *(Univ of Rome "La Sapienza")*

5:15 p.m.

Transient Analysis of the ASTRID Demonstrator Including a Gas Nitrogen Power Conversion System with the CATHARE2 Code, F. Bertrand, G. Mauger *(CEA)*

5:40 p.m.

Computational Thermal Hydraulics Schemes for SFR Transients Studies, Marie-Sophie Chenaud, L. I. Simon, Marine Anderhuber, Laura Matteo, Antoine Gerschenfeld *(CEA)*

Track 1: Two-Phase Flow and Heat Transfer Fundamentals—III

Session Organizers: Seungjin Kim *(Penn State)*, Annalisa Manera *(Univ of Michigan)*

Session Chair: Horst-Michael Prasser *(ETH)*

Watertower: 4:00-6:30 p.m.

4:00 p.m.

Numerical Prediction of Turbulent Convective Heat Transfer with Molten Salt in Circular Pipe, Yushuang Chen, Zhongfeng Tang, Naxiu Wang *(Chinese Academy of Science)*

4:25 p.m.

Experimental Study of Heat Transfer Mechanisms Under Exponential Power Excursion in Plate-Type Fuel, G. Su *(MIT)*, M. Bucci *(CEA)*, T. J. Mckrell, J. Buongiorno, *(MIT)*

4:50 p.m.

Experimental Investigation of Critical Heat Flux for Zero and Natural Circulation Flow of Water in Three Rods Bundle near Atmospheric Pressure, Y. Aharon, I. Hochbaum *(NRCN)*

5:15 p.m.

Numerical Investigations of a Spent Fuel Storage Pool in Abnormal Conditions, J.-P. Simoneau, B. Gaudron, Jérôme Laviéville, Julien Dumazet *(EdF)*

5:40 p.m.

Experimental Investigation of Thermal Hydraulic Limits of BWR RCIC System Operation under Long-Term Operation, M. Solom, K. Vierow *(Texas A&M)*, A. Nosek *(NRC)*

6:05 p.m.

Thermal Shrinkage Based Model for Predicting the Voids during Solidification of Lead, Niranjan Gudibande, Kannan Iyer *(Indian Inst of Technology)*

Track 2: Computational Multi-Fluid Dynamics—II

Session Organizer: Emilio Baglietto *(MIT)*

Session Chairs: Emilio Baglietto *(MIT)*, Djamel Lakehal *(ASCOMP AG)*

Buckingham: 4:00-6:30 p.m.

4:00 p.m.

Numerical Study of Direct Contact Condensation of Steam on Stable Interface in a BWR Supression Pool Test Facility, G. Patel, V. Tanskanen, V. Rintala, J. Hyvärinen *(Lappeenranta Univ of Technology)*

4:25 p.m.

Momentum Convection within the Staggered Grid Formulation, J. W. Lane, T. L. George *(Zachry Nuclear Eng, Inc.)*

4:50 p.m.

Assessment of an Interfacial Shear Term for Adiabatic Dispersed Air-Water Two-Phase Flow with the Two-Fluid Model, S. L. Sharma, T. Hibiki, M. Ishii *(Purdue Univ)*, J. P. Schlegel *(Missouri Univ Sci and Technology)*, J. R. Buchanan, Jr., K. J. Hogan *(Bechtel Marine Propulsion Corp.)*, P. W. Guilbert *(ANSYS UK Ltd)*

5:15 p.m.

A CFD Approach to Spacer Grid Optimization for Improved Dryout Performance in BWR Fuel Bundle, T. Strömgren, A. Zhezherun, Y. Le Moigne, J.-M. Le Corre, D. Y. Sheng, S. Perzon *(Westinghouse Electric Sweden)*

5:40 p.m.

Modeling of Interfacial Momentum Exchange for Wall-Bounded Bubbly Flows, Jungwoo Kim *(Seoul National Univ of Science and Technology)*, Donjoo Kim *(Kumoh National Inst of Technology)*, Hyungmin Park, Jun Ho Lee *(Seoul Natl Univ)*

6:05 p.m.

Modeling of Rayleigh-Taylor Instability for Steam Direct Contact Condensation, Marco Pellegrini, Masanori Naitoh *(The Inst of Applied Energy)*, Colin Josey, Emilio Baglietto *(MIT)*

Track 5: Debris Bed Cooling

Session Organizer: Nikolay Kolev *(Siemens)*

Session Chair: Bal-Raj Sehgal *(KTH)*

Atlanta: 4:00-6:30 p.m.

4:00 p.m.

Experimental Investigations on the Coolability of Debris Beds under Variation of Inflow Conditions, S. Leininger, R. Kulenovic, E. Laurien *(Univ of Stuttgart)*

4:25 p.m.

Unsteady Void Measurements Within Debris Beds using High Speed X-Ray Tomography, E. Laurien, T. Stürzel, M. Zhou *(Univ of Stuttgart)*

4:50 p.m.

Validation of the MEWA Code Against POMECO-HT Experiments and Coolability Analysis of Stratified Debris Beds, Zheng Huang, Weimin Ma, Sachin Thakre *(KTH)*

5:15 p.m.

Experimental Study of Pressure Drops in Coarse Particle Beds, R. Clavier, N. Chikhi, F. Fichot *(IRSN)*, M. Quintard *(IMFT)*

5:40 p.m.

An Experimental Study on Flow Characteristics of Homogeneous and Stratified Debris Beds, Liangxing Li, Xumao Zou, Jiaojiao Lou, Huixiong Li, Xianliang Lei *(Xi'an Jiaotong Univ)*

6:05 p.m.

First Experimental Results of Large Scale Debris Bed Reflood Tests in the PEARL Facility, Nourdine Chikhi, T. Garcin, F. Foubert, P. March, F. Fichot *(IRSN)*

Track 3: Plant System Code Validation—II

Session Organizers: Kyung Doo Kim *(KAERI)*, Yan-Hua Yang *(SJTU)*
Session Chairs: Kyung Doo Kim *(KAERI)*, Suizheng Qiu *(Xi'an Jiao Tong Univ)*

Wrigley: 4:00-6:30 p.m.

4:00 p.m.

On the Definition of a Minimum Set of Requirements to Assess the Adequacy of the RELAP5-3D© Multidimensional Flow Capability with Selected Canonical Problems, C. Frepoli, J. W. Fricano, J. P. Yurko *(FPoliSolutions LLC)*, F. Buschman, D. Aumiller *(BAPL)*

4:25 p.m.

Simulation of Faraday Waves with RELAP5-3D Thermal-Hydraulic Code, C. Frepoli, J. W. Fricano *(FPoliSolutions LLC)*, F. Buschman, D. Aumiller *(BAPL)*

4:50 p.m.

On the Level of Approximation of the Multi-Dimensional Potential Flow Solution in Complex Geometries with Thermal-Hydraulic System Codes, C. Frepoli, J. P. Yurko, J. W. Fricano *(FPoliSolutions LLC)*, F. Buschman, D. Aumiller *(BAPL)*

5:15 p.m.

Investigation of Multidimensional Flow Mixing Phenomena in the Reactor Pressure Vessel with the System Code ATHLET, P. Pandazis, S. C. Ceuca, P. J. Schoeffel, H. V. Hristov *(GRS)*

5:40 p.m.

The CATHARE Code Condensation Modelling Confronted to the TOPFLOW-PTS Steady-State Experiments, Pierre Gaillard, Dominique Bestion, Isabelle Dor, Philippe Germain, Frederic Moutin *(CEA-DEN-DM2S-STMF)*

6:05 p.m.

Assessment of TRACE/PARCS Benchmark Against Leibstadt Plant Data During the Turbine Trip Test, P. Papadoulos, A. Sekhri *(ETH Zurich)*, F. Giust *(Axpo KN)*, P. Hidalga, R. Miró, T. Barrachina, G. Verdú *(Univ Politècnica de València)*

Poster Sessions

9:00 a.m.-4:00 p.m.

Poster Session—I

Session Organizer: Elia Merzari *(ANL)*

Session Chairs: Elia Merzari *(ANL)*, Hee Cheon No *(KAIST)*

Regency D: 9:00 a.m.-4:00 p.m.

W01 - Six-Field Governing Equation Development for Advanced System Codes, Glenn Roth, Fatih Aydogan *(Univ of Idaho)*

W02 - Experimental and Numerical Study of Valves for Supercritical Carbon Dioxide BRAYTON Cycle, Haomin Yuan, Mark Anderson *(Univ of Wisconsin)*

W03 - Spatially-Resolved Measurement of Gas Phase Temperature and Velocity in the Subchannels of a Fuel Element during Dry-Out, Martin Arlit, C. Partmann *(Technische Univ Dresden)*, E. Schleicher *(Helmholtz-Zentrum Dresden-Rossendorf)*, U. Hampel *(Technische Univ Dresden)*

W04 - Experimental and Analytic Study of the Damped Rocking Movement of a Cylindrical Shell in a Flowing Annular Channel, Benoit Migot, A. Malon *(AREVA NP)*, R. J. Gibert *(RJG-Conseil)*

W05 - An Experimental Study on the Quench Front Velocity and Temperature during Rewetting of a Hot Vertical Rod, Niki Lymperea, Andreas Nikoglou, Evangelos Hinis *(National Technical Univ of Athens)*

W06 - On the Use of Hybrid RANS/LES Methods for the Simulation of the Erosion of a Stratified Layer by a Turbulent Buoyant Jet, Fabien Duval *(IRSN)*, Michael Le Bars *(IRPHE)*

W07 - Experimental and Theoretical Study of Iron Concentration on Clogging Phenomenon in Secondary Circuit of Pressurized Nuclear Power Plant, Alejandro Carlos Mourgues, Thierry Muller, Florian Pedler, Arelia Lassauce, Michael Guillodo, Philippe Dolleans *(AREVA NP)*, Marylise Charon-Charles *(AREVA)*

W08 - A New Lumped Thermal Resistance Heat Transfer Model for Fuel Pin Structure, Shisheng Wang, Andrei Rineiski, Liancheng Guo *(KIT)*

W09 - Assessment of the Best Estimate Thermal Design Method using THALES Subchannel Code, Byeong Il Jang *(KEPCO Nuclear Fuel)*, Hong Ju Kim, Beomjun Jang, Shane Park, Chong Kuk Chun *(KEPCO NF)*

W010 - Advanced Multiphysics Thermal-Hydraulics Models for the High Flux Isotope Reactor, Prashant K. Jain, James D. Freels *(ORNL)*

W011 - Non-Linear Eddy Viscosity Turbulence Modeling in Hydra-TH for Fuel Related Applications, Benjamin Lawrence Magolan, Emilio Baglietto *(MIT)*, Mark A. Christon *(LANL)*, Thomas M. Smith *(SNL)*

W12 - Diagnostic Techniques for Flow Induced Vibration, Shengjie Gong *(Shanghai Jiao Tong Univ)*, Fujun Gan *(Shanghai Nucl Eng Research Design Inst)*, Yong Mei, Chi Wang, Hanyang Gu *(Shanghai Jiao Tong Univ)*

W13 - A Supercritical Pressure Parallel Channel Natural Circulation Loop, Manish Sharma, Kapil Bodkha, D. S. Pilkhwal, P. K. Vijayan *(BARC)*

W14 - Quantification of Input Uncertainties Based on VEERA Reflooding Experiments, Torsti Ossian Alku *(VTT Technical Research Centre of Finland Ltd)*

W15 - Implementation of Strong Implicit Procedure for the Energy Equations in Subchannel Code ATHAS, Wenjie Ding, Jianqiang Shan, Bo Zhang *(Xi'an Jiaotong Univ)*

W16 - An Experimental Study on the Dynamics of a Liquid Film Under Shearing Force and Thermal Influence, Ke Wang, Youjia Zhang, Weimin Ma *(Royal Inst of Technology)*

W17 - Measurements of the Flow Distribution in Subchannels of a Wire Wrapped 37-Pin Rod Assembly, Seok-Kyu Chang, Dong-Jin Euh, Hae Seob Choi, Hyungmo Kim, Dong-Won Lee, Hyeong-Yeon Lee *(KAERI)*

W18 - CTF Residual Formulation Solid Liquid Coupling, Christopher A. Dances, Maria Avramova *(Penn State)*, Vince Mousseau *(SNL)*

W19 - Visualization of Turbulent Thermal Mixing Structures in a Horizontal Stratified Condensing Flow, Seungtae Lee *(KAERI)*

W20 - The Impact of Vertical Acceleration on the Nonlinear Behaviors of Multiple Parallel Boiling Channels, Jin-Der Lee, Chin Pan, Shaw-Wen Chen *(National Tsing Hua Univ)*

W21 - Reactor Core Analysis at Low Flow Condition Using THALES Subchannel Code, Beomjun Jang, Chongkuk Chun, Joo Il Yoon, Byeong Il Jang *(Kepco Nuclear Fuel)*, Dong Soo Song *(KHNP)*

W22 - Uncertainty Analysis of an Interfacial Area Reconstruction Algorithm, Akshay Dave, Annalisa Manera *(Univ of Michigan)*, Dirk Lucas, M. Beyer *(Helmholtz-Zentrum Dresden-Rossendorf)*, M. Prasser *(ETH Zurich)*

W23 - Experimental Investigation of Flat Plate Deflection Under Variable Velocity Parallel Flow, John C. Kennedy, Casey J. Jesse, Gerhard H. Schnieders, Gary L. Solbrekken *(Univ of Missouri, Columbia)*

W24 - Uncertainty Quantification of TRACE Wall Heat Transfer Modeling in Subcooled Boiling Using BFBT Experiments, Guojun Hu, Tomasz Kozlowski, Caleb Brooks *(Univ of Illinois)*

W25 - Steam Condensation in Packed Beds—An Experimental Study, Jacob Edwards, Daniel Gould *(Kansas State Univ)*, Piyush Sabharwall *(INL)*

W26 - Validation of the Dryout Modelling Code, FIDOM, Dinesh Kumar Chandraker, Arnab Dasgupta, A. K. Nayak, P. K. Vijayan *(BARC)*, Kaushik Deshpande *(Walchand College of Eng)*, S. P. Walker *(Imperial College)*

W27 - A Reevaluation of the Lift Force in Eulerian Multiphase CFD, R. Segrue, E. Baglietto *(MIT)*

W28 - Balance of Plant and Power Transmission for the Offshore Floating Nuclear Plant, Paolo Minelli, J. Buongiorno, M. Golay, N. Todreas *(MIT)*

Technical Sessions

9:30 a.m.-12:00 p.m.

Track 7: Advancements in Subchannel Analysis

Session Organizers: Dave Aumiller *(BMPC)*, Hisashi Ninokata *(Politecnico di Milano)*

Session Chairs: David Aumiller *(BMPC)*, Hisashi Ninokata *(Politecnico di Milano)*

Regency A: 9:30-12:00 p.m.

9:30 a.m.

COBRA-IE: A New Sub-Channel Analysis Code, David L. Aumiller, G. W. Swartele, M. J. Meholic, L. J. Lloyd, F. X. Buschman *(BAPL)*

9:55 a.m.

Development of a Sub-Grid Liquid Jet Condensation Model, Francis X. Buschman, David L. Aumiller *(BAPL)*

10:20 a.m.

A Discussion of Uncertainty Quantification for CHF as Performed in COBRA-IE, David L. Aumiller, Michael J. Meholic *(BAPL)*

10:45 a.m.

An Assessment of Void Fraction Data with COBRA-IE, David L. Aumiller, Michael J. Meholic *(BAPL)*

11:10 a.m.

Large Open Region Interfacial Drag Modeling Package in COBRA-IE, David L. Aumiller *(BAPL)*, Jeffrey W. Lane *(Zachry)*

11:35 a.m.

Assessment of Subchannel Code ASSERT-PV for Supercritical Applications, Yanfei Rao, Nihan Onder, Krishna Podila *(Canadian Nuclear Laboratories Ltd.)*

Track 7: The NURESAFE European Project: Multiscale Thermal Hydraulic Analysis—I

Session Organizer: Dominique Bestion *(CEA)*

Session Chair: Dominique Bestion *(CEA)*

Regency B: 9:30 a.m.-12:00 p.m.

9:30 a.m.

CFD Simulation of the Departure from Nucleate Boiling, Ladislav Vyskocil, Jiri Macek *(UJV Rez, a. s.)*

9:55 a.m.

Implementation and Assessment of the Delayed Equilibrium Model for Computing Flashing Choked Flows into a Multi-Field CFD Code, Matthieu Duponcheel, Jean-Marie Alexandre Seynhaeve, Yann Bartosiewicz *(Univ Catholique de Louvain)*

10:20 a.m.

CFD Modelling of Chugging Condensation Regime of BWR Suppression Pool Experiments, Vesa Tanskanen, Giteshkumar Patel, Markku Puustinen, Elina Hujala, Riitta Kyrki-Rajamäki, Juhani Hyvärinen *(Lappeenranta Univ of Technology)*

10:45 a.m.

Experimental Evaluation of Local Bubble Parameters of Subcooled Boiling Flow in a Pressurized Vertical Annulus Channel, In-Cheol Chu, Seung Jun Lee, Young Jung Youn, Jong Kuk Park, Hae Sup Choi, Dong Jin Euh, C.-H. Song *(KAERI)*

11:10 a.m.

Development and Assessment of a Method for Evaluating Uncertainty of Input Parameters, Andriy Kovtonyuk *(Tractebel Eng)*, Sergii Lutsanych *(Univ of Pisa)*, Alessandro Petruzzi *(NINE)*, Fabio Moretti *(Univ of Pisa)*

11:35 a.m.

Validation of CATHARE TH-SYS Code Against Experimental Reflood Tests, Sergii Lutsanych, Fabio Moretti, Francesco D'Auria *(Univ of Pisa)*

Track 7: OECD/NEA Benchmark Study of the Accident at the Fukushima Dai-ichi Nuclear Power Plant—I

Session Organizers: Marco Pellegrini *(IAE)*, Randy Gaunt *(SNL)*

Session Chairs: Luis Enrique Herranz *(CIEMAT)*, Marco Pellegrini *(Inst of Applied Energy)*

Regency C: 9:30 a.m.-12:00 p.m.

9:30 a.m.

Overview and Outcomes of Benchmark Study of the Accident at the Fukushima Daiichi NPS *(OECD/NEA BSAF Project)*, Fumihisa Nagase *(JAEA)*, Randall O. Gauntt *(SNL)*, Masanori Naito *(The Inst of Applied Energy)*

9:55 a.m.

The Findings Obtained During the OECD/NEA BSAF Activity with the Employment of the SAMPSON Code, M. Naitoh, M. Pellegrini, A. Takahashi, H. Mizouchi, H. Suzuki *(Inst of Applied Energy)*

10:20 a.m.

Lessons Learned from the Fukushima Analysis: The Modeling of Severe Accidents in Nuclear Power Plants, Luis E. Herranz, Claudia Lopez del Pra, Joan Fontanet, Elena Fernandez *(CIEMAT)*

10:45 a.m.

Fukusima Core Melt Composition Simulation with ASTEC, Herve Bonneville, L. Carenini, M. Barrachin *(Inst de Radioprotection et de Sûreté Nucléaire)*

11:10 a.m.

EPRI MAAP5 Fukushima Daiichi Analysis, David L. Luxat, Jeff R. Gabor (ERIN Eng an

Track 1: Boiling and Condensation Fundamentals—I

Session Organizers: Caleb Brooks *(UIUC)*, Rong Situ *(James Cook Univ)*
Session Chairs: Chul-Hwa Song *(KAERI)*, Eckhard Krepper *(HZDR)*
Toronto: 9:30 a.m.-12:00 p.m.

9:30 a.m.

Numerical Study of Heat Diffusion Controlled Bubble Growth in a Pressurised Liquid, Giovanni Giustini, Janani Sree Murallidharan *(Imperial College London)*, Yohei Sato, Bojan Niceno *(Scherrer Inst)*, Vittorio Badalassi, Simon Walker *(Imperial College London)*

9:55 a.m.

Experimental Investigation of Heat Transfer Phenomenon of Annular Heat Pipe for Passive In-Core Cooling System, In Guk Kim, Kyung Mo Kim, Yeong Shin Jeong, In Cheol Bang *(UNIST)*

10:20 a.m.

Treatment of Nucleation and Bubble Dynamics in High Heat Flux Boiling, Yang Liu, Nam T. Dinh *(NCSU)*

10:45 a.m.

Modeling and Validation of Forced Convection Subcooled Boiling, Dillon R. Shaver, Michael Z. Podowski *(RPI)*

11:10 a.m.

A Study of Heat Transfer Mechanisms and Flow Characteristics for Single Rising Taylor Bubbles, Jungho Kim, Alex Scammell *(Univ of Maryland)*

11:35 a.m.

Improvement of Wall Surface Temperature Evaluation Procedure During Subcooled Nucleate Boiling in Non-Empirical Boiling and Condensation Model, Yasuo Ose *(Yamato System Engineer Co., Ltd.)*, Tomoaki Kunugi *(Kyoto Univ)*

Track 2: Computational Fluid Dynamics—III

Session Organizers: Sofiane Benhamadouche *(EdF R&D)*, Stavros Tavoularis *(Univ of Ottawa)*
Session Chairs: Elia Merzari *(ANL)*, Martin Ferrand *(EDF R&D)*
Comiskey: 9:30 a.m.-12:00 p.m.

9:30 a.m.

Calibration and Optimization of Pressurized Thermal Shock for Benchmarking Direct Numerical Simulation, Gemma Damiani, D. Rosa, Afaque Shams, E. M. J. Komen *(NRG)*, E. Merzari, A. Obabko, P. Fischer *(ANL)*

9:55 a.m.

Numerical Study of Bubble Coalescence in Sub-Cooled Flow Boiling, Eyitayo Owoeye, DuWayne L. Schubring *(Univ of Florida)*

10:20 a.m.

CFD Evaluation of OECD PSBT Geometry Effects Based on Fluid Temperature Measurements, Yiban Xu, Yixing Sung, Emre Tatli *(Westinghouse)*

10:45 a.m.

CFD Modeling of Mixing Phenomena for Pressurized Thermal Shock Analysis on the DOWNCOMER of WWER-440, Maro Aghazarian, Tsolak Malakyan, Ashkhen Nalbandyan, Armen Amirjanyan *(Nuclear and Radiation Safety Center)*

11:10 a.m.

Implementation and Validation of a Surface Tension Model for the Multi-Scale Approach GENTOP, Gustavo A. Montoya, Emilio Baglietto *(MIT)*, Dirk Lucas *(Helmholtz-Zentrum Dresden-Rossendorf)*

11:35 a.m.

A Generalized Turbulent Dispersion Model for Bubbly Flow Numerical Simulation in NEPTUNE_CFD, Jerome Lavieville, Nicolas Merigoux, Mathieu Guingo, Cyril Baudry, Stephane Mimouni *(EdF R&D)*

Track 6: Thermal Hydraulics in Sodium-Cooled Fast Reactors (Severe Accidents and Sodium-Water Reactions)—III

Session Organizers: Thomas Fanning *(ANL)*, Ferry Roelofs *(NRG)*

Session Chairs: Thomas Fanning *(ANL)*, Pradip Saha *(GE Hitachi Nuclear Energy)*

Gold Coast: 9:30 a.m.-12:00 p.m.

9:30 a.m.

Simulation of GR19 Sodium Boiling Experiments with CATHARE 2 System Code and TRIO_U MC Subchannel Code, Marine Anderhuber, Antoine Gerschenfeld, Nicolas Alpy, Jorge Perez, Jean-Marie Seiler *(CEA)*

9:55 a.m.

Assessment of RANS at Low Prandtl Number and Simulation of Sodium Boiling Flows with a CMFD Code, Stephane Mimouni, C. Baudry, M. Hassanaly, J. Lavieville, N. Mechitoua, N. Mérigoux *(EdF R&D)*, V. Heisel *(ENSEEIT)*

10:20 a.m.

SLIMM Decay Heat Removal by Natural Circulation of Ambient Air, Luis Palomino, Mohamed S. El-Genk *(Univ of New Mexico)*

10:45 a.m.

Numerical Investigation of Self-Wastage Phenomena in Steam Generator of Sodium-Cooled Fast Reactor, Sunghyon Jang, T. Takata, A. Yamaguchi *(Osaka Univ)*, A. Uchibori, A. Kurihara, H. Ohshima *(JAEA)*

11:10 a.m.

A Visual Study of Molten Metal Fuel Coolant Interactions Under an Initial Phase of SFR Severe Accident using Gallium Metal vs Water or R123, Hyo Heo, Seong Dae Park *(Ulsan Natl Inst Sci Tech)*, Dong Wook Jerng *(Chung-Ang Univ)*, In Cheol Bang *(Ulsan Natl Inst Sci Tech)*

11:35 a.m.

Single and Two-Phase Sodium Flow Analysis for two TUCOP CABRI Tests Using the ASTEC-Na Code, Sara Perez-Martin, Werner Pfrang *(KIT)*, Giacomino Bandini, Stefano Ederli, Carlo Parisi *(ENEA)*

Track 1: Two-Phase Flow and Heat Transfer Fundamentals—IV

Session Organizers: Seungjin Kim *(Penn State)*, Annalisa Manera *(Univ of Michigan)*

Session Chairs: Annalisa Manera *(Univ of Michigan)*, Jovica Riznic *(CNSC)*

Watertower: 9:30 a.m.-12:00 p.m.

9:30 a.m.

Experimental Study of Pressure Drop and Modelling of Interfacial Shear for Vertical Annular Flow, Liang-ming Pan, Hui He, Yao Wu *(Chongqing Univ)*, Peng Ju, Takashi Hibiki, Mamoru Ishii *(Purdue Univ)*

9:55 a.m.

Theoretical Analysis of the Characteristics of Critical Heat Flux in Vertical Narrow Rectangular Channels Under Motion Conditions, Mengmeng Xi, Wenxi Tian, Siyang Huang, Guanghui Su, Suizheng Qiu *(Xi'an Jiaotong Univ)*, Dongxiao Du *(Shanghai Nucl Eng Research Design Inst)*

10:20 a.m.

Detailed Measurements of Local Parameters in Annular Two-Phase Flow in Fuel Bundle under BWR Operating Conditions, Jean-Marie Le Corre, Anders Hallehn, Henryk Tejne, Uffe Bergmann, Fredrik Waldemarsson *(Westinghouse Electric Sweden AB)*, Boel Morenius *(KTH)*, Ramine Baghai *(RBI Instrumentation)*

10:45 a.m.

Heat Loss Evaluation in Large Scale Rod Bundle CHF Experiments, Baowen Yang, Hui Zhang, Bo Zhang, *(Xi'an Jiaotong Univ)*

11:10 a.m.

Study on Flow Boiling Heat Transfer in Horizontal-Rectangular-Narrow-Flat Flow Channel, Yasuo Koizumi *(JAEA)*, Koji Ohira *(Japan Steel Works Ltd.)*

Track 3: Experiments and Data Bases for Assessment and Validation (including of 3D Models)

Session Organizers: Sang-Ki Moon *(KAERI)*, Hideo Nakamura *(JAEA)*

Session Chairs: Sang-Ki Moon *(KAERI)*, Hideo Nakamura *(JAEA)*

Buckingham: 9:30 a.m.-12:00 p.m.

9:30 a.m.

TRACG Analysis and Results of Phase 1 of the OECD/NEA Oskarshamn-2 BWR Stability Benchmark, Haley Michelle Cowen, Scott Pfeffer, Juswald Vedovi, Lander Ibarra, David Vreeland, Dana Miranda *(GE Hitachi Nuclear)*

9:55 a.m.

Experimental Characterization of Interchannel Mixing Through a Narrow Gap, Simo A. Makiharju, Steven L. Ceccio *(Univ of Michigan)*, John R. Buchanan, Alexander G. Mychkovsky, Kevin J. Hogan, Kirk T. Lowe *(Bechtel Marine Propulsion Corp.)*

10:20 a.m.

Assessment of Multi-Dimensional Component of Mars with Air-Water Cross Flow Experiment, Jin-Hwa Yang, Chi-Jin Choi, Hyoung-Kyu Cho, Goon-Cherl Park *(Seoul Natl Univ)*, Dong-Jin Euh *(KAERI)*

10:45 a.m.

Validation of CATHARE 3 Code on the PIERO Experiment, Roberto Freitas *(IRSN)*, Yann Di Pasquale *(CS-SI)*

11:10 a.m.

Turbulent Gas Mixing in Strong Density Stratified Shear and Non-Shear Flows, Benedikt Krohn, Medhat Sharabi *(Paul Scherrer Inst)*, Bojan Niceno, Horst-Michael Prasser *(Paul Scherrer Inst/ ETH Zürich)*, Henny Bijleveld, Afaque Shams, Ferry Roelofs *(NRG)*

11:35 a.m.

A Natural Circulation Experiment of Passive Residual Heat Removal Heat Exchanger for AP1000®, M. Duan, Y. Chen, Y. Lv, W. Li, K. Bi, W. Wang, K. Du *(China Inst of Atomic Energy)*

Track 5: Hydrogen and Fission Product Behavior

Session Organizer: Sama Bilbao y Leon *(VCU)*

Session Chair: Jianjun Xiao *(KIT)*

Atlanta: 9:30 a.m.-11:35 a.m.

9:30 a.m.

Erosion of a Confined Stratified Layer by a Vertical Jet-Detailed Assessment of a CFD Approach Against the OECD/NEA PSI Benchmark, Stephan Kelm *(FjZ)*, Ralf Kapulla *(Paul Scherrer Inst)*, Hans-Josef Allelein *(RWTH Aachen Univ)*

9:55 a.m.

Development and Qualification of an Aerosol Generator for Investigations Under Thermal-Hydraulic Severe Accident Boundary Conditions, Bjoern Alexander Krupa *(Inst for Reactor Safety and Reactor Technology)*, Paul-Martin Steffen *(Safety Research and Reactor Technology)*, Jeffrey Kobalz, Hans-Josef Allelein *(Inst for Reactor Safety and Reactor Technology)*

10:20 a.m.

Parametric Study on Density Stratification Erosion Caused by a Horizontal Steam Jet Interacting with a Vertical Plate Obstruction, Sidharth Paranjape, Ralf Kapulla, Guillaume Mignot, Domenico Paladino *(Paul Scherrer Inst)*

10:45 a.m.

Calculation of the Probability of DDT during Severe Accidents, Wison Luangdilok, E. van Heerden, P. McMinn *(Fauske & Assoc, LLC)*

11:10 a.m.

Three Dimensional Scalable All-Speed CFD Code Gasflow-MPI: Applications to Turbulent Combustion of Premixed Hydrogen-Air Mixtures with Heat and Mass Transfer, Jianjun Xiao *(KIT)*, John R. Travis *(Eng and Scientific Software Inc.)*, Reinhard Redlinger, Mike Kuznetsov, Anatoly Svishchev, Wolfgang Breitung, Thomas Jordan *(KIT)*

Track 3: Plant System Code Validation—III

Session Organizers: Kyung Doo Kim *(KAERI)*, Yan-Hua Yang *(SNPTC/SJTU)*

Session Chairs: Pete Yarsky *(NRC)*, Yong Hoon Jeong *(KAIST)*

Wrigley: 9:30 a.m.-12:00 p.m.

9:30 a.m.

Evaluation of RELAP5/MOD3.2 for ACP1000 Passive Residual Heat Removal System, Houjun Gong, Zhao Xi, Yanping Huang *(Nuclear Power Inst of China)*

9:55 a.m.

Simulation of Esprit of Hualong Secondary Passive Residual Heat Removal System by Using RELAP5, Feng Li *(Science and Technology on Reactor System Design Technology Laboratory)*

10:20 a.m.

Validation of RELAP5/MOD3.3 Against a Load Step Transient at RINGHALS 4 NPP, Jozsef Banati *(Chalmers Univ of Technology)*, Magnus Holmgren *(Ringhals AB)*

10:45 a.m.

Development of TALL-3D Test Matrix for APROS Code Validation, Ignas Mickus, Kaspar Kööp, Marti Jeltsov, Dmitry Grishchenko, Pavel Kudinov *(KTH)*, Jari Lappalainen *(VTT Technical Research Centre of Finland)*

11:10 a.m.

Reactor Core Isolation Cooling TRACG Model, Sam Lafountain *(GE Hitachi)*, Charles Heck *(Global Nuclear Fuels)*, Necdet Kurul *(GE Hitachi)*

11:35 a.m.

Validation of MARS-LMR Code for Heat Transfer Models in the DHRS of the PGSFR, Chiwoong Choi, Kwiseok Ha *(KAERI)*

Technical Sessions

1:30-3:35 p.m.

Track 7: Corium Research Platform: Past and Future—I

Session Organizers: Jinho Song *(KAERI)*, Sudhamay Basu *(NRC)*

Session Chairs: Jinho Song *(KAERI)*, Mitchell T. Farmer *(ANL)*

Regency A: 1:30-3:35 p.m.

1:30 p.m.

Severe Accident Facilities for European Safety Targets, Alexei Miassoedov *(KIT)*, Christophe Journeau *(CEA)*, Sevostian Bechta *(KTH)*, Zoltan Hozer *(MTA EK)*, Dario Manara, David Bottomley *(EC-JRC-ITU)*, Monika Kiselova *(UJV)*, Gert Langrock *(AREVA)*

1:55 p.m.

Needs for Large Mass Prototypic Corium Experiments: The PLINIUS-2 Platform, Christophe G. Journeau, Laurence Buffe, Jean-Francois Haquet, Pascal Piluso, Guy Willermoz *(CEA)*

2:20 p.m.

Fukushima Daiichi Unit 1 Ex-Vessel Prediction: Core-Concrete Interaction, Kevin R. Robb, Matthew W. Francis *(ORNL)*, Mitchell T. Farmer *(ANL)*

2:45 p.m.

Key Findings and Remaining Questions in the Areas of Core-Concrete Interaction and Debris Coolability, Mitchell T. Farmer, Steve Lomperski, Craig Gerardi, Nathan Bremer *(ANL)*, Sud Basu *(NRC)*

3:10 p.m.

Reactor Safety Gap Evaluation of Accident Tolerant Components and Severe Accident Analysis, Mike Corradini *(Univ of Wisconsin, Madison)*, Phillip Ellison *(GE Power and Water)*, Mitchell T. Farmer *(ANL)*, Matthew Francis *(ORNL)*, Jeff Gabor *(Erin Engineering)*, Randy Gauntt *(SNL)*, Roy Linthicum *(Exelon Corp.)*, Chan Paik, Martin Plys *(Fauske and Associates LLC)*, Cristian Rabiti *(INL)*, Joy Rempe *(Rempe and Assoc LLC)*, Kevin Robb *(ORNL)*, Richard Wachowiak *(EPRI)*

Track 7: Thermal Hydraulic Experiments and Numerical Analysis in Support of MYRRHA—III

Session Organizer: Katrien Van Tichelen *(SCK-CEN)*

Session Chairs: Katrien Van Tichelen *(SCK-CEN)*, Philippe Planquart *(Von Karman Inst)*

Regency B: 1:30-3:35 p.m.

1:30 p.m.

Transient Analyses for the MYRRHA-FASTEF Reactor by SIMMER Code, Morena Angelucci, M. Eboli, N. Forgione *(Univ of Pisa)*, G. Bandini *(ENEA)*

1:55 p.m.

CFD and Experimental Investigation of Sloshing Parameters for the Safety Assessment of HLM Reactors, Konstantinos Myrillas, Philippe Planquart, Jean-Marie Buchlin *(von Karman Inst)*, Marc Schyns *(SCK/CEN)*

2:20 p.m.

Influence of the 3-D Phenomena on the Safety Parameters during a ULOF Accident in the MYRRHA Reactor, Francesco Andreoli *(Univ of Pisa)*, Dario Bisogni, Francesco Belloni, Guy Scheveneels, Katrien Van Tichelen *(SCK/CEN)*

2:45 p.m.

Numerical Analysis of MYRRHA Control Rod System Dynamics, Graham Kennedy *(SCK/CEN)*, Maria Manuela Profir, Vincent Moreau *(CRS4)*

3:10 p.m.

Safety Analysis of the MYRRHA Reactor, Diego Castelliti, Katrien Van Tichelen, Gert Van den Eynde, Baudouin Arien *(SCK/CEN)*

Track 4: Instabilities and Nonlinear Dynamics

Session Organizer: Tomasz Kozlowski *(Univ of Illinois)*

Session Chair: Tomasz Kozlowski *(Univ of Illinois)*

Regency C: 1:30-3:10 p.m.

1:30 p.m.

A Method to Prevent Severe Power and Flow Oscillations in Boiling Water Reactors, Yousef M. Farawila *(Farawila et al., Inc.)*

1:55 p.m.

TRACE/SIMULATE-3K Analysis of the NEA/OECD Oskarshamn-2 Stability Benchmark, Abdelhamid Dokhane, Omar Zerkak, Hakim Ferroukhi *(Paul Scherrer Inst)*, Ivan Gajev *(Bulgarian Nuclear Regulatory Agency)*, Jerry Judd *(Studsvik Scandpower, Inc.)*, Tomasz Kozlowski *(Univ of Illinois)*

2:20 p.m.

Simulation of the Inadvertent Rod Cluster Control Assembly Bank Withdrawal at Power for ANGRA I NPP using an LQR Digital Controller, M. A. Bayout Alvarenga *(National Commission of Nuclear Energy)*, J. A. C. Canedo Medeiros, J. J. Rivero Oliva, Paulo Fernando F. Frutuoso e Melo *(COPPE, Federal University of Rio de Janeiro)*

2:45 p.m.

A Physical Mechanism for Rotating Lines of Symmetry in BWR Out-of-Phase Limit Cycle Oscillations, Aaron Wysocki, Annalisa Manera, Thomas Downar *(Univ of Michigan)*, Jose March-Leuba *(ORNL)*

Track 1: Boiling and Condensation Fundamentals—II

Session Organizers: Caleb Brooks *(Univ of Illinois)*, Rong Situ *(James Cook Univ)*

Session Chairs: Steve Bajorek *(NRC)*, Karen Vierow *(TAMU)*

Toronto: 1:30-3:35 p.m.

1:30 p.m.

Influence of Boiling Initiation Surface Superheat on Subcooled Water Flow Boiling Critical Heat Flux in a SUS304 Circular Tube at High Liquid Reynolds Number, Koichi Hata *(Kyoto Univ)*, K. Fukuda *(Kobe Univ.)*, S. Masuzaki *(NIFS)*

1:55 p.m.

Subcooled Boiling-Induced Vibration of a Single Heater Rod Confined with Metallic Walls, Kenji Takano, Yusuke Hashimoto, Tomoaki Kunugi, Takehiko Yokomine, Zensaku Kawara *(Kyoto Univ)*

2:20 p.m.

Roles of Boiling Surface Characterized by Micro-Structures on Boiling Heat Transfer and Critical Heat Flux, Seol Ha Kim, Jun Young Kang, Hyun Sun Park, Moriyama Kiyofumi, Moo Hwan Kim *(POSTECH)*

2:45 p.m.

Observation of CHF Phenomena Based on a Visualization of Near Wall Boiling Structure in Vertical Narrow Channel Submerged in a Pool, In-Cheol Chu, Dong Jin Euh, Chul-Hwa Song *(KAERI)*

3:10 p.m.

Microlayer Models for Nucleate Boiling Simulations: The Significance of Conjugate Heat Transfer, Susann Haensch *(Imperial College London)*, Chidu Narayanan, Sylvain Reboux *(ASCOMP GmbH)*, Giovanni Giustini, Simon Peter Walker *(Imperial College London)*

Track 2: Accuracy and Uncertainty Analysis

Session Organizer: Annalisa Manera *(Univ of Michigan)*

Session Chairs: Yiqi Yu *(ANL)*, Emre Ozdemir *(Zachry Nuclear Eng)*

Comiskey: 1:30-3:10 p.m.

1:30 p.m.

A Methodology for Global Sensitivity Analysis of Transient Code Output Applied to a Reflood Experiment Model using TRACE, Damar Canggih Wicaksono *(Ecole Polytechnique Fédérale de Lausanne)*, Omar Zerkak *(Paul Scherrer Inst)*, Andreas Pautz *(Ecole Polytechnique Fédérale de Lausanne)*

1:55 p.m.

Uncertainty and Sensitivity Analysis of COBRA-TF for the OECD LWR UAM Benchmark using DAKOTA, Nathan W. Porter, Maria N. Avramova, Kostadin N. Ivanov *(Penn State)*

2:20 p.m.

Use of Deterministic Sampling for Uncertainty Quantification in CFD, Peter Karl Martin Hedberg *(SSM)*, Peter Jan Hessling *(SP Technical Research Inst of Sweden)*

2:45 p.m.

Scaling Issues for the Experimental Characterization of Reactor Coolant System in Integral Test Facilities and Role of System Code as Extrapolation Pool, Fulvio Mascari, Felice De Rosa *(ENEA)*, Hideo Nakamura *(JAEA/Nuclear Safety Research Center)*, Klaus Umminger *(AREVA)*, Francesco D'Auria *(Univ of Pisa/San Piero a Grado Nuclear Research Group)*

Track 6: Thermal Hydraulics of Advanced Reactors: General

Session Organizer: W. David Pointer *(ORNL)*

Session Chairs: Edward Blandford *(Univ of New Mexico)*, Seungmin Oh *(Global Nuclear Fuel - America)*

Gold Coast: 1:30-3:35 p.m.

1:30 p.m.

Conceptual Design of Tritium Removal Facility for FHRs, Xiao Wu, David J. Arcilesi., Xiaodong Sun, Richard Christensen *(Ohio State Univ)*, Piyush Sabharwall *(INL)*

1:55 p.m.

Study on Startup Characteristics of Heat Pipe Cooled Space Reactor, Yuan Yuan, Jianqiang Shan, Bin Zhang, Junli Gou, Bo Zhang *(Xi'an Jiaotong Univ)*

2:20 p.m.

Accident Analysis of Heat Pipe Cooled Space Reactor, Yuan Yuan, Jianqiang Shan, Bin Zhang, Junli Gou, Bo Zhang *(Xi'an Jiaotong Univ)*

2:45 p.m.

Characterization of Tritium Transport in the FLibe-Graphite System, for In-Situ Tritium Absorption by the Fuel Elements of the Fluoride-Salt-Cooled High-Temperature Reactor (FHR), Michael Charles Young, Huali Wu, Raluca O. Scarlat *(Univ of Wisconsin, Madison)*

3:10 p.m.

Preliminary Analysis of the Afterheat Removal in Pebble Bed Fluoride Salt Cooled High Temperature Reactors Under Accident Conditions, Qiming Li, Shende Sun, Wen Zhou, Naxiu Wang *(Chinese Academy of Sciences)*

Track 1: Natural Circulation, Passive Safety Systems and Related Phenomena—I

Session Organizers: Qiao Wu *(Oregon State Univ)*, Paolo Ferroni *(Westinghouse)*

Session Chairs: Guanghui Su *(Xi'an Jiao Tong Univ)*, Darius Lisowski *(ANL)*

Watertower: 1:30-3:35 p.m.

1:30 p.m.

Passive Decay Heat Removal System Design for the Integral Inherent Safety Light Water Reactor (I^2S-LWR), Mingjun Wang *(Xi'an Jiaotong Univ/Univ of Michigan)*, Annalisa Manera *(Univ of Michigan)*, Matthew J. Memmott *(Brigham Young Univ)*, Suizheng Qiu *(Xi'an Jiaotong Univ)*

1:55 p.m.

Experimental Study of Laminar Mixed Convection in a Rod Bundle with Mixing Vane Spacer Grids, Lokanath Mohanta, Fan-Bill Cheung *(Penn State)*, Stephen M. Bajorek, Kirk Tien, Chris L. Hoxie *(NRC)*

2:20 p.m.

Heat Transfer Analysis of Horizontal U-Shaped Heat Exchanger Submerged in a Pool using MARS Code, Seongsu Jeon, Soon-Joon Hong *(Inst of Future Energy Technology)*, Hyoung-Kyu Cho, Goon-Cherl Park *(Seoul Natl Univ)*

2:45 p.m.

Numerical Simulation of Air Natural Circulation and Thermal Radiation in Passive Containment System, Weizhong Zhang, Qian Lin *(Shanghai Nucl Research Design Inst)*

3:10 p.m.

Analysis of Reverse Flow in Low-Rise Inverted U-Tube Steam Generator of PWR Factel Facility, O-P Kauppinen, V. Riikonen, V. Kouhia, J. Hyvarinen *(Lappeenranta Univ of Technology)*

Track 5: Modeling and Experiments of Severe Accidents—III

Session Organizer: Luis Herranz *(CIEMAT)*

Session Chair: Sama Bilbao y Leon *(VCU)*

Buckingham: 1:30-3:35 p.m.

1:30 p.m.

Analytical Modelling of the Primary Phase of an Unprotected Loss of Flow, Jean-Baptiste Droin, Nathalie Marie, Frederic Bertrand *(CEA)*, Elsa Merle-Lucotte *(CNRS-IN2P3)*

1:55 p.m.

COPRA Experiments on Natural Convection Heat Transfer with High RAYLEIGH Numbers, Luteng Zhang, Yukun Zhou, Yapei Zhang, Wenxi Tian, Suizheng Qiu, Guanghui Su *(Xi'an Jiaotong Univ)*

2:20 p.m.

Enhancement of Downward Facing Boiling Heat Transfer by the Cold Spray Technique, Faruk Ahmed Sohag, F. R. Beck, L. Mohanta, F. B. Cheung, A. E. Segall, T. J. Eden, J. Potter *(Penn State)*

2:45 p.m.

MAAP BWR and PWR Lower Plenum Model Improvements, Sung Jin Lee, Basar Ozar, Chan Y. Paik, Quan Zhou, Paul McMinn, Michael Epstein *(Fauske & Associates, LLC)*

Track 4: Operation and Safety of Existing Reactors: General—I

Session Organizer: Bao Truong *(TerraPower)*

Session Chairs: Ethan Bates *(TerraPower)*, Afaque Shams *(NRG)*

Atlanta: 1:30-3:35 p.m.

1:30 p.m.

On the Aspect of Evaluation of Critical Channel Power and Associated Uncertainty in CANDU Slow Loss of Regulation Event Analysis, Yujun Guo, N. Hammouda *(Canadian Nucl Safety Comm)*

1:55 p.m.

Experimental Test Facility Data Synthesis with the Dynamical System Scaling Methodology, Cesare Frepoli, Joseph P. Yurko *(FPoliSolutions LLC)*, Jose N. Reyes *(NuScale Power, LLC)*

2:20 p.m.

Demonstration of Test Facility Design Optimization with the Dynamical System Scaling Methodology, Cesare Frepoli, Joseph P. Yurko *(FPoliSolutions LLC)*, Jose N. Reyes *(NuScale Power, LLC)*

2:45 p.m.

A Top-Down Scaling Analysis for the ROSA-IV/LSTF Integral Effects Test Facility to Support Applying the WCOBRA/TRAC-TF2 System Code to a Three-Loop Small Break LOCA, Jun Liao, Katsuhiro Ohkawa *(Westinghouse STD)*

3:10 p.m.

LBLOCA Uncertainty Analysis using META Models, Jose Felipe Villanueva, Francisco Sánchez-Sáez, Ana Isabel Sánchez, Sebastián Martorell *(Univ Politècnica de València)*

Track 4: NPP Transient and Accident Analysis—III

Session Organizer: Xiaojing Liu *(SJTU)*

Session Chairs: John Phillip Sharpe *(GE Hitachi Nuclear Energy)*, Pete Yarsky *(NRC)*

Wrigley: 1:30-3:35 p.m.

1:30 p.m.

Sources and Effects of Non-Condensable Gases in Reactor Coolant System of LWR, Pavel Kral *(UJV Rez, a. s.)*, Juhani Hyvarinen *(Lappeenranta Technical Univ)*, Andrej Prosek *(Jožef Stefan Inst)*, Attila Guba *(MTA Centre for Energy Research)*

1:55 p.m.

Application of CFD Towards the Thermo-Hydraulic Analysis of Spent Fuel Pool Accidents, Ronald Oertel, Eckhard Krepper, Dirk Lucas *(Helmholtz-Zentrum Dresden-Rossendorf)*

2:20 p.m.

Thermal-Hydraulic Design and Transient Analysis of Passive Air Cooling System for CPR1000 Spent Fuel Storage Pool, Li Ge, Junli Gou, Jianqiang Shan, Bin Zhang, Bo Zhang, Zijiang Yang *(Xi'an Jiaotong Univ)*

2:45 p.m.

Assessment of Station Blackout Mitigation Strategy Applying the Ultimate Response Guideline to MAANSHAN PWR, Che-Hao Chen, Kai-Chun Huang, Shao-Wen Chen *(Natl Tsing Hua Univ)*, Jong-Rong Wang, Chunkuan Shih *(Nuclear and New Energy Education and Research Foundation)*, Show-Chyuan Chiang, Chia-Chuan Liu *(Taiwan Power Co.)*, Hao-Tzu Lin *(INER)*

3:10 p.m.

Analysis of the AP1000® Passive Containment Cooling System Air Flow Path Using Computational Fluid Dynamics, Richard F. Wright, Xu Hong, Megan Durse *(Westinghouse STD)*, Todd Sutton *(Westinghouse)*

Technical Sessions

4:00-6:05 p.m.

Track 8: HPC Applications in Nuclear Engineering: Opportunities and Challenges–Panel

Session Organizers: Sofiane Benhamadouche *(EDF R&D)*, Elia Merzari *(ANL)*

Session Chairs: Igor Bolotnov *(NCSU)*, Sofiane Benhamadouche *(EDF R&D)*

Regency A: 4:00-6:05 p.m.

Panelists:

- Paul Fischer *(University of Illinois–Urbana Chamapign)*
- Hiroshi Okuda *(Univ of Tokyo)*
- Yvan Fournier *(EdF)*

Track 7: Addressing the GSI-191: Progress in Methodologies and Technologies—I

Session Organizer: Rodolfo Vaghetto *(TAMU)*

Session Chairs: Yassin Hassan *(TAMU)*, Rodolfo Vaghetto *(TAMU)*

Regency B: 4:00-6:05 p.m.

4:00 p.m.

Experimental Observations of Boric Acid Precipitation Scenarios, Rodolfo Vaghetto, Saya Lee, Yassin A. Hassan, Ernie John Lowry Kee *(Texas A&M)*

4:25 p.m.

Overview of the Flume Integral Effects and Separate Effects Testing and Analysis (FIESTA) Facility for Investigating Containment Debris Transport and Sump Strainer Head Loss, Cody Williams, Daniel P. LaBrier, Edward D. Blandford *(Univ of New Mexico)*

4:50 p.m.

Investigation of the Release of Zinc in the Reactor Sump and the Behavior of Dissolved Zinc at Hotspots in the Reactor Core after a Loss of Coolant Accident, Stefan Renger, Soeren Alt, Wolfgang Kaestner, Andre Seeliger *(Univ of Applied Sciences Zittau/Görlitz)*, Holger Kryk *(Helmholtz-Zentrum Dresden-Rossendorf)*

5:15 p.m.

Conventional and Chemical Head Loss Modeling of Multi-Constituent Debris Beds in Resolution of GSI-191, Amir F. Ali, Edward D. Blandford *(Univ of New Mexico)*

5:40 p.m.

The Effect of Electric Potential on Fibrous Debris Bypass Through a Containment Sump Strainer, Saya Lee, Rodolfo Vaghetto, Jean Lim, Matthew J. Kappes, Yassin A. Hassan *(Texas A&M)*

Track 7: Important Severe Accident Research Issues after Fukushima Accidents

Session Organizer: Jun Sugimoto *(Kyoto Univ)*

Session Chair: Jun Sugimoto *(Kyoto Univ)*

Regency C: 4:00-5:40 p.m.

4:00 p.m.

Plinius Prototypic Corium Experimental Platform: Major Results and Future Works, Viviane Bouyer, Nathalie Cassiaut-Louis, Pascal Fouquart, Pascal Piluso *(CEA, DEN, Cadarache, SMTA/LPMA)*

4:25 p.m.

Molten Core Relocation Analysis of CORA-17 and CORA-18 for SAMPSON/MCRA Validation, Andrea Prestigiacomo *(Politecnico di Milano)*, Marco Pellegrini, Alessandro Costa, Masanori Naitoh *(The Inst of Applied Energy)*, Hisashi Ninokata *(Politecnico di Milano)*

4:50 p.m.

Thermal Hydraulic Safety Research at JAEA after the Fukushima Dai-Ichi Nuclear Power Station Accident, Taisuke Yonomoto, Yasuteru Sibamoto, Takeshi Takeda, Akira Sato, Masahiro Ishigaki, Satoshi Abe, Yuria Okagaki, HaoMin Sun, Daisuke Tochio *(JAEA)*

5:15 p.m.

New AESJ Thermo-Hydraulics Roadmap for LWR Safety Improvement and Development after Fukushima-Daiichi Accident, Hideo Nakamura *(JAEA /Nuclear Safety Research Center)*, Kenji Arai, Hirohide Oikawa *(Toshiba)*, Tadashi Fujii *(Hitachi-GE Nuclear Engineering)*, Shigemitsu Umezawa *(Mitsubishi Heavy Industry)*, Yutaka Abe *(Univ of Tsukuba)*, Jun Sugimoto *(Kyoto Univ)*, Seiichi Koshizuka, Akira Yamaguchi *(Univ of Tokyo)*

Track 7: Advancements in SFR Thermal Hydraulics

Session Organizer: Tanju Sofu *(ANL)*

Session Chairs: Ulrich Bieder *(CEA)*, Adrian Tentner *(ANL)*

Toronto: 4:00-6:05 p.m.

4:00 p.m.

Pseudo 3-D Full-Core Conjugate Heat Transfer Modeling of Sodium Fast Reactors, Rui Hu, Yiqi Yu *(ANL)*

4:25 p.m.

Experimental Evaluation on Sodium-to-Air Heat Exchanger Performance for PGSFR Design Code Validation, Sujin Yeom, Jonggan Hong, Jae-Hyuk Eoh, Jong-Man Kim, Youngil Cho, Min-Hwan Jung, Da-Young Gam, Tae-Joon Kim, Inkoo Hwang, Jewhan Lee, Ji-Young Jeong, Chungho Cho *(KAERI)*

4:50 p.m.

Structure-Based Resolution of Turbulence for Sodium Fast Reactor Thermal Striping Applications, Michael Acton, Giancarlo Lenci, Emilio Baglietto *(MIT)*

5:10 p.m.

Thermal-Hydraulic Analysis of a 7-Pin Sodium Fast Reactor Fuel Bundle with a New Pattern of Helical Wire-Wrap Spacer, Seong Dae Park, Sung Bo Moon, Seok Bin Seo, In Cheol Bang *(UNIST)*

5:40 p.m.

Benchmark Analysis of EBR-II Protected Loss-of-Flow Transient, Ivan Horvatovic, Chirayu Batra, Marco Cherubini, Alessandro Petruzzi *(NINE)*, Francesco D'Auria *(Gruppo di Ricerca Nucleare San Piero a Grado)*, Tomislav Bajs *(Enconet d.o.o.)*

Track 5: Natural Convection and Mixing Phenomena, Modeling and Experiments

Session Organizer: Dave Novog *(McMaster Univ)*

Session Chairs: Haihua Zhao *(INL)*, Yang Liu *(Virginia Tech)*

Comiskey: 4:00-5:40 p.m.

4:00 p.m.

Natural Convection Heat Transfer Characteristics of KUR Fuel Assembly during Loss of Coolant Accident, Daisuke Ito, Yasushi Saito *(Kyoto Univ)*

4:25 p.m.

Benchmark of LIVE Experiments with MAAP5.04 Alpha, Basar Ozar, Sung J. Lee, Michael Epstein, Chan Y. Paik *(Fauske & Assoc LLC)*

4:50 p.m.

Investigation of MCCI Phenomena with Multi-Physics MPS Simulation, Penghui Chai, Nedjet Erkan, Masahiro Kondo, Koji Okamoto *(Univ of Tokyo)*

5:15 p.m.

Performance of Hydrogen Mitigation Systems for a Scaled Accident Scenario: Overview of Ercosam Project Experimental Results for the Panda Facility, Guillaume Mignot, Ralf Kapulla, Sidharth Paranjape, Domenico Paladino *(Paul Scherrer Inst)*

Track 6: Thermal Hydraulics in Small Modular Reactors—II

Session Organizer: Maria Avramova *(North Carolina State Univ)*

Session Chairs: Maria Avramova *(North Carolina State Univ)*, Robert Martin *(BWX Technologies)*

Gold Coast: 4:00-6:05 p.m.

4:00 p.m.

Experimental Stability Maps for a BWR-Type Small Modular Reactor, Shanbin Shi, Yuchen Lin, Won Sik Yang, Mamoru Ishii *(Purdue Univ)*

4:25 p.m.

Applying Uncertainty and Sensitivity on Thermal Hydraulic Subchannel Analysis for the Multi-Application Small Light Water Reactor, Adam Brigantic, Wade R. Marcum *(Oregon State Univ)*

4:50 p.m.

NRELAP5 Predictions of KAIST High Pressure Condensation Data Using Existing and Extended Shah Condensation Correlation, Pravin Sawant, John Marking, Claudio Delfino *(NuScale Power, LLC)*

5:15 p.m.

Comparison of COBRA-TF and VIPRE-01 Against Low Flow Code Assessment Problems, Azat Galimov, Claudio Delfino *(NuScale Power, LLC)*, Michael Bradbury *(Information Systems Laboratories, Inc.)*, Garry Gose *(Zachry Nuclear Eng, Inc)*, Robert Keith Salko *(ORNL)*

5:40 p.m.

Analytical Stability Analogue for a Single-Phase Natural Circulation Loop, Yousef M. Farawila, Donald R. Todd *(Farawila et al., Inc.)*, Maurice J. Ades *(NuScale Power, LLC)*

Track 1: Two-Phase Flow and Heat Transfer Fundamentals—V

Session Organizers: Seungjin Kim *(Penn State)*, Annalisa Manera *(Univ of Michigan)*

Session Chairs: Dirk Lucas *(HZDR)*, Joshua Schlegel *(Missouri Univ of Sci & Tech)*

Watertower: 4:00-6:05 p.m.

4:00 p.m.

Characterization of Horizontal Air-Water Two-Phase Flow, Ran Kong, Seungjin Kim *(Penn State)*

4:25 p.m.

Effects of Steam-Water vs. Air-Water Fluid Pairs and Pressure on Flooding in Large Diameter Tubes, Karen Vierow, Nicholas Mohammed *(Texas A&M)*, David Aumiller *(BAPL)*

4:50 p.m.

Inlet Effects on Vertical-Downward Air-Water Two-Phase Flow, Shouxu Qiao, Daniel Mena, Seungjin Kim *(Penn State)*

5:15 p.m.

Onset of Flow Instability Due to the Mergence of Facing Bubble Layers in a Vertical Narrow Rectangular Channel, Juhyung Lee, Soon Heung Chang, Yong Hoon Jeong *(KAIST)*

5:40 p.m.

Flow Structure in Core Catcher Cooling Loop Through an Inclined-to-Vertical Elbow Bend, Ki-Won Song, Nguyen T. Hung, Hyun Sun Park, Shripad T. Revankar *(POSTECH)*, Bo W. Rhee, Kwang Soon Ha, Rae-Joon Park, Jin Ho Song *(KAERI)*

Track 5: Modeling and Experiments of Severe Accidents—IV

Session Organizer: Luis Herranz *(CIEMAT)*

Session Chairs: Randall Gauntt *(SNL)*, Kevin Robb *(ORNL)*

Buckingham: 4:00-6:05 p.m.

4:00 p.m.

CHF Experiment of RPV Lower Head with Real Surface Material for ERVC-IVR Strategy, Wei Lu, Ming Zhang, Teng Hu, Huajian Chang *(State Nuclear Power Research Inst)*

4:25 p.m.

Turbulent Convection Experiment to Support IVR Strategy, Ma Li, Jing Li, Shui Ji, Huajian Chang *(State Nuclear Power Technology Research & Development Centre)*

4:50 p.m.

Model Development of UO2-ZR Plate Fuel Behavior at Early Phase of Severe Accident and Molten Fuel Meat Relocation, Zhang Zhuohua, Peng Shinian *(Nuclear Power Inst of China)*

5:15 p.m.

Live Experiments on the In-Vessel Melt Pool Behaviour with Different External Cooling Conditions and the Simulation Results with a Coupled MELCOR-PECM Approach, Philipp Dietrich, Xiaoyang Gaus-Liu, Alexei Miassoedov, Frank Kretzschmar, Andreas Class *(KIT)*

5:40 p.m.

Heat Up and Potential Failure of BWR Upper Internals during a Severe Accident, Kevin R. Robb *(ORNL)*

Track 4: Operation and Safety of Existing Reactors: General—II

Session Organizer: Bao Truong *(TerraPower)*

Session Chair: Guangjun Li *(GE Hitachi Nuclear Energy)*

Atlanta: 4:00-5:40 p.m.

4:00 p.m.

Safety Margins after Failure of Fuel Cladding during Protected Loss-of-Heat-Sink Accidents in a Sodium-Cooled Fast Reactor, Yoshitaka Fukano *(JAEA)*, Masahiro Nishimura, Fumiaki Yamada, Takero Mori *(JAEA)*

4:25 p.m.

Uncertainty Analysis for Lift-Forces on BWR Fuel Assemblies, Carl Adamsson *(Vattenfall Nuclear Fuel)*, Carolin Holmkvist *(Uppsala Univ)*

4:50 p.m.

Suppression of Chemical Reactivity of Sodium-Titanium Nano Fluid in Sodium-Water Vapor Reaction, Gunyeop Park, Soo Jae Kim, Hyun Soo Kim, Sun Ryung Oh, Hyun Sun Park, Moo Hwan Kim, Je Hyun Baek *(POSTECH)*

5:15 p.m.

Comparison of Some Approaches for the Estimation of Tolerance Limits in the Context of LBLOCA Uncertainty Analysis, Jose Felipe Villanueva, Francisco Sánchez-Sáez, Ana Isabel Sánchez, Sebastián Martorell *(Univ Politècnica de Valéncia)*

Track 4: NPP Transient and Accident Analysis—IV

Session Organizer: Xiaojing Liu *(SJTU)*

Session Chairs: Cesare Frepoli *(FPoliSolutions)*, Milorad Dzodzo *(Westinghouse)*

Wrigley: 4:00-6:05 p.m.

4:00 p.m.

Ranking of Uncertain Parameters for Dynamic Event Tree Analysis: A Case Study based on a Station Blackout Scenario, Saidur Rahman, D. R. Karanki, A. Epiney, O. Zerkak, V. N. Dang *(Paul Scherrer Inst)*

4:25 p.m.

Effects of ECCS on the Cold-Leg Fluid Temperature during SGTR Accidents, Tadashi Watanabe *(Univ of Fukui)*

4:50 p.m.

A Dynamic Model of Hydrostatic Reactor Coolant Pump Seals for RELAP5/MOD3.3, Michael Anthony LaPresti, Naugab E. Lee, Ruben Espinosa, Michael Volodzko, Mie Azuma *(Westinghouse)*

5:15 p.m.

Core Exit Thermocouple Response to Inadequate Core Cooling Using CFD Dynamic Mesh, Liping Cao, Josh Hartz, Hong Xu, Justin Figley *(Westinghouse)*

5:40 p.m.

TRACG Analysis of Boiling Water Reactor Control Rod Drop Accident to Optimize Analysis Methodology, Dana C. Miranda, D. G. Vreeland, C. McElroy, J. Yang, J. Vedovi, J. Vedovi *(GE Hitachi)*

Poster Sessions

9:00 a.m.-4:00 p.m.

Poster Session—II

Session Organizer: Elia Merzari *(ANL)*

Session Chairs: W. David Pointer *(ORNL)*, Sama Bilbao y Leon *(VCU)*

Regency D: 9:00 a.m.-4:00 p.m.

T01 - Numerical Simulations of Turbulent Mixing Factor in 2x2 Rod Bundles at Supercritical Pressures, Jinguang Zang, Xiao Yan, Daiquan Du, Xiaokang Zeng, Yanping Huang *(Nuclear Power Inst of China)*

T02 - Plateau Facility in Support to ASTRID and the SFR Program: An Overview of the First Mock-Up of the ASTRID Upper Plenum, MICAS, D. Guénadou, I. Tkatschenko, P. Aubert *(CEA)*

T03 - Design of a Unit Cell Facility for Studies of the Prismatic VHTR Lower Plenum, D. Tyler Landfried, Paul Kristo, Mark Kimber *(Univ of Pittsburgh)*

T04 - GOTHIC 8.1 Benchmark to THAI Facility Experiment with Steam-Helium Stratification, T. Moore, T. L. George *(Numerical Applications)*

T05 - Hot Channel Analysis of a 333 MWth Civil Nuclear Marine Core using the COBRA-EN Code, Syed Bahauddin Alam, Benjamin A. Lindley, Geoffrey T. Parks *(Univ of Cambridge)*

T06 - CTF Application to BWR Modeling and Simulations, C. Gosdin, M. Avramova *(Penn State)*, R. Salko *(ORNL)*

T07 - Experimental Investigation on Thermal-Hydraulics Behavior during a Station Blackout Transient in a Pressurized Water Reactor, K. H. Kang, Y. S. Park, J. R. Kim, B. U. Bae, N. H. Choi, K. Y. Choi *(KAERI)*

T08 - Loss of Coolant Flow Accident Analysis for Fluoride Salt Cooled High Temperature Reactor, Yao Fu, Yang Yang, Yang Zou, Qaing Sun, Jie Zhang *(Chinese Academy of Sciences)*

T09 - Comparison and Analysis on Integral Small Modular Reactor with Two Different ESF Designs Response to Postulated Events, Guoxu Zhang, Heng Xie *(Tsinghu Univ)*

T10 - Instrumentation for Temperature and Heat Flux Measurement on a Solid Surface under BWR Operating Conditions, M. Bergagio, S. Hedberg, S. Rydström, Henryk Anglart *(KTH)*

T11- Requirements Analysis and Research of Severe Accident Process Simulation Based on COS-SA Code and Emergency Decision Support, Xiong Yiqiang, Jing Liu, Haidan Wang, Gang Chen, Wei Bai, Huie Sha, Yixue Chen *(SNPTC)*

T12 - SOCRAT-BN Simulation of Siena Loss-of-Flow Experiments, Y. Y. Vinogradova, M. E. Kuznetsova, N. I. Ryzhov, V. N. Semenov, E. V. Usov, R. V. Chalyy *(RAS)*

T13 - Revisiting ISP-13 with RELAP/SCDAPSIM/MOD3.5 using Core SCDAP Components, J.Freixa, M. Perez-Ferragut, F. Reventos *(UPC)*, C. M. Allison, J. K. Hohorst *(ISS)*

T14 - Comparison Analysis of CHF Parametric Trends in Vertical Tubes and 5x5 Bundle, Shumiao Wang, Jianqiang Shan, Bo Zhang *(Xi'an Jiaotong Univ)*, Xuemei Lang *(NPIC)*

T15 - Effect of Additives on CHF Behaviors for ERVC-IVR Strategy with FIRM Facility, Yang Sheng, Lu Wei, Hu Teng, Chang Huajian, *(State Nuclear Power Research Inst)*

T-16 - RELAP/SCDAPSIM/MOD4.0 Modification for Transient Accident Scenario of Test Blanket Modules Involving Helium Flows into Heavy Liquid Metal, M. Perez, J. Freixa, E. Mas de les Valls *(Technical Univ of Catalonia)*, T. Sandeep, V. Chaudhari *(Inst for Plasma Research)*

T-17 - Graphite Oxidation Rates in Comparison to Regimes with Application to the Oregon State Over University High Temperature Test Facility, Jorday Coy, Brian Woods, Matt Hertel Evan Peters *(Oregon State Univ)*

T-18 - MARS Code Evaluation of Reflood Phenomena in a Partially-Deformed 5x5 Rod Bundle, B. J. Kim, J. Kim, K. Kim, S. K. Moon, C.-H. Song *(KAERI)*

T19 - CTF Void Drift Validation, M. Gergar, M. Avramova *(Penn State)*, R. Salko *(ORNL)*

T20 - Developments on High Pressure Two Phase Flow Measurement Techniques, H. Schmidt, L. Dennhardt, D. Hille, I. Ganzmann, O. Herbst, L. Klemm, M. Rehm, K. Umminger, E. Peter, D. Gordon *(AREVA GmbH)*

T21 - Flow Mixing Characteristics in Subchannels of a Wire-Wrapped 61-Pin Rod Assembly for a Sodium-Cooled Fast Reactor, Hyungmo Kim, Dong-Won Lee, Yung Joo Ko, Seok-Kyu Chang, Sun Rock Choi, Hae Seob Choi, Hyeon Seok Woo, Dong-Jin Euh, Ji-Young Jeong, Hyeong-Yeon Lee *(KAERI)*

T 22 - Experimental Study of Condensation Heat Transfer in the Presence of Noncondensable Gas on the Vertical Tube, Yeong-Jun Jang, Dong-Jae Choi, Yeon-Gun Lee *(Jeju National Univ)*, Sin Kim, Dong-Wook Jerng *(Chung-Ang Univ)*

T23 - A Simple and Efficient Steam Generator Design for Integral SMRs, M. Ilyas, M, A. Khan *(Pakistan Inst of Eng and Applied Sciences)*

T24 - Study on the Improvement of TOPAZ-II System by using a Heat Pipe Radiator, Wenwen Zhang, Wenxi Tian, Suizheng Qiu, Guanghui Su *(Xi'an Jiaotong Univ)*

T25 - Preliminary Steady State and Transient Analysis of a Molten Salt Based Reactor using RELAP/SCDAPSIM/MOD4.0, Shuying Jiang, Maosong Cheng, Zhimin Dai, Guimin Liu *(Chinese Academy of Sciences)*

T26 - Verification and Validation of a Fuel-Rod Temperature Analysis Code-BIRCH, J. L. Ruan, Y. B. Zhu, J. G. Li *(China Nuclear Power Technology Research Inst)*

T27 - A Specialized Thermal-Hydraulic Code with Porous Media Model and SIMPLEC Algorithm for PB-FHRs, Yanzhi E, Yang Zou, Hongjie Xu, Shixiong Song, Jie Zhang *(Chinese Academy of Sciences)*

T28 - Experimental and Modeling Studies of Over-Cooling Transients in Fluoride-Salt Cooled High-Temperature Reactors, F. Carotti, M. Abou Dbai, K. Ahmed, R. O. Scarlat *(Univ of Wisconsin, Madison)*

Poster Session—II (continued)

Regency D: 9:00 a.m.-4:00 p.m.

T29 - Analysis on UCRW-ATWS in TMSR-SF1, Bo Xu, Yang Zou, Xiaohan Yu, Yao Fu, Qiang Sun, *(Chinese Academy of Sciences)*

T30 - The Sub-Criticality Level Effects in Operational Transients of Beam Interruption in Power and Startup in Accelerator Driven Systems, R. S. dos Santos *(CNEN/IEN)*

T31 - An SBLOCA Test of Pressurizer Safety Valve Line Break with the SMART-ITL Facility and its MARS-KS Code Simulation, Hwang Bae, Sung Uk Ryu, Sung-Jae Yi, Hyun-Sik Park *(KAERI)*, Yeon-Sik Cho, Jae-Seung Suh *(System Eng and Technology)*

T32 - Development of a Computational Model to Determine Performance of a Self-Priming Venturi Scrubber for Thorium Reactor, Paridhi Goel *(Homi Bhabha National Inst)*, Avinash Moharana *(BARC)*, A. K. Nayak *(Homi Bhabha National Inst/BARC)*

T33 - Effect of a Blockage Length on the Coolability during Reflood in a 2x2 Rod Bundle with a 90% Partially Blocked Region, Kihwan Kim, Byung-Jae Kim, Hae-Seob Choi, Sang-Ki Moon, Chul-Hwa Song *(KAERI)*

T34 - Anisotropic Azimuthal Power and Temperature Distribution as a Driving Force for Hydrogen Redistribution, M. G. Mankosa, C. J. Piotrowski, M. N. Avramova, A. T. Motta, K. N. Ivanov *(Penn State)*, S. Stafford, R. L. Williamson *(INL)*

Technical Sessions

9:30 a.m.-12:00 p.m.

Track 7: Critical Heat Flux in Fuel Bundle: Modeling, Prediction, and Experimental Measurements—I

Session Organizer: Bao-Wen Yang *(XJTU)*

Session Chair: Bao-Wen Yang *(XJTU)*

Regency A: 9:30 a.m.-12:00 p.m.

9:30 a.m.

Margins to Critical Heat Flux in Pressurized Water Reactors using Modern Thermal-Hydraulic Methods, Christophe Herer *(IRSN)*

9:55 a.m.

Comparison of Experimental Critical Heat Flux Data to Prediction Methods for Conditions Prototypical of Light Water Small Modular Reactors, M. S. Greenwood, J. P. Duarte, M. Corradini *(Univ of Wisconsin, Madison)*

10:20 a.m.

Experimental Study of Annular Two-Phase Flow on Rod-Bundle Geometry with Spacer, Son H. Pham, Zensaku Kawara, Takehiko Yokomine, Tomoaki Kunugi *(Kyoto Univ)*

10:45 a.m.

Research on Critical Heat Flux of PWR Fuel Assembly in NPIC, Shengjie Qin, Xuemei Lang, Shijie Xie, Junyi Zhang, Wenxing Liu, Wenbin Zhuo *(Nuclear Power Inst of China)*

11:10 a.m.

Critical Heat Flux Experiment in Internally Heated Vertical Annulus at Low Flow and Low Pressure Conditions, G. Mayer, R. Nagy, I. Nagy *(Hungarian Academy of Sciences)*

11:35 a.m.

Research of the Bundle CHF Prediction Based on the Minimum DNBR Point and the BO Point Methods, Wei Liu *(Nuclear Power Inst of China)*, Jianqiang Shan *(Xi'an Jiaotong Univ)*

Track 7: The NURESAFE European Project: Multiscale Thermal Hydraulic Analysis—II

Session Organizer: Dominique Bestion *(CEA)*

Session Chair: Djamel Lakehal *(ASCOMP AG)*

Regency B: 9:30 a.m.-12:00 p.m.

9:30 a.m.

DNS of Turbulent Convective Flow Boiling in a Channel, D. Metrailler, S. Reboux, D. Caviezel, D. Lakehal *(ASCOMP GmbH)*

9:55 a.m.

Three-Dimensional Simulation of Flooding Waves in a Vertical Pipe, M. Tekavčič, B. Končar, I. Kljenak *(Jožef Stefan Inst)*

10:20 a.m.

Uncertainty Evaluation of CFD Simulation using Optimal Statistical Estimator, A. Prosek, B. Končar, M. Leskovar, S. Košmrlj *(Jožef Stefan Inst)*

10:45 a.m.

Near-Wall Turbulence-Bubbles Interactions in a Channel Flow at Re_τ=400: A DNS/LES investigation, D. Metrailler, S. Reboux, D. Lakehal *(ASCOMP GmbH)*

11:10 a.m.

CATHARE-TransAT Coupling for the Prediction of Boron Dilution in the Rocom Test Facility, J. Bao, S. Reboux, N. Pagan, D. Lakehal *(ASCOMP GmbH)*

11:35 a.m.

Combined Evaluation of Dynamics Bubble, Polydispersion Model and Turbulence Modeling for Adiabatic Two-Phase Flows, Stephane Mimouni, M. Guingo, M. Hassanaly, J. Lavieville, N. Mechitoua, N. Mérigoux *(EdF R&D)*

Track 7: OECD/NEA Benchmark Study of the Accident at the Fukushima Dai-ichi Nuclear Power Plant—II

Session Organizers: Marco Pellegrini *(IAE)*, Randall Gauntt *(SNL)*

Session Chairs: David Luxat *(ERIN Engineering and Research Inc)*, Randall Gauntt *(SNL)*

Regency C: 9:30 a.m.-11:35 a.m.

9:30 a.m.

Thermal Hydraulic and Core Relocation Analysis on Fukushima Daiichi Unit 1, Tae Woon Kim, Sung Il Kim, Jinho Song, KwangSoon Ha, Kwangil Ahn*(KAERI)*

9:55 a.m.

Effect of External Water Injection on Core Degradation and Fission Product Release in Fukushima Unit 1 Accident, Sung Il Kim, Tae Woon Kim, Kwang Soon Ha, Jinho Song *(KAERI)*

10:20 a.m.

Analysis of Fukushima Unit 2 Accident by Considering the Operating Condition of RCIC System and Torus Room Flooding, Sung Il Kim, Jong-Hwa Park, Kwang Soon Ha, Jinho Song *(KAERI)*

10:45 a.m.

ATHLET-CD/COCOSYS Analyses of Severe Accidents in Fukushima *(Units 2 and 3)* within the OECD/NEA BSAF Project, Phase I. M. Sonnenkalb, S. Band *(GRS GmbH)*

11:10 a.m.

Analysis for Progression of Accident at Fukushima Dai-ichi Nuclear Power Station with THALES2 Code, Toshinori Matsumoto, Jun Ishikawa, Yu Maruyama *(JAEA)*

11:35 a.m.

Analysis of the Fukushima Daiichi NPP Unit 3 with MELCOR_2.1, L. Fernandez-Moguel, A. Rydl, B. Jaeckel *(Scherrer Inst)*

Track 3: Boiling and Condensation Heat Transfer

Session Organizer: Guanghui Su *(XJTU)*

Session Chairs: Hyun-Sik Park *(KAERI)*, Hyungdae Kim *(KHU)*

Toronto: 9:30 a.m.-12:00 p.m.

9:30 a.m.

Assessment of the MELCOR and RELAP5-3D Code for Condensation in the Presence of Noncondensable Gas, Wen Fu *(Tsinghua Univ)*, Dhongik Yoon, Michael L. Corradini, Mark H. Anderson *(Univ of Wisconsin, Madison)*

9:55 a.m.

Simulations of High-Pressure Subcooled Boiling Flows in Rectangular Channels, R. Thakrar, J. Murallidharan, S. P. Walker *(Imperial College London)*

10:20 a.m.

Analysis of Wave Influence on Steam Condensation with Non-Condensable Gases Using CFD, Xianmao Wang, Huajian Chang *(Tsinghua Univ)*, Liyong Han *(State Nuclear Power Technology R&D Center)*

10:45 a.m.

Heat Transfer Regime Calibration for Phase-Change Heat Exchangers in RELAP5-3D, R. P. Martin *(B&W mPower, Inc)*, W. L. Weaver *(Consultant)*

11:10 a.m.

Integrated Assessment of Thermal Hydraulic Processes in W7-X Fusion Experimental Facility, T. Kaliatka, E. Uspuras, A. Kaliatka *(Lithuanian Energy Inst)*

11:35 a.m.

Interface Tracking Based Evaluation of Bubble Growth Rates in High Pressure Pool Boiling Conditions, J. Murallidharan, G. Giustini *(Imperial College London)*, Y. Sato, B. Ničeno *(PSI)*, V. Badalassi, S. P. Walker *(Imperial College London)*

Track 5: Fuel Coolant Interaction, Modeling and Experiments—I

Session Organizer: Don Todd *(Angstrom Tech)*

Session Chairs: John Luxat *(McMaster Univ)*, Masahiro Furuya *(CRIEPI)*

Comiskey: 9:30 a.m.-12:00 p.m.

9:30 a.m.

A Two-Scale Approach for Modeling the Corium Melt Fragmentation during Fuel-Coolant Interaction, S. Castrillon Escobar, R. Meignen, S. Picchi *(IRSN)*, N. Rimbert, M. Gradeck *(LEMTA, Univ)*

9:55 a.m.

Influence of Oxidation on Fuel Coolant Interaction, Matjaž Leskovar, Vasilij Centrih *(Jožef Stefan Inst)*

10:20 a.m.

An Experimental Study on Void Generation Around Hot Metal Particle Quenched into Water Pool, Louis Manickam, Sachin Thakre, Weimin Ma *(KTH)*

10:45 a.m.

Suppression Measures and Effective Triggering Retardant of Steam Explosions, Masahiro Furuya, Takahiro Arai *(CRIEPI)*

11:10 a.m.

Intensification of Chemically Assisted Melt-Water Explosive Interactions, Anthony A. Sansone, Rusi P. Taleyarkhan *(Purdue Univ)*

11:35 a.m.

The Effect of Thermal Conditions and Jet Properties on Steam Explosion, I. Baruch *(Ben-Gurion Univ of the Negev)*, G. Widenfeld *(NRCN)*

Track 6: Thermal Hydraulics in Sodium-Cooled Fast Reactors (Verification and Validation)—IV

Session Organizers: Thomas Fanning *(ANL)*, Ferry Roelofs *(NRG)*

Session Chairs: Yann Bartosiewicz *(Univ of Louvain)*, Ferry Roelofs *(NRG)*

Gold Coast: 9:30 a.m.-12:00 p.m.

9:30 a.m.

The Present State-of-the-Art Thermal Striping Studies for Sodium Cooled Fast Reactors, Seok-Ki Choi, Ji-Woong Han, Dehee Kim, Tae-Ho Lee *(KAERI)*

9:55 a.m.

CFD Analysis of Upper Plenum Flow for a Sodium-Cooled Small Modular Reactor, A. Kraus, R. Hu *(ANL)*

10:20 a.m.

Convection Heat Transfer Analysis and Correlation for Alkali Liquid Metals in Uniformly Heated Tubes, Timothy M. Schriener, Mohamed S. El-Genk *(Univ of New Mexico)*

10:45 a.m.

Benchmark Analysis of Thermal Striping Phenomena in Planar Triple Parallel Jets Tests for Fundamental Validation of Fluid-Structure Thermal Interaction Code for Sodium-Cooled Fast Reactor, Masaaki Tanaka *(JAEA)*, Kazuyoshi Nagasawa *(NESI In-Corp)*

11:10 a.m.

Proposal of Benchmark Problem of Thermal Striping Phenomena in Planar Triple Parallel Jets Tests for Fundamental Code Validation in Sodium-Cooled Fast Reactor Development, J. Kobayashi, M. Tanaka, S. Ohno, H. Ohshima, H. Kamide *(JAEA)*

11:35 a.m.

CFD Investigation of Wire-Wrapped Fuel Rod Bundles and Flow Sensitivity to Bundle Size, L. M. Brockmeyer, F. S. Sarikurt, Y. A. Hassan *(Texas A&M)*, E. Merzari *(ANL)*

Track 1: Natural Circulation, Passive Safety Systems and Related Phenomena—II

Session Organizers: Qiao Wu *(Oregon State Univ)*, Paolo Ferroni *(Westinghouse)*

Session Chairs: Eung Soo Kim *(Seoul National Univ)*, Dirk Lucas *(HZDR)*

Watertower: 9:30 a.m.-12:00 p.m.

9:30 a.m.

Conceptual Design Approach of Passive Cooling Systems, C. Diakodimitris, P. A. Douxchamps, C. Angulo *(Tractebel Eng)*, J. Engelen *(SCK/CEN)*

9:55 a.m.

Boiled-Up Pool Heat Transfer for a Horizontal Tube Bundle, Robert E. Henry, Kevin Ramsden *(Fauske and Assoc)*, John Freeman, Dan Lee *(Exelon)*

10:20 a.m.

Natural Circulation Model and Performance Analysis of "SLIMM"—A Small, Modular Reactor, Denise Haskins, Mohamed S. El-Genk *(Univ of New Mexico)*

10:45 a.m.

Single-Phase and Two-Phase Natural Convection in the McMaster Nuclear Reactor, A. S. Schneider, J. C. Luxat *(McMaster Univ)*

11:10 a.m.

Temperature Profiles and Mixing in a Natural Circulation Cooling Facility via Distributed Optical Sensors, C. Tompkins, M. Corradini, M. Anderson *(Univ of Wisconsin, Madison)*

11:35 a.m.

Experimental Investigation of a Scaled Reactor Cavity Cooling System with Air for the VHTR, M. A. Muci *(Duke Energy)*, D. D. Lisowski *(ANL)*, M. H. Anderson, M. L. Corradini *(Univ of Wisconsin, Madison)*

Track 5: Advanced Design Features for Severe Accident Mitigation

Session Organizer: I. K. Park *(KAERI)*

Session Chair: Pradip Saha *(GE Hitachi Nuclear Energy)*

Buckingham: 9:30 a.m.-11:35 a.m.

9:30 a.m.

Comparison of an Advanced Analytical Tool with the SIMMERCode to Support Astrid Severe Accident Mitigation Studies, N. Marie, A. Bachrata, F. Bertrand *(CEA)*

9:55 a.m.

Analytical Simulation of In-Vessel Retention Strategy for VVER-1000/320 Reactor using MELCOR Code, J. Duspiva *(UJV Rez, a. s.)*

10:20 a.m.

The Analysis of TRACE/FRAPTRAN in Ultimate Response Guideline for Lungmen ABWR Nuclear Power Plant, J. R. Wang *(Natl Tsing Hua Univ/ INER)*, H. T. Lin *(INER)*, Y. T. Lee, A. L.Ho, S. W. Chen, C. Shih *(Natl Tsing Hua Univ)*

10:45 a.m.

A Study on Transient Heat Transfer of the EU-ABWR External Core Catcher using the Phase-Change Effective Convectivity Model, Chi-Thanh Tran *(Vietnam Atomic Energy Inst)*, Viet-Hung Nguyen *(Hanoi Unive of Science and Technology)*, Mika Tahara, Yoshihiro Kojima, Ryoichi Hamazaki *(Toshiba Corp)*, Pavel Kudinov *(Royal Instof Technology)*

11:10 a.m.

Assessment of Molten Pool Cooling Characteristics During LBLOCA for Advanced Passive PWR, Lili Tong, Ge Shao *(Shanghai Jiao Tong Univ)*

Track 1: Multifield Two-Phase Flow Modeling—I

Session Organizer: Takashi Hibiki *(Purdue Univ)*

Session Chairs: Jean-Marie LeCorre *(Westinghouse Electric Company)*, Xiaodong Sun *(The Ohio State University)*

Atlanta: 9:30 a.m.-12:00 p.m.

9:30 a.m.

Turbulence-Induced Bubble Collision Force Model Development and Assessment for Adiabatic Dispersed Air-Water Two-Phase Flow with the Two-Fluid Model, S. L. Sharma, T. Hibiki, M. Ishii *(Purdue Univ)*, C. S. Brooks *(Univ of Illinois)*, J. P. Schlegel *(Missouri Univ Sci Tech)*, Y. Liu *(Virginia Polytechnic Inst and State Univ)*, J. R. Buchanan *(Bechtel Marine Propulsion Corp)*

9:55 a.m.

Liquid-Side Interfacial Heat Transfer in Inverted Annular Film Boiling, J. M. Kelly *(NRC)*

10:20 a.m.

Validation and Cross-Verification of Three Mechanistic Codes for Annular Two-Phase Flow Simulation and Dryout Prediction, L. Sanmiguel Gimeno, S. P. Walker, G. F. Hewitt *(Imperial College)*, J.-M. Le Corre *(Westinghouse Electric Sweden)*, A. Dasgupta *(BARC)*, M. Ahmad *(Pakistan Inst of Eng & Applied Sciences)*

10:45 a.m.

Numerical Study on Modeling of Liquid Film Flow under Countercurrent Flow Limitation in Volume of Fluid Method, T. Watanabe, T. Takata *(Osaka Univ)*, A. Yamaguchi *(Univ of Tokyo)*

11:10 a.m.

Development of a Post-Dryout Heat Transfer Model, Y.-J. Wang, C. Pan *(Natl Tsing Hua Univ)*

11:35 a.m.

Derivation of a Generic Multi-Field Two-Fluid Model, Y. Liu *(Virginia Tech)*, J. D. Talley, K. J. Hogan, J. R. Buchanan, Jr. *(Bechtel Marine Propulsion Corp.)*

Track 6: Thermal Hydraulics in Salt-Cooled High-Temperature Reactors

Session Organizer: Kevin Robb *(ORNL)*

Session Chairs: Kevin Robb *(ORNL)*, Piyush Sabharwall *(INL)*

Wrigley: 9:30 a.m.-11:10 a.m.

9:30 a.m.

Thermal Hydraulic Benchmarking Exercises to Support Fluoride-Salt-Cooled, High-Temperature Reactor (FHR) Licensing, N.Haneklaus, J. Kendrick, L. Huddar, N. Zweibaum, P. F. Peterson *(Univ of California, Berkeley)*, J. Hughes, E. Blandford *(Univ of New Mexico)*, Q. Lv, X. Sun *(Ohio State)*, G. Yoder *(ORNL)*

9:55 a.m.

Pseudo-3D Steady State Thermal-Hydraulic Modeling of the Advanced High Temperature Reactor Fuel Assembly, P. Avigni, B. Petrovic *(Georgia Tech)*

10:20 a.m.

Disturbed Transient Analysis with Stable Operation Mode ofTMSR-SF1, Minghai Li, Jie Zhang, Yang Zou, Yao Fu, YangYang *(Shanghai Inst of Applied Physics/CAS)*

10:45 a.m.

Three-Dimensional Thermal Hydraulic Analysis of a Transportable Fluoride-Salt-Cooled High-Temperature Reactor, Chenglong Wang, Kaichao Sun, Lin-Wen Hu *(MIT)*, Suizheng Qiu, Dalin Zhang *(Xi'an Jiaotong Univ)*

Technical Sessions

1:30-3:35 p.m.

Track 8: Thermal-Hydraulics Education–Panel

Session Organizers: Sama Bilbao y Leon *(VCU)*, Kurshad Muftuoglu *(GE Hitachi)*

Session Chairs: Sama Bilbao y Leon *(VCU)*, Kurshad Muftuoglu *(GE Hitachi)*

Regency A: 1:30-3:35 p.m.

Panelists:

- Annalisa Manera *(Univ of Michigan)*
- Djamel Lakehal *(CEO ASCOMP GmbH)*
- Jeong Ik Lee *(KAIST)*
- Henryk Anglart *(KTH)*
- Eckart Laurien *(Univ of Stuttgart)*

Track 7: Addressing the GSI-191: Progress in Methodologies and Technologies—II

Session Organizer: Rodolfo Vaghetto *(TAMU)*

Session Chairs: Vera Moiseytseva *(YK Risk)*, Saya Lee *(TAMU)*

Regency B: 1:30-3:35 p.m.

1:30 p.m.

RoverD: Use of Test Data in GSI-191 Risk Assessment, Ernie Kee *(Texas A&M)*, John Hasenbein, Alex Zolan *(Univ of Texas, Austin)*, Phil Grissom *(SNC)*, Seyed Reihani *(Univ of Illinois, Champaign)*, Fatma Yilmaz *(South Texas Project)*, Bruce Letellier *(Alion Sci Technol)*, Vera Moiseytseva *(YK.risk, LLC)*, David Imbaratto *(PG&E Diablo Canyon Power Plant)*

1:55 p.m.

MELCOR and GOTHIC Analyses of a Large Dry Pressurized Water Reactor Containment to Support Resolution of GSI-191, B. Beeny, R. Vaghetto, K. Vierow, Y. A. Hassan *(Texas A&M)*

2:20 p.m.

A Sensitivity Study Supporting Comparative Analysis of MELCOR and GOTHIC Large Dry Pressurized Water Reactor Containment Models, B. Beeny, R. Vaghetto, K. Vierow, Y. A. Hassan *(Texas A&M)*

2:45 p.m.

Unique Challenges in Making a Regulatory Decision Regarding the Combined Effects of Boric Acid Precipitation and GSI-191, Ashley Guzzetta *(NRC)*

3:10 p.m.

Viscous Inertial Shear-Transition-Adaptive *(VISTA)* Porous Media Head-Loss Formulation, Bruce Letellier, Mark Macali *(Alion Sci Technol)*, Ernie Kee *(Texas A&M)*

Track 7: OECD/NEA Benchmark Study of the Accident at the Fukushima Dai-ichi Nuclear Power Plant—III

Session Organizers: Marco Pellegrini *(IAE)*, Randall Gauntt *(SNL)*

Session Chairs: Martin Sonnenkalb *(GRS mbH)*, Shinya Mizokami *(Tokyo Electric Power Co.)*

Regency C: 1:30-3:35 p.m.

1:30 p.m.

Benchmark Study of the Accident at the Fukushima Daiichi NPS: Best Estimate Case Comparison, Marco Pellegrini *(The Inst of Applied Energy)*

1:55 p.m.

MAAP-MELCOR Crosswalk Phase 1 Study, David L. Luxat, Joshua T. Hanophy *(ERIN Eng and Research, Inc.)*, Donald Kalanich, Randall O. Gauntt *(SNL)*, Richard M. Wachowiak *(EPRI)*, invited

2:20 p.m.

Recent Findings on the Damaged Reactors and Containment Vessels of Fukushima Dai-ichi NPS, D. Yamada, S. Mizokami, T. Honda, D. Yamauchi, Y. Yamanaka *(Tokyo Electric Power Co.)*

2:45 p.m.

An Approach Toward Evaluation of FP Behaviors in NPPs Under Severe Accidents, Shunsuke Uchida, Masanori Naitoh, Hidetoshi Okada, Marco Pellegrini *(Inst of Applied Energy)*, Masahiro Osakabe *(Tokyo Univ of Marine Science and Technology)*, Andrea Achilli *(SIET)*, Yukio Hanamoto *(KAKEN)*

3:10 p.m.

Source Term Estimation for the Fukushima Daiichi Nuclear Power Station Accident by Combined Analysis of Environmental Monitoring and Plant Data Through Atmospheric Dispersion Simulation, Haruyasu Nagai, Hiroaki Terada, Masamichi Chino, Genki Katata, Satoshi Mikami, Kimiaki Saito *(JAEA)*

Track 7: CASL—Thermal-Hydraulics Activities in the Consortium for Advanced Simulation of LWRS

Session Organizer: Igor Bolotnov *(NCSU)*

Session Chair: Igor Bolotnov *(NCSU)*

Toronto: 1:30-3:35 p.m.

1:30 p.m.

Mechanistic Modeling of Two-Phase Flow Around Spacer Grids with Mixing Vanes, B. M. Waite, D. R. Shaver, M. Z. Podowski, *(RPI)*

1:55 p.m.

Interface Tracking Simulations of Bubbly Flows in the PWR Relevant Geometries, Jun Fang *(NCSU)*, Michel Rasquin *(ANL)*, Igor A. Bolotnov *(NCSU)*

2:20 p.m.

Spectral Analysis of the Turbulent Energy Spectrum in Single and Two-Phase Bubbly Flows in Different Geometries Based on Direct Numerical Simulation Results, C. S. Brown, I. A. Bolotnov *(NCSU)*

2:45 p.m.

Synthesis of CRUD and its Effects on Pool and Subcooled Flow Boiling, Carolyn Coyle, Jacopo Buongiorno, Thomas McKrell, Robert Cohen *(MIT)*

3:10 p.m.

CTF Validation Activities, T. Blyth, C. Dances, M.Avramova *(Penn State)*, R. Salko *(ORNL)*

Track 5: Fuel Coolant Interaction, Modeling and Experiments—II

Session Organizer: Don Todd *(Angstrom Tech)*

Session Chair: Mark Anderson *(Univ of Wisconsin, Madison)*

Comiskey: 1:30-3:35 p.m.

1:30 p.m.

An Explanation of BORAX-1, SPERT-1 and the SL-1 Accident, Robert E. Henry *(Fauske & Assoc)*, Michael Epstein *(Fauske & Assoc (Retired))*, Hans K. Fauske *(Fauske & Assoc)*

1:55 p.m.

Simulation of FARO L-28 and L-31 Tests to Assess Molten Jet Fragmentation Modeling in MAAP, A. Le Belguet, E. Beuzet, M. Torkhani *(EdF R&D)*

2:20 p.m.

Heat Transfer Origin of Thermal Shock Fracture and Its Application for LWR Fuel during Reflood, Youho Lee, Hee Cheon No *(KAIST)*

2:45 p.m.

Simulation of Ex-Vessel Melt Jet Breakup and Sensitivity on Model Parameters and Accident Conditions, Kiyofumi Moriyama, Hyun Sun Park *(POSTECH)*

3:10 p.m.

Development of TEXAS-V Code Surrogate Model for Assessment of Steam Explosion Impact in Nordic BWR, D. Grishchenko, S. Basso, S. Galushin, P. Kudinov *(KTH)*

Track 3: Validation & Verification: General

Session Organizers: Han Young Yoon *(KAERI)*, Phil Sharpe *(GE Hitachi)*

Session Chairs: John Phillip Sharpe *(GE Hitachi)*, Jeff Lane *(Zachry Nuclear Eng)*

Gold Coast: 1:30-3:35 p.m.

1:30 p.m.

Validation Test Plan of a CANDU-6 Moderator Tank Scaled-Down Test Facility, Bo W. Rhee, Hyoung T. Kim *(KAERI)*, Michael D. Atkins, Tongbeum Kim *(Univ of Witwatersrand)*

1:55 p.m.

Thermal Cycling Testing of Distributed Fiber Optic Temperature Sensors for High-Temperature Applications, Darius D. Lisowski, Craig D. Gerardi, Stephen W. Lomperski *(ANL)*

2:20 p.m.

Assessment of RELAP5/MOD3.3 for Subcooled Boiling, Flashing and Condensation in a Vertical Annulus, Caleb S. Brooks *(Univ of Illinois)*, William D. Fullmer *(Univ of Colorado)*, Clayton D. Lietwiler *(GSE Systems Inc.)*

2:45 p.m.

Experimental Investigation on Transient Heat Transfer Characteristics of C-Shape Heating Rod Bundle used in PRHR HX, Yuhao Zhang, Daogang Lu, Guanghao Wu *(North China Electric Power Univ)*, Zheng Du *(State Nuclear Power Software Development Center of China)*

3:10 p.m.

Initial Condition Effects on Kelvin-Helmholtz Instabilities Developed from a Round Jet, Amy B. McCleney, Philippe M. Bardet *(The George Washington Univ)*

Track 1: Two-Phase Flow and Heat Transfer Fundamentals—VI

Session Organizers: Seungjin Kim *(Penn State)*, Annalisa Manera *(Univ of Michigan)*

Session Chairs: Masahiro Kawaji *(City College of New York)*, Shuichiro Miwa *(Hokkaido Univ)*

Watertower: 1:30-3:35 p.m.

1:30 p.m.

Interfacial Stability in Vertical Swirling Annular Two-Phase Flow, Li Liu, Bofeng Bai *(Xi'an Jiaotong Univ)*

1:55 p.m.

Boiled-Up Level and Boiling Two-Phase Flow Dynamics in 5x5 Heated Rod Bundle during Boil-Off Process under Atmospheric Pressure Conditions, Takahiro Arai, Masahiro Furuya, Taizo Kanai, Kenetsu Shirakawa, Yoshihisa Nishi *(CRIEPI)*

2:20 p.m.

Pulsed Injection Tracer Mixing in Annular Liquid Films, A. Saxena, J. Eiholzer, H.-M. Prasser *(ETH Zurich)*

2:45 p.m.

Heat Transfer from Finned Surface in Downward-Facing Subcooled Flow Boiling, Abdul R. Khan, Nejdet Erkan, Koji Okamoto *(Univ of Tokyo)*

3:10 p.m.

Quenching of a Heated Rod: Physical Phenomena and Heat Transfer, Arnab Dasgupta, P. P. Kulkarni, G. J. Gorade, D. K. Chandraker, A. K. Nayak, P. K. Vijayan *(BARC)*, S. P. Walker *(Imperial College, London)*

Track 5: Modeling and Experiments of Severe Accidents—V

Session Organizer: Luis Herranz *(CIEMAT)*

Session Chairs: Michael Corradini *(Univ of Wisconsin, Madison)*, Jinho Song *(KAERI)*

Buckingham: 1:30-3:10 p.m.

1:30 p.m.

Numerical Simulation of Anisotropic Ablation of Siliceous Concrete—Analysis of CCI-3 MCCI Experiment by MPS Method, Xin Li, Akifumi Yamaji *(Waseda Univ)*

1:55 p.m.

The Energetics of Coolant-Bubble-Covergas Interactions Associated with LMR Out-Of-Reactor SourceTerm Experiments, John C. Petrykowski, Hmza Mohamed *(Univ of Dayton)*

2:20 p.m.

Analysis of Metal Vessel Wall Ablation Experiment with High Temperature Liquid by MPS Method, Daisuke Masumura*(Waseda Univ)*, Yoshiaki Oka *(Tokyo Univ)*, Akifumi Yamaji *(Waseda Univ)*, Masahiro Furuya *(CRIEPI)*

2:45 p.m.

RCIC Governing Equation Scoping Studies for Severe Accidents, Kyle Ross, Jeffrey Neil Cardoni *(SNL)*

3:10 p.m.

Nodalization Schemes for Lumped-Parameter Calculations of Representative Nuclear Reactor Severe Accident Tests in the MISTRA Facilty, Sonia Benteboula, Frederic Dabbene *(CEA)*

Track 6: Thermal Hydraulics in Lead-Cooled and Lead-Bismuth-Cooled Fast Reactors

Session Organizer: Xu Cheng *(KIT)*

Session Chair: Jianqiang Shan *(Xi'an Jiao Tong Univ)*

Atlanta: 1:30-3:35 p.m.

1:30 p.m.

European Outlook for LMFR Thermal Hydraulics, F. Roelofs, A. Shams *(NRG)*, J. Pacio *(KIT)*, V. Moreau *(CRS4)*, P. Planquart *(VKI)*, K. van Tichelen *(SCK/CEN)*, I. Di Piazza, M. Tarantino *(ENEA)*

1:55 p.m.

Experimental Study on Natural Circulation and Gas Injection Enhanced Circulation in KYLIN-II Mixed Circulation Loop, Sheng Gao, Liuli Chen, Kefeng lv, Chenchong Yue, Qunying Huang, Yican Wu *(Chinese Academy of Science/Jiangsu Higher Education Inst)*, Mariano Tarantino *(ENEA)*

2:20 p.m.

Experimental and Numerical Investigations of Interaction Between Heavy Liquid Metal and Water for Supporting the Safety of LFR GEN. IV Reator Design, A. Del Nevo *(ENEA)*, N. Giannini, A. Pesetti, N. Forgione *(UNIPI)*

2:45 p.m.

Experimental and Numerical Investigation of Double Wall Bayonet Tubes Performances in Pool Type Integral Test Facility, D. Rozzia *(Univ of Pisa)*, A. Del Nevo, M. Tarantino *(ENEA)*,

3:10 p.m.

Typical Accidents Analysis on the Loss of Flow and External Neutron Source Changing Accidents for a 800 MWth ADS, Tianyu Lu, Jianqiang Shan, Junli Gou, Bin Zhang, Bo Zhang, Li Ge, Yuan Yuan, Zijang Yang *(Xi'an Jiaotong Univ)*

Track 6: Thermal Hydraulics in Supercritical Water Reactors

Session Organizers: Martin Rohde *(Udelft)*, Xiaojing Liu *(SJTU)*

Session Chair: Xiaojing Liu *(Shanghai Jiao Tong Univ)*

Wrigley: 1:30-2:45 p.m.

1:30 p.m.

Experimental and Numerical Study on Heat Transfer of Supercritical Water Flowing Upward in 2x2 Rod Bundles, M. Zhao *(Shanghai Jiao Tong Univ/KIT)*, H. Y. Gu *(Shanghai Jiao Tong Univ)*, X. Chang *(Shanghai Jiao Tong Univ/KIT)*, H. B. Li *(China Nuclear Power Technology Research Inst)*, Q. R. Yang *(KIT)*

1:55 p.m.

CFD Simulation of Supercritical Flow and Heat Transfer in a Three Rod Wire Wrapped Bundle, K. Podila, Y. F. Rao *(Canadian Nuclear Lab)*

2:20 p.m.

Development Heat Transfer Correlations for Supercritial CO_2 in Natural Circulation Loop, Guangxu Liu, Yanping Huang, Junfeng Wang *(Nuclear Power Inst of China)*

Technical Sessions

4:00-6:30 p.m.

Track 7: Corium Research Platform: Past and Future—II

Session Organizers: Jinho Song *(KAERI)*, Sudhamay Basu *(NRC)*

Session Chair: Christophe Journeau *(CEA)*

Regency A: 4:00-6:30 p.m.

4:00 p.m.

FCI Test Results Under Conditions of the Partially Flooded Cavity and the Flooded Reactor in the TROI, S. W. Hong, Y. S, Na, S. H. Hong, J. H. Song *(KAERI)*

4:25 p.m.

Past and Future R&D at IRSN on Corium Progression and Related Mitigation Strategies in a Severe Accident, Jacquemain Didier, Vola Didier, Meignen Renaud, Jean Michel Bonnet, Fichot Florian, Raimond Emmanuel, Marc Barrachin *(IRSN)*

4:50 p.m.

Fukushima Daiichi Unit 1 Ex-Vessel Prediction: Core Melt Spreading, M. T. Farmer *(ANL)*, K. R. Robb, M. W. Francis *(ORNL)*

5:15 p.m.

Corium-Related Improvements in the EDF Version of MAAP Code in the Frame of Severe Accident Studies, E. Beuzet, N. Bakouta, M. Boissavit, F. Haurais, A. L. Belguet, V. Lombard, M. Torkhani *(EdF R&D)*

5:40 p.m.

VESTA Test Facility for Severe Accident Researches at KAERI, Hwan Yeol Kim, Sang Mo An, Jaehoon Jung, Kwang Soon Ha, Jin Ho Song *(KAERI)*

6:05 p.m.

Core Melt Stabilization Concepts for Existing and Future LWRs and Associated R&D Needs, Manfred Fischer *(AREVA GmbH)*, Sevostian V. Bechta *(KTH)*, Vladimir V. Bezlepkin *(ATOMPROECT Enterprise of ROSATOM State Corp)*, Ryoichi Hamazaki *(Toshiba Corp)*, Alexei Miassoedov *(KIT)*

Track 8: Advancements in the Prediction of DNB with CFD–Panel

Session Organizer: Emilio Baglietto *(MIT)*

Session Chair: Emilio Baglietto *(MIT)*

Regency B: 4:00-6:30 p.m.

Panelists:

- S. Mimouni *(EdF)*, "Computational Multi-Fluid Dynamics Predictions of DNB"
- Z. Karoutas *(WEC)*, "Use of CFD to Predict Critical Heat Flux in Rod Bundles"
- N. T. Dinh *(NCSU)*, "Predictability of Boiling Heat Transfer and Burnout at High Heat Fluxes"
- Simon Lo *(CD-Adapco)*, "Bubble Dynamics in DNB"

Track 7: Design, Analysis and Testing of Micro-, Mini and Other Small-Diameter Channel Heat Exchangers

Session Organizer: Paolo Ferroni *(WEC)*

Session Chairs: Emre Tatli *(Westinghouse)*, Xiaodong Sun *(The Ohio State Univ)*

Regency C: 4:00-6:30 p.m.

4:00 p.m.

Fabrication and Testing of a High-Temperature Printed Circuit Heat Exchanger, Minghui Chen, Xiaodong Sun, Richard N. Christensen *(Ohio State)*, Isaac Skavdahl, Vivek P. Utgikar *(Univ of Idaho)*, Piyush Sabharwall *(INL)*

4:25 p.m.

Printed Circuit Heat Exchanger Design, Analysis and Experiment, Seungjoon Baik, Seong Gu Kim, Seongmin Son, Hyeon Tae Kim, Jeong Ik Lee *(KAIST)*

4:50 p.m.

Modeling the Mechanical Integrity of Airfoil Printed Circuit Heat Exchangers, Ian Jentz, Mark Anderson *(Univ of Wisconsin, Madison)*, Xiaodong Sun *(Ohio State)*

5:15 p.m.

CFD Modeling of Sodium-Oxide Deposition in Sodium-Cooled Fast Reactor Compact Heat Exchangers, E. Tatli, J. P. Mazzoccoli, P. Ferroni *(Westinghouse)*

5:40 p.m.

Preliminary Structural Assessment of a Printed Circuit Heat Exchanger with S-Shaped Fins, X. Zhang, X. Sun, R. N. Christensen *(Ohio State)*, M. Anderson *(Univ of Wisconsin, Madison)*

6:05 p.m.

Experimental and Numerical Activities in Support of the Design of ASTRID Sodium-Gas Heat Exchanger, F. Vitillo, X. Jeanningros, L. Cachon, C. Galati, P. Olympio, S. Madeleine *(CEA)*

Track 1: Flow-Induced Vibration in Reactor Components

Session Organizer: Wade Marcum *(Oregon State Univ)*
Session Chairs: Wade Marcum *(Oregon State Univ)*, Philippe Bardet *(GWU)*

Toronto: 4:00-6:30 p.m.

4:00 p.m.

Comprehensive Characterization of Motion of a Helical Structure Due to Flow Induced Vibration, P. L. Harmon, W. R. Marcum *(Oregon State Univ)*

4:25 p.m.

Impact of Flow Induced Vibration Acoustic Loads on the Design of the Peach Bottom Replacement Steam Dryer, David R. Forsyth, Leslie F. Wellstein, Robert C. Theuret, David A. Suddaby *(Westinghouse)*, John Rommel, Ken Ainger *(Exelon Generation Co.)*

4:50 p.m.

Symbolic Dynamics Applied in the Identification of Flow Patterns Inside Tube Banks, Alexandre Vagtinski de Paula, Sergio Viçosa Möller *(UFRGS)*

5:15 p.m.

Surrogate Spacer Grid Design for Fluid-Structure Interactions Studies in Fuel Bundles, Noah A. Weichselbaum, Shadman Hussain, Pierre Korysko, Morteza Rahimi-Abkenar, Philippe M. Bardet, Majid T. Manzari *(The George Washington Univ)*

5:40 p.m.

Numerical Prediction of Flow Induced Vibrations in Nuclear Reactor Applications, E. ter Hofstede *(NRG/TU Delft)*, A. Shams *(NRG/TU Delft)*, A. H. van Zuijlen *(TU Delft)*

Track 2: Computational Fluid Dynamics—IV

Session Organizers: Si Young Lee *(SNL)*, Sofiane Benhamadouche *(EDF R&D)*
Session Chairs: Jean-Marie LeCorre *(WEC)*, Ulrich Bieder *(CEA)*

Comiskey: 4:00-6:30 p.m.

4:00 p.m.

CFD Analysis of Flowing Field in 5x5 Rod Bundle with Multiple-Grids, J. B. Zhao, X. Y. Zhang, L. Qiao *(South China Univ of Technology)*

4:25 p.m.

Towards the Development of a Full-Scale Transient CFDModel to Simulate the Static and Dynamic in-Core Mass Flux Distribution in a Classical German PWR, Dong-Yuan Sheng *(Westinghouse Electric Sweden AB)*, Marcus Seidl *(E.ON Kernkraft GmbH)*

4:50 p.m.

A Review of AREVA's Experimental Validation of State-of-the-Art Single-Phase CFD Methods with Application to PWR Fuel Analysis and Design, A. Hatman, A. Chatelain, K. Goodheart, M. Martin, T. Keheley *(AREVA Inc.)*

5:15 p.m.

Computational Fluid Dynamics Analysis of the Fluid Flow and Heat Transfer in the Core Bypass Region of a PWR, I. Clifford, A. Vasiliev, O. Zerkak, H. Ferroukhi, A. Pautz *(Paul Scherrer Inst)*

5:40 p.m.

Single-Phase and Two-Phase CFD Simulations of the Coolant Flow Inside a Bruce/Darlington CANDU Flow Channel, F.Abbasian, G. I. Hadaller, R. A. Fortman *(Stern Laboratories Inc.)*

6:05 p.m.

Computational Fluid Dynamics Benchmark using AP1000®1/4-Scale Upper Head Test Data, William L. Moody, Teresa A. Bissett, Yiban Xu, Gregory A. Meyer *(Westinghouse)*

Track 6: Thermal Hydraulics in High-Temperature Gas-Cooled Reactors—I

Session Organizer: Elvis Dominguez *(ORNL)*
Session Chairs: Rodolfo Vaghetto *(Texas A&M Univ)*, Darius Lisowski *(ANL)*

Gold Coast: 4:00-6:30 p.m.

4:00 p.m.

Analysis on Anticipated Transient Without SCRAMS (ATWS) Accidents of the HTR-10GT, Minggang Lang, Yujie Dong *(Tsinghua Univ)*

4:25 p.m.

Analyses of LOCAs in the Primary Heat Transfer System of the Helium Cooled Pebble Bed Blanket Concept, Bruno Gonfiotti, Sandro Paci *(Univ of Pisa)*, Dario Carloni, Lorenzo V. Boccaccini *(KIT)*

4:50 p.m.

Numerical Solution of Heat Transfer Process in a Prismatic VHTR Considering Core Bypass Flow and Cross Flow, Li Wang, Qiusheng Liu, Katsuya Fukuda *(Kobe Univ)*

5:15 p.m.

Modeling of the Thermal Hydraulics of Very-High-Temperature Reactors with the System Code ATHLET, D. von der Cron, H. V. Hristov, A. Seubert *(GRS)*

5:40 p.m.

Concept Design and Thermal-Hydraulic Analysis for Helium-Cooled ADS, Tianji Peng, Zhiwei Zhou, Xuanyu Sheng *(Tsinghua Univ)*, Long Gu *(Chinese Academy of Sciences)*

6:05 p.m.

Study of Abnormal Heat Transfer during Forced and Natural Convection Scenarios in a Prismatic Core of a VHTR: Numerical and Experimental Results, Francisco I. Valentin, Narbeh Artoun *(City College of New York)*, Ryan Anderson *(Montana State Univ)*, Masahiro Kawaji *(City College of New York/The CUNY Energy Inst)*

Track 2: Computational Thermal-Hydraulics: General

Session Organizers: Brian Jackson *(TerraPower)*, Ferry Roelofs *(NRG)*

Session Chairs: Kurshad Muftuoglu *(GE Hitachi Nuclear Energy)*, Afaque Shams *(NRG)*

Watertower: 4:00-6:30 p.m.

4:00 p.m.

Improvement and Validation of the Wall Heat Transfer Package of RELAP5/MOD3.3 Code, Xiaofei Xiong, Jianqiang Shan, Junli Gou *(Xi'an Jiaotong Univ)*

4:25 p.m.

Development of a Thermal-Mechanical-Material Behavior Analysis Code for the Dispersion-Plate-Type Fuel, Yingwei Wu, Qing Lu, Yangbin Deng, Dalin Zhang, Wenxi Tian, Suizheng Qiu, Guanghui Su *(Xi'an Jiaotong Univ)*

4:50 p.m.

Computational Analysis of Bubble Micro-Layer in Sub-Cooled Boiling, Eyitayo James Owoeye, DuWayne Schubring *(Univ of Florida)*

5:15 p.m.

On the Application of Wall Boiling Models to Prediction of Subcooled Flow Boiling using EAGLE Code, N. H. Hoang, I. C. Chu, D. J. Euh, C. H. Song *(Korea Univ of Science and Technology/KAERI)*

5:40 p.m.

CFD Analyses of Main Flow Penetration Depth in Isolated Branch Lines, Brandon LaFleur, Victor Petrov, Annalisa Manera *(Univ of Michigan)*

6:05 p.m.

Fluid-Structure Interaction (FSI) Modeling of Thin Plates, C. J. Jesse, J. C. Kennedy, G. L. Solbrekken *(Univ of Missouri, Columbia)*

Track 5: Modeling and Experiments of Severe Accidents—VI

Session Organizer: Luis Herranz *(CIEMAT)*

Session Chairs: Angel Papukchiev *(GRS GmbH Nuclear Fuel)*, Pavel Kudinov *(Royal Inst of Technology)*

Buckingham: 4:00-6:05 p.m.

4:00 p.m.

Methodology using MELCOR2.1/SNAP to Establish an SBO Model of Chinshan BWR/4 Nuclear Power Plant, Yu Chiang *(Natl Tsing Hua Univ)*, Jong-Rong Wang *(Natl Tsing Hua Univ/Nuclear and New Energy Education and Research Foundation)*, Hao-Tzu Lin *(INER)*, Shao-Wen Chen *(Natl Tsing Hua Univ)*, Chunkuan Shih *(Natl Tsing Hua Univ/Nuclear and New Energy Education and Research Foundation)*

4:25 p.m.

Simulation of Orientation Effects on Critical Heat Flux in Downward-Facing Channel for IVR, K. Shirvan, R. Azizian *(MIT)*

4:50 p.m.

Severe Accident Progression in the BWR Lower Plenum and the Modes of Vessel Failure, B. R. Sehgal, S. Bechta *(KTH)*

5:15 p.m.

Experimental Investigation of Debris Bed Agglomeration and Particle Size Distribution using WO3-ZRO2 Melt, Paval Kudinov, Dmitry Grishchenko, Alexander Konovalenko, K. Karbojian *(KTH)*, S E. Yakush *(RAS)*

5:40 p.m.

Experiments and Modeling of Particulate Debris Spreading in a Pool, A. Konovalenko *(KTH)*, S. Basso, P. Kudinov *(KTH)*

Track 1: Fundamental Thermal Hydraulics: General—II

Session Organizers: Xiaojing Liu *(SJTU)*, Martin Rohde *(Udelft)*

Session Chairs: Peipei Chen *(SNPTC)*, Yang Liu *(Virginia Tech)*

Atlanta: 4:00-6:05 p.m.

4:00 p.m.

Large Scale BWR Containment LOCA Response Test at the INKA Test Facility, Thomas Wagner *(AREVA GmbH)*, Stephan Leyer *(Univ duLuxembourg)*

4:25 p.m.

Numerical Simulation of Supercritical Pressure Fluids with Variable Turbulent Prandtl Number and Modified Damping Function (1/2), Y. Y. Bae, E. S. Kim, M. H. Kim *(KAERI)*

4:50 p.m.

Computational Fluid Dynamics Assessment of Emergency Core Cooling System Check Valves at Comanche Peak, Brian M. Golchert, Thomas Loebig, James Wyble III *(Westinghouse)*, Andrea Lemons *(Luminant)*

5:15 p.m.

Numerical Simulation on Melting and Solidification Based on Lagrangian Approach, Jin-Biao Xiong, Hong-Yan Wang, Xu Cheng, Yan-Hua Yang *(Jiao Tong Univ)*

5:40 p.m.

Wall Superheat Prediction in Narrow Rectangular Channels Under Fully Developed Boiling of Water at Low Pressures, A. Ghione, P. Vinai, C. Demaziere *(Chalmers Univ of Techn)*, B. Noel *(CEA)*

Technical Sessions

9:30 a.m.-12:00 p.m.

Track 7: Critical Heat Flux in Fuel Bundle: Modeling, Prediction and Experimental Measurements—II

Session Organizer: Bao-Wen Yang *(XJTU)*

Session Chair: Nam T. Dinh *(NCSU)*

Regency AB: 9:30 a.m.-12:00 p.m.

9:30 a.m.

Critical Heat Flux with Subcooled Flowing Water in Tubes for Pressures From Atmosphere up to Near-Critical Point, Y. Chen, K. Bi, C. Yang, M. Zhao, K. Du *(China Institute of Atomic Energy)*

9:55 a.m.

A Consideration of Experimental Uncertainties for Predicting CHF in Rod Bundles, Dae-Hyun Hwang, Seong-Jin Kim, Hyuk Kwon, Kyong-Won Seo *(KAERI)*

10:20 a.m.

Study on CHF Correlation for PWR at Low Pressure Conditions Based on Stepwise Regression Analysis, Yin Yuan *(Shenzhen Univ)*, Fu Xian-Gang *(CNPRI)*, Zhu Yuanbing, Kong Xiangyin, Li JingGang *(CNPRI)*

10:45 a.m.

Numerical Study on the Effects of Vane Angle and Dimple on the Thermal Hydraulic Performance of a PWR Fue1 Assembly, Hui Zhang, Bao-Wen Yang, Bin Zhang, Bin Han *(X'an Jiaotong Univ)*, Yaping Huang *(CNNC)*

11:10 a.m.

Heat Loss Simulation and Uncertainty Analysis in Fuel Bundle CHF and Other Large Scale Thermal-Hydraulic Experiments, Aiguo Liu, Bao-Wen Yang, Sipeng Wang, Yudong Zha *(Xi'an Jiaotong Univ)*

11:35 a.m.

Improvement of Mixing Vane Crossflow Model in Subchannel Analysis, Hu Mao, Bao-Wen Yang, Jianqiang Shan, Bo Zhang *(Xi'an Jiaotong Univ)*

Track 7: Advances in System Thermal-Hydraulics Modeling and Code Development

Session Organizers: Rui Hu *(ANL)*, Chul-Hwa Song *(KAERI)*

Session Chair: Rui Hu *(ANL)*

Regency C: 9:30 a.m.-12:00 p.m.

9:30 a.m.

A Strongly Coupled Reactor Core Isolation Cooling System Model for Extended Station Blackout Analyses, Haihua Zhao, Ling Zou, Hongbin Zhang, Richard C. Martineau *(INL)*

9:55 a.m.

Development of a Multiple Liquid Component Capability in GOTHIC to Better Support Boric Acid, Radiological, and GSI-191 Analyses, J. W. Lane, T. L. George *(Numerical Application)*

10:20 a.m.

Development, Validation and Assessment of the TRACE Thermal-Hydraulics Systems Code, S. M. Bajorek, M. Bernard, C. Gingrich, C. L. Hoxie, A. Ireland, J. Kelly, J. Mahaffy, C. Murray, J. Spore, J. Staudenmeier, M. Thurgood, K. Tien, J. Whitman *(NRC)*

10:45 a.m.

Recent Developments for the SAS4A/SASSYS-1 Safety Analysis Code, T. H. Fanning, J. W. Thomas, T. Sumner, A. J. Brunett *(ANL)*

11:10 a.m.

Recent Improvements in the SPACE Code, Kyung Doo Kim, S. W. Lee, S. W. Bae, B. J. Kim, J. S. Heo, J. H. Lee, B.U. Bae, B. D. Chung *(KAERI)*

11:35 a.m.

Development of a Coupled Code System Based on SPACE Safety Analysis Code and RAST-K Three-Dimensional Neutronics Code, Seyun Kim, Eunki Lee, Yo-Han Kim, Dong-Hyuk Lee *(Central Research Inst/Korea Hydro & Nuclear Power Co.)*

Track 1: Boiling and Condensation Fundamentals—III

Session Organizers: Caleb Brooks *(Univ of Illinois)*, Rong Situ *(James Cook Univ)*

Session Chairs: Caleb Brooks *(Univ of Illinois)*, Ling Zou *(INL)*

Toronto: 9:30 a.m.-11:35 a.m

9:30 a.m.

Condensation Heat Transfer Coefficient Correlation based on Slip Ratio Model in a Horizontal Heat Exchanger, Seok Kim, Sung Uk Ryu, Seung Tae Lee, Dong-Jin Euh, Chul-Hwa Song *(KAERI)*

9:55 a.m.

Direct Condensation and Entrainment Steam Experiments at the TOPFLOW-DENISE Facility, T. Seidel, M. Beyer, D. Lucas *(Helmholtz-Zentrum Dresden-Rossendorf)*

10:20 a.m.

Experimental Study of Boiling Initiation on a Smooth Heating Surface, Hang Jin Jo, Moriyama Kiyofumi, Hyunwoo Noh, Hyun Sun Park *(POSTECH)*, Moo Hwan Kim *(POSTECH/KINS)*

10:45 a.m.

Fundamental Experiments of Condensation Heat Transfer on Water Jets in the Presence of Noncondensable Gas, F. X. Buschman, D. L. Aumiller *(BAPL)*, L. E. Hochreiter, F. B. Cheung, D. K. Johnson, M. J. Meholic, D. J. Skilone *(Penn State Univ)*

11:10 a.m.

Generalized Correlation for Steam Condensation Rates in the Presence of Air-Helium Mixtures, A. Dehbi *(Scherrer Inst)*

Track 2: Computational Fluid Dynamics—V

Session Organizers: Stavros Tavoularis *(Univ of Ottawa)*, Si Young Lee *(SNL)*

Session Chairs: Milorad Dzodzo *(Westinghouse)* and Thomas Hoehne *(HZDR)*

Comiskey: 9:30 a.m.-12:00 p.m.

9:30 a.m.

Numerical Analysis of Influence of Branch Flow on Thermal Mixing in a T-Junction Piping System, Karthick Selvam, Rudi Kulenovic, Eckart Laurien *(Univ of Stuttgart)*

9:55 a.m.

Thermal Hydraulic Analysis in Reactor Vessel Internals Considering Irradiation Heat, Sungje Hong, Kunwoo Yi, Jin Huh, Inyoung Im, Eunkee Kim *(KEPCO Engineering and Construction Co., Inc.)*

10:20 a.m.

A Structure-Based Approach for Topological Resolution of Coherent Turbulence: Overview and Demonstration, Giancarlo Lenci, Emilio Baglietto *(MIT)*

10:45 a.m.

CFD Analysis of Turbulent Mixed Convection Upward Flow of Supercritical Water in a Vertical Tube, Vladimir Agranat *(Applied Computational Fluid Dynamics Analysis)*, Michael Malin *(Concentration, Heat and Momentum Limited)*, Rand Abdullah, Igor Pioro *(Univ of Ontario Inst of Tech)*

11:10 a.m.

Developments and Applications of TRACE/CFD Model of Maanshan PWR Pressure Vessel, Yu-Ting Ku, Yung-Shin Tseng, Jung-Hua Yang, Shao-Wen Chen, Jong-Rong Wang, Chunkuan Shin *(Tsing Hua Univ/ Nuclear and New Energy Education and Research Foundation)*

11:35 a.m.

Simulations of ECC Safety Injection for Single Phase and Stratified Phase Flow, Kai Wang, Rong Cai, Wuyue Ren, Suizheng Qiu, Wenxi Tian, G.H. Su, Ronghua Chen *(Xi'an Jiaotong Univ)*

Track 6: Thermal Hydraulics in High-Temperature Gas-Cooled Reactors—II

Session Organizer: Elvis Dominguez *(ORNL)*

Session Chairs: Masahiro Kawaji *(City College of New York)*, Hitesh Bindra *(Kansas State Univ)*

Gold Coast: 9:30 a.m.-12:00 p.m.

9:30 a.m.

Heat and Dust Transport in a Pebble Bed HTR, S. T. Jayaraju, A. Shams, F. Roelofs *(NRG)*

9:55 a.m.

An Experimental Investigation of Thermal Loading on a Plate from Parallel Triple Jet, Paul J. Kristo, D. Tyler Landfried, Mark L. Kimber *(Univ of Pittsburgh)*

10:20 a.m.

Analytical Modeling of a Scaled Reactor Cavity Cooling System (RCCS) with Air, Y. Aharon *(Nuclear Research Center Negev)*, M. Muci, C. Tompkins, M. Anderson, M. Corradini *(Univ of Wisconsin, Madison)*

10:45 a.m.

Role of Radiation Heat Transfer in Cooling of a Scaled Model of a Prismatic Graphite Core in a VHTR, Francisco Ivan Valentin, Masahiro Kawaji *(City College of New York)*

11:10 a.m.

Uncertainty Quantification of Calculated Temperatures for Advanced Gas Reactor Fuel Irradiation Experiments, Binh T. Pham, Grant L. Hawkes, Jeffrey J. Einerson *(INL)*

11:35 a.m.

Effect of End Plate on the Flow Crossing a Yawed Circular Cylinder, Hui Liang, Sheng-Yao Jiang, Ri Qiang Duan *(Tsinghua Univ)*

Track 1: Natural Circulation, Passive Safety Systems and Related Phenomena—III

Session Organizers: Qiao Wu *(Oregon State Univ)*, Paolo Ferroni *(Westinghouse)*

Session Chairs: Yiban Xu *(Westinghouse)*, Jinbiao Xiong *(SJTU)*

Watertower: 9:30 a.m.-11:35 a.m.

9:30 a.m.

Experimental and Numerical Investigation of Flow Structure and Heat Transfer During High Pressure Condensation in a Declined Pipe at COSMEA Facility, Thomas Geissler, Uwe Hemple *(Technische Univ Dresden)*, Rita Szijarto *(Scherrer Inst)*, Matthias Beyer *(Helmholtz Zentrum Dresden Rossendorf (HZDR))*, Horst-Michael Prasser *(Scherrrer Inst)*, Stephan Leyer *(Technische Hochschule Deggendorf)*, Markus Walther *(AREVA GmbH)*

9:55 a.m.

Experimental Investigation and Flow Visualization of Steam Condensation in a Scaled IRWST-ADS Simulator, Suleiman Al Issa, Raphael Macian-Juan *(Technische Univ Muchen)*, Gonzalo Jiminez, Cesar Queral, Javier Monero-Mayorga *(Univ Politecnica Madrid)*

10:20 a.m.

Investigation of Operational Charactistics of Passive Containment Cooling System for an Advanced PWR, Zheng Huang, Huimin Zhang, Weimin Ma, Qiaoyan Chen, Xiaofeng Han *(China Nuclear Power Engineering Co., Ltd.)*

10:45 a.m.

CFD Simulation of Natural Convection Cooling After a Loss-of-Flow Transient, A. Kraus, R. Hu *(ANL)*

11:10 a.m.

Natural Convective Heat Transfer from a Heated Slender Vertical Tube in a Cylindrical Tank, Lin Xian, Guangming Jiang, Hongxing Yu (Nuclear Power Inst of Chin

Track 7: Research Progress of Large Advanced PWR Program in China

Session Organizer: Peipei Chen *(SNTPC)*

Session Chairs: Peipei Chen *(SNPTC)*, Wenxi Tian *(XJTU)*

Buckingham: 9:30 a.m.-12:00 p.m.

9:30 a.m.

Experimental and Theoretical Research on Liquid Entrainment in AP1000® ADS Blow-Down Phase of SBLOCA, S.Z. Qiu, D.C. Sun, W. Tian, Y. Xiang, G.H. Su *(Xi'an Jiao Tong Univ)*, P. Zhang *(SNPTRD)*

9:55 a.m.

ADS-IRWST Transient Evaluation Model for AP1000® SBLOCA Analysis, Han Wang *(State Nuclear Power Technology R&D Center)*, Peipei Chen *(State Nuclear Power Technology Corp)*

10:20 a.m.

Experimental and Numerical Investigation of Heat Transfer and Pressure Drop in Staggered Arrangement Helically Finned-Tube Bundle, Jiangtao Yu, Di Lin Liu, Wenxi Tian, M. Y. Zheng, Yingwei Wu, G. H. Su, S. Z. Qiu *(Xi'an Jiaotong Univ)*

10:45 a.m.

Experimental Methods of the PCCS Containment Wall Condensation with Non-Condensable Gas, Cheng Li, Zhan Gao, Shan Zhou, Hongsen Li, Wangfang Du, Wei Zhao, Lin Yang *(Chinese Nuclear Power Technology Corp. R&D Centre)*

11:10 a.m.

Experimental Investigation of CCFL in Pressurizer Surge Line with Air-Water, Z.W. Wang, W. X. Tian, J. T. Yu, D. L. Zhang, G. H. Su, S. Z. Qiu, R.H. Chen *(Xi'an Jiao Tong Univ)*, B. Dong *(State Nuclear Power Software Development Center)*

11:35 a.m.

Experiment of Condensation in T-Junction: Steam-Water Flow in Water-Injected Condition, W. Y. Ren, G. J. Yu, J. W. Bian, W. X. Tian, G. H. Su, S. Z. Qiu *(Xi'an Jiao Tong Univ)*, X. L. Fu *(SNPSDC/NKLNPS)*

Track 1: Multifield Two-Phase Flow Modeling—II

Session Organizer: Takashi Hibiki *(Purdue Univ)*

Session Chairs: John Buchanan *(Bechtel Marine Propulsion Corp)*, Haihua Zhao *(INL)*

Atlanta: 9:30 a.m.-12:00 p.m.

9:30 a.m.

Film-Droplet Split Correlation at the Onset of Annular-Mist Flow, S. Oh, B. Hizoum, P. Saha, B. Dooies, D. Miranda *(GE Hitachi Nuclear)*, J. G. M. Andersen *(Consultant)*

9:55 a.m.

Numerical Calculation of the Heat Transfer Characteristics of Fuel Cladding with Dirt at Low Coolant Speed, S. H. Yin, X. Y. Zhang, A. Q. Liu *(South China Univ of Techn)*

10:20 a.m.

Modifications of Critical Heat Flux Models on Horizontal Surfaces in Pool Boiling Using Interfacial Instabilities of Viscous Potential Flows, Jong Hyuk Lee, Byung Jae Kim, Kyung Doo Kim *(KAERI)*

10:45 a.m.

Analysis and Applications of a Generalized Multi-Field Two Fluid Approach for Plunging Jet Configuration, E. Krepper, D. Lucas *(Helmholtz-Zentrum Dresden-Rossendorf)*, F. Zidouni *(USTHB)*

11:10 a.m.

Effect of Viscosity on a Well-Posed One-Dimensional Two-Fluid Model for Wavy Two-Phase Flow Beyond the Kelvin-Helmholtz Instability: Limit Cycles and Chaos, Martin Lopez de Bertodano *(Purdue Univ)*, William D. Fullmer *(Univ of Colorado, Boulder)*

11:35 a.m.

On Well-Posedness and Stability of the Two-Fluid Model for Vertical Bubbly Flows, A. Vaidheeswarn, M. Lopez de Bertodano *(Purdue Univ)*, W. D. Fullmer *(Univ of Colorado, Boulder)*

Track 2: Plant System Code Development

Session Organizers: Tomasz Kozlowski *(Univ of Illinois)*, Annalisa Manera *(Univ of Michigan)*

Session Chair: Kurshad Muftuoglu *(GE Hitachi Nuclear Energy)*

Wrigley: 9:30 a.m.-12:00 p.m.

9:30 a.m.

Description of an Improved Turbomachinery Model to be Developed in the CATHARE3 Code for Astrid Power Conversion System Application, G. Mauger, F. Bentivoglio, N. Tauveron *(CEA)*

9:55 a.m.

Improvement of RELAP5 Models for Condensation of Steam and Steam-Gas Mixture in Horizontal and Inclined Tubes, P. Kral *(UJV Rez, a. s.)*

10:20 a.m.

Analysis of Protected RIA and LOFA in Plate Type Research Reactor Using Coupled Neutronics Thermal-Hydraulics System Code, Marat Margulis, Erez Gilad *(Ben-Gurion Univ of the Negev)*

10:45 a.m.

ASTEC Simulation of a SBO with Re-Flood in a German KONVOI NPP, Florian Gremme, Marco K. Koch *(Ruhr-Univ Bochum)*

11:10 a.m.

Commercial Grade Dedication of RELAP5-3D©, D. Prelewicz *(Information Systems Laboratories, Inc.)*, B. Wolf, C. Delfino *(NuScale Power, LLC.)*

11:35 a.m.

Evaluation of Thales Subchannel Code Behavior for Loss of Flow and RCP ROTOR Seizure Scenarios, Kang Hoon Moon *(KNFC)*, Erdal Ozdemir *(KINGS)*, Seung J. Oh *(KEPCO INGS)*, Yongdeog Kim *(KHNP CRI)*

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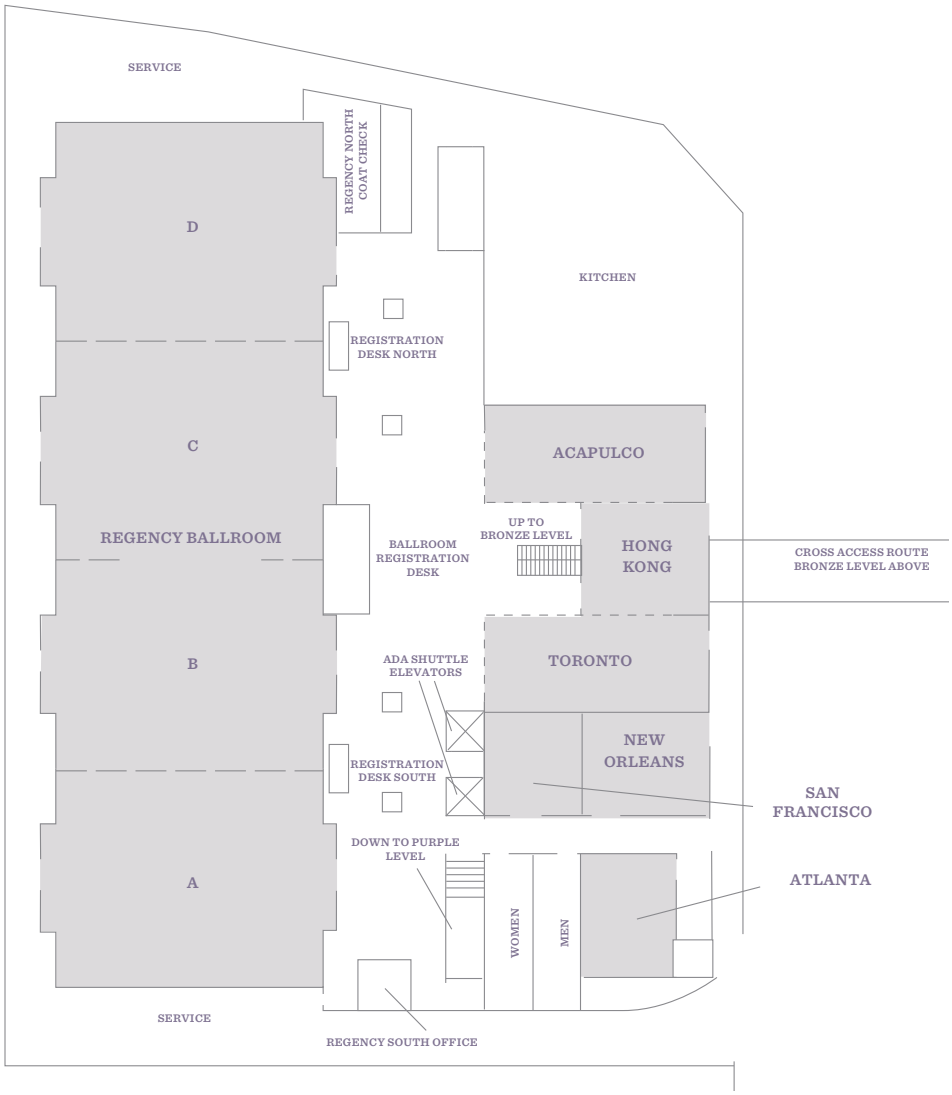
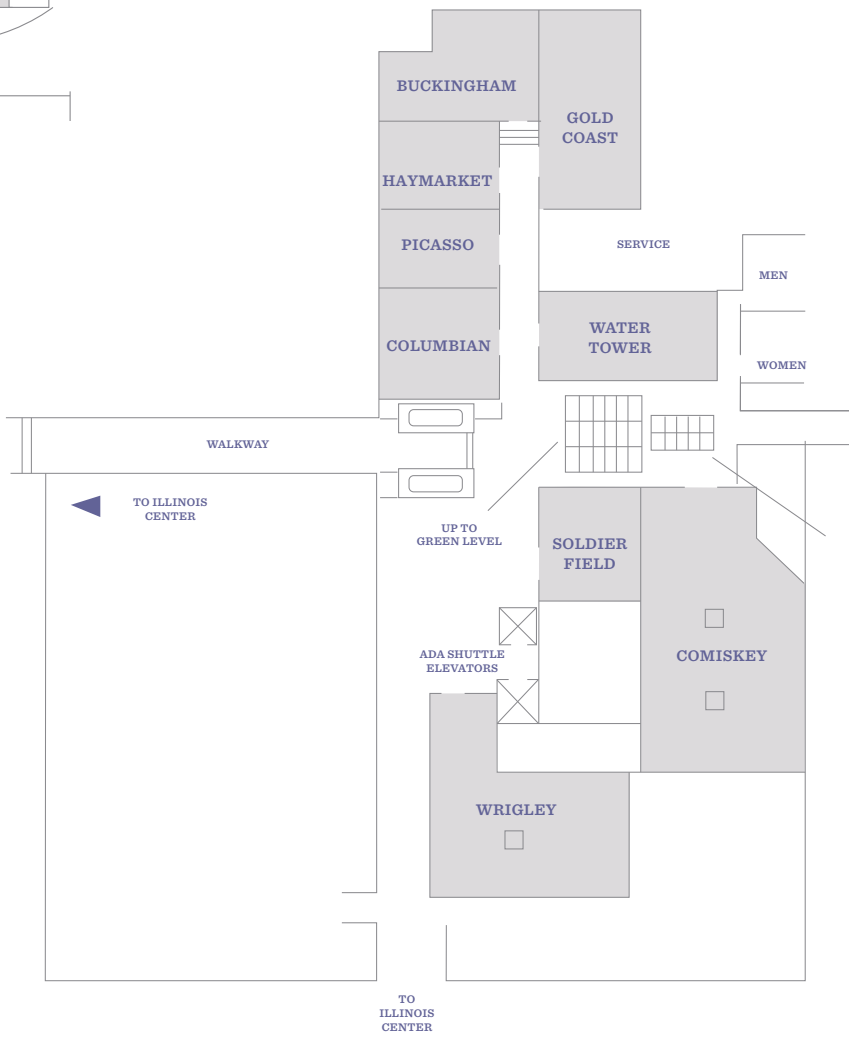
Gold Level - West Tower



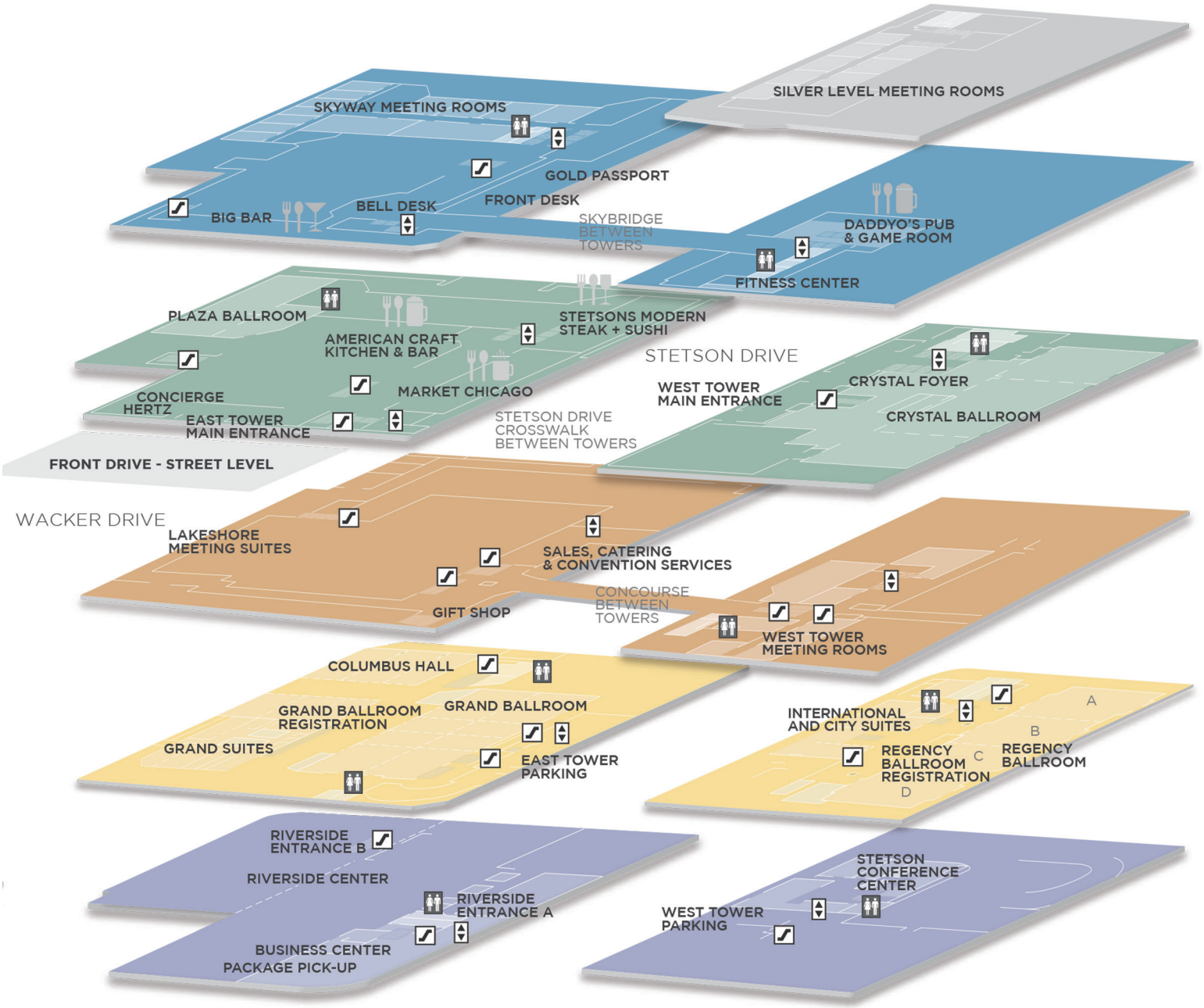
Bronze Level - West Tower



HYATT REGENCY CHICAGO

EAST TOWER

WEST TOWER



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