

# International RELAP5 Advanced Workshop / Users Group and Business Meeting Monday, April 15, 2019 through Friday, April 19, 2019

**Attire: Business Casual**

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**Argonne National Laboratory (ANL)**

Son Pham  
Dhongik Yoon

**Electric Boat**

Robert Scherrer

**FPoliSolutions**

Cesare Frepoli

**Framatome**

Daniel Tinkler

**Information Systems Laboratory (ISL)**

Doug Barber  
Glenn Roth

**Institute of Nuclear Safety System, Inc.**

Chihiro Yanagi  
Ikuo Kinoshita

**Japan Atomic Energy Agency**

Nao Watanabe

**Naval Nuclear Laboratory (NNL)**

Frank Buschman  
Beren Evans

**NuScale**

Brian Wolf

**Palovede Nuclear / APS**

Majid Saba

**Southern Nuclear**

Butch Bornt

**TerraPower, LLC**

Justin Thomas

**Virginia Commonwealth University**

Tao Liu

**Idaho National Laboratory (INL)**

Nolan Anderson

Andrew Baker

Art Baker

Cole Blakely

Yong-Joon Choi

Cliff Davis

Aaron Epiney

Joshua Fishler

Charlie Folsom

Russell Gardner

Ben Johnson

Donna Guillen

Diego Mandelli

Rich Martineau

George Mesina

Brenda Monson

Carlo Parisi

Tate Shorthill

Jim Wolf

Changhu Xing

Jianguo Yu

Hongbin Zhang

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Host: Jim Wolf

Admin Asst: Brenda Monson

Revision Number 7

Date agenda revised April 11, 2019

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***Monday, April 15, 2019***

***International RELAP5 Advanced Workshop  
Introductions and Basic Hydrodynamics***

***Residence Inn, 635 West Broadway Idaho Falls, ID 83402***

7:30 Registration

***Instructors: Nolan Anderson – INL and Cliff Davis – INL***

8:00 Introductions

8:15 RELAP5-3D Code Overview

8:45 Flow Regimes

9:00 Flow Models

9:45 Break

10:00 Input for Basic Hydrodynamic Components

11:30 Non-condensable Model

12:00 No-Host Lunch

1:00 RELAP5-3D Execution Procedures

1:30 Exercises: Basic Hydrodynamic Components

5:00 Adjourn

***Tuesday, April 16, 2019***

***International RELAP5 Advanced Workshop (continued)  
Heat / Mass Transfer and Heat Structures***

***Residence Inn, 635 West Broadway Idaho Falls, ID 83402***

***Instructors: Nolan Anderson – INL and Cliff Davis – INL***

8:00 Heat Transfer Models

9:30 Break

9:45 Input for Heat Structures and Material Properties

10:15 Nodalization Exercises (Combining Flow Paths in Parallel and Series)

12:00 No-Host Lunch

1:00 Nodalization Exercises (Combining Flow Paths in Parallel and Series) – continued

2:00 Exercises: Basic Hydrodynamics and Heat Structures

5:00 Adjourn

***Wednesday, April 17, 2019***

***International RELAP5 Advanced Workshop (continued)  
Other Hydrodynamic Components and Processes***

***Residence Inn, 635 West Broadway Idaho Falls, ID 83402***

***Instructors: Nolan Anderson – INL and Cliff Davis – INL***

- 8:00 Smooth and Abrupt Area Change Modeling
- 8:30 Component Models
- 9:00 Special Process Models
- 10:00 Break
- 10:15 Trips, Tables, and Control Variables
- 10:45 Input for Other Hydrodynamic Components, Control Variables
- 11:15 Output File
- 12:00 No-Host Lunch
- 1:00 Generic PWR Model Description
- 1:15 Exercises: Generic PWR
- 3:00 Exercises: Generic PWR Core Renodalization
- 5:00 Adjourn

**Thursday, April 18, 2019**

**International RELAP5 Users Group Meeting**

**Residence Inn, 635 West Broadway Idaho Falls, ID 83402**

8:00 Registration

**Chairman: Jim Wolf – INL**

8:30 Welcome and Introduction ..... Jim Wolf  
*Idaho National Laboratory, (208) 526-7725*

8:45 RELAP5-3D, The Path Forward ..... Jim Wolf  
*Idaho National Laboratory, (208) 526-7725*

9:30 Conversion of RELAP5-3D to GFORTRAN.....George Mesina  
*Idaho National Laboratory, (208) 526-8312*

10:00 Current Status of RELAP-7.....Rich Martineau  
*Idaho National Laboratory, (208) 526-2938*

10:30 Break

**Chairman: George Mesina – INL**

10:45 Coupling to BISON ..... Russell Gardner  
*Idaho National Laboratory, (208) 526-2970*

11:15 Direct Sparse Matrix Linear Solver for the Nodal Kinetics in RELAP5-3D .....Doug Barber  
*Information Systems Laboratory (208) 552-6278*

11:45 Quantitative Verification of RELAP5-3D ..... Frank Buschman  
*Naval Nuclear Labs (412) 476-6199*

12:15 No-Host Lunch

**Thursday, April 18, 2019 (continued)**

**International RELAP5 Users Group Meeting (continued)**

**Chairman: Frank Buschman – NNL**

- 1:45 Advances Using the Jacobian Tool .....George Mesina  
*Idaho National Laboratory, (208) 526-8312*
- 2:15 Multi-Unit PRA with RAVEN / RELAP5-3D ..... Diego Mandelli  
*Idaho National Laboratory, (208) 526-1026*
- 2:45 Six Field Model RELAP5-3D.....George Mesina  
*Idaho National Laboratory, (208) 526-8312*  
Glenn Roth  
*Information Systems Laboratory (208) 552-2000*
- 3:15 Break

**Chairman: Doug Barber – ISL**

- 3:30 Validation of RELAP5-3D Using HE-FUS3 Data ..... Cliff Davis  
*Idaho National Laboratory, (208) 526-9470*
- 4:00 Assessment of RELAP5-3D for LWRS Applications..... Yong-Joon Choi  
*Idaho National Laboratory, (208) 526-3022*
- 4:30 Adjourn

**Sandpiper, 750 Lindsay Blvd, Idaho Falls, ID 83402**

- 6:30 No-Host Dinner (Reservation under IRUG)

**Friday, April 19, 2019**

**International RELAP5 Users Group Meeting (continued)**

**Residence Inn, 635 West Broadway Idaho Falls, ID 83402**

**Chairman: George Mesina – INL**

- 8:30 Validation of a Simple RELAP5-3D Point Kinetics Model of the Full-Slotted MARCH core in TREAT ..... Cliff Davis  
*Idaho National Laboratory, (208) 526-9470*
- 9:00 Risk Analysis of ATFs with RELAP5-3D / RAVEN..... Diego Mandelli  
*Idaho National Laboratory, (208) 526-1026*
- 9:30 Analysis of the Accident Tolerant Fuel using RELAP5-3D ..... Carlo Parisi  
*Idaho National Laboratory, (208) 526-2483*
- 10:00 TREAT Water Recirculation Loop Analysis .....Aaron Epiney  
*Idaho National Laboratory, (208) 526-0726*
- 10:30 Break

**Chairman: Aaron Epiney – INL**

- 10:45 Analysis of the Versatile Test Reactor Using RELAP5-3D ..... Carlo Parisi  
*Idaho National Laboratory, (208) 526-2483*
- 11:15 Update on FPoliSolutions' RISMC Program Using RAVEN and RELAP5-3D.....Cesare Frepoli  
*FPoliSolution, (724) 448-9615*
- 11:45 Analysis Using RELAP5-3D as Compared with a Test Mockup .....Bob Scherrer  
*General Dynamics Electric Boat, (860) 867-2637*
- 12:15 No-Host Lunch

**Friday, April 19, 2019 (continued)**

**International RELAP5 Users Group Business Meeting**

**Chairman: Jim Wolf – INL**

- 1:45 Business Meeting ..... Jim Wolf  
*Idaho National Laboratory, (208) 526-7725*
  - Review of the 2018 Meeting Minutes
  - Election of new IRUG Vice Chairman
- 2:00 Selected User Problems ..... Nolan Anderson  
*Idaho National Laboratory, (208) 526-9323*
- 2:30 Licensing, Status, License Fee Structure, and Export Control Status ..... Art Baker  
*Idaho National Laboratory, (208) 526-1872*
- 3:00 RELAP5-3D Priorities ..... All
- 3:30 Dates for Next Year’s Meeting ..... Jim Wolf  
*Idaho National Laboratory, (208) 526-7725*
- 3:45 Final Discussions / Questions ..... All
- 4:00 Adjourn