



**GAS-COOLED REACTOR**

ADVANCED REACTOR TECHNOLOGIES PROGRAM

July 16, 2024

# Welcome and Meeting Logistics

**Gerhard Strydom, PhD**

*National Technical Director: ART-GCR (INL)*



**DOE ART GCR Review Meeting**

*Hybrid Meeting at INL*

**July 16–18, 2024**

# Welcome and Meeting Logistics

- Presentations will be available on the ART website by mid-August ([art.inl.gov](http://art.inl.gov)).
- Please mute when not talking.
- Please use the Teams *raise hand* feature to ask verbal questions to the presenters, or send us questions via *chat*.
- Questions will be addressed at the end of each presentation (time permitting).
- In case of audio/video issues
  - Try dialing in.
  - Headsets, wired and non-VPN connections usually perform best.



# Agenda: Day 1

*(All times are MT)*

## ***Advanced Gas Reactor (AGR) TRISO Fuel Qualification Program***

- 08:00 Welcome and Meeting Logistics..... Gerhard Strydom, INL
- 08:05 Department of Energy Nuclear Energy Perspectives ..... Alison Hahn, DOE-HQ
- 08:15 Department of Energy ART Program Perspective..... Matt Hahn, DOE-HQ
- 08:25 ART GCR Program Overview ..... Gerhard Strydom, INL
- 08:40 DOE AGR Fuel Development and Qualification Program Overview ..... Paul Demkowicz, INL
- 09:05 AGR-3/4 Fuel Compact Fission Product Concentration Profiles ..... Lu Cai, INL
- 09:25 Break (10 minutes)**
- 09:35 AGR-3/4 PIE and Data Analysis..... Adriaan Riet, INL
- 10:05 AGR-5/6/7 PIE Overview 2024..... John Stempien, INL
- 10:35 AGR-5/6/7 Partial Mass Balance..... Lu Cai, INL
- 10:55 Break (10 minutes)**



# Agenda: Day 1

## *AGR TRISO Fuel Qualification Program (Continued)*

- 11:05 AGR-5/6/7 Compact Destructive Exams and Safety Testing—ORNL ..... Will Cureton, ORNL
- 11:35 AGR-5/6/7 Compact Destructive Exams and Safety Testing 2024—INL ..... John Stempien, INL
- 12:05 Break for lunch setup (15 minutes)**

## *TRISO Fuels NEUP Projects (60 minutes)*

- 12:20 Robust bullet-time tagging and tracking system based on computer vision ..... Muthanna Al-Dahhan, for individual ex-core TRISO-fueled pebble identification ..... Missouri S&T
- 12:40 Statistical modeling of the effect of microstructural heterogeneity on the ..... Yongfeng Zhang, irradiation behavior of TRISO fuel buffer layer ..... University of Wisconsin Madison
- 13:00 Separate-effect Test Facilities Under Prototypical Conditions for ..... N.K. Anand & Y. A. Hassan, Depressurization and Water-ingress Accidents ..... Texas A&M University



# Agenda: Day 1

## *AGR TRISO Fuel Qualification Program*

- 13:20 Supplemental PIE Activities Supporting Mechanistic Understanding of .....Tyler Gerczak, ORNL  
TRISO Performance.....
- 13:40 Microtensile Specimen Analysis..... Tanner Mauseh, INL
- 14:00 X-ray Computed Tomography of TRISO Fuel .....William Chuirazzi, INL
- 14:20 Break (15 minutes)**
- 14:35 Thermophysical Property Characterization of Irradiated TRISO Compacts .....Ethan Hisle, INL
- 14:55 Overview of New Quality Control Methods Development at ORNL in FY24..... Grant Helmreich, ORNL
- 15:15 AGR Fuel Oxidation Testing Summary and Plans ..... John Stempien, INL
- 15:35 Break (15 minutes)**
- 15:50 Fission Product Release Data Summary Covering AGR-1 through AGR-3/4 ..... John Stempien, INL
- 16:10 Fuel Performance Modeling Status Update and Potential Model Improvements .....Bill Skerjanc, INL
- 16:30 NDMAS Portal Updates ..... Courtney Otani, INL
- 16:45 Concluding remarks .....Paul Demkowicz, INL
- 17:00 Adjourn**



# Agenda: Day 2

## *Graphite Qualification and R&D*

- 08:00 DOE ART Graphite R&D Introduction .....Will Windes, INL
- 08:20 Graphite Oxidation Activities ..... Rebecca Smith, INL
- 08:50 Oxidation Resistant Graphite .....Tim Bragg and Michael Barkdull, INL
- 09:20 Overview of Graphite Model Development..... Veerappan Prithvirajan, INL
- 09:50 Break (20 minutes)**
- 10:10 ASME – Grappling with the Concept of Component Failure..... Martin Metcalfe, Martin Metcalfe Consultancy
- 10:40 ASME Code Development (Design Rules)..... Andrea Mack, INL
- 11:10 Ceramic Composites..... Wilna Geringer, ORNL
- 11:40 Break for lunch setup (20 minutes)**



# Agenda: Day 2

## *Graphite Qualification and R&D NEUP Projects (60 minutes)*

- 12:00 Introduction of NEUP speakers .....Will Windes, INL
- 12:05 Multiscale Effects of Defects and Microstructure on Mechanical..... Gongyuan (Patrick) Liu,  
Properties of Nuclear Graphite..... The Pennsylvania State University
- 12:35 Quantifying the Dynamic and Static Porosity/Microstructure.....Jacob Eapen,  
Characteristics of Irradiated Graphite through Multi-technique ..... North Carolina State University  
Experiments and Mesoscale Modeling.....

## *Graphite Qualification and R&D*

- 13:05 AGC Update.....Will Windes, INL
- 13:35 Molten Salt Intrusion ..... Nidia Gallego, ORNL
- 14:05 Split-disk Studies.....Arvin Cunningham, INL and Lianshan Lin, ORNL
- 14:35 Wear Testing..... Tomas Grejtak, ORNL
- 15:05 Concluding remarks .....Will Windes, INL
- 15:20 **Adjourn**



# Agenda: Day 3



***Collaborative Computing Center (C3), C3 Auditorium (Rooms 1131A-1131B)***

*955 MK Simpson Blvd, Idaho Falls, ID 83401*

*(All times are MT)*

## ***High Temperature Metals***

08:00 High Temperature Metals Program Overview ..... Mike McMurtrey, INL

08:15 High Temperature Materials ..... Heramb Mahajan, INL

## ***Methods, Modeling, and Validation***

08:30 ART GCR Design, Methods and Validation Overview ..... Paolo Balestra, INL

08:50 Water-Cooled Natural Convection Shutdown Heat Removal Test Facility ..... Matthew Jasica, ANL  
(NSTF) data and status .....

**09:20 Break (20 minutes)**

09:40 Progress in the High Temperature Test Facility (HTTF) Benchmark ..... Robert Kile, INL

10:10 Advanced Cross Section Library generation using reduced order models ..... Yifeng Che, INL





# Agenda: Day 3

10:40 AIR cooled RCCS CFD modeling validation..... Sinan Okayay, Penn State University

**11:00 Break for lunch setup (20 minutes)**

## *Methods, Modeling, and Validation NEUP Projects (60 minutes)*

11:20 Investigating Heat Transfer in Horizontally Oriented HTGR Under ..... Bindra Hitesh,  
Normal and PCC Conditions .....Purdue University

11:50 Thermal Hydraulics Investigation of Horizontally Oriented Layout ..... Muthanna Al Dahhan,  
Micro HTGRs Using Integrated Advanced Measurement Techniques ..... Missouri S&T

## *Methods, Modeling, and Validation*

12:20 HTGR Validation: NEUP Survey and Database .....Sunming Qin, INL

12:50 TREAT TRISO Transient Testing Pre-test Analysis Using ..... Mustafa K. Jaradat and  
NEAMS Tools ..... Jacob A. Hirschhorn, INL

**13:20 Break (20 minutes)**

13:50 International Collaborations Overview..... Paolo Balestra, INL

14:20 Questions/Discussions..... Paolo Balestra, INL

14:30 Final Remarks 2024 Program Review..... Gerhard Strydom, INL

**14:40 Adjourn**





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# Thank You!

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**Gerhard Strydom**

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