

# Advanced Manufacturing for Nuclear Workshop & Advanced Methods for Manufacturing Annual Program Review

Oak Ridge National Laboratory  
Manufacturing Demonstration Facility  
2360 Cherahala Blvd,  
Knoxville, TN 37932

December 4-6, 2018



## AGENDA

### Day 1 – Tuesday, December 4, 2018

Time	Topic	Chair /Presenter
	<b>The Vision For Advanced Manufacturing In Nuclear</b>	<b>GAIN - Chair</b>
8:00 AM	➤ Arrival and Badging	
8:30 AM	➤ Objective of Workshop	A. Worrall, GAIN
8:45 AM	➤ AMM Program Direction	A. Caponiti, DOE-NE
9:05 AM	➤ GAIN Initiative Direction	R. Baranwal, GAIN
9:25 AM	➤ Where Is Advanced Manufacturing Heading?	S. Babu, UT/ORNL
<b>10:05 AM Break/Networking</b>		
10:35 AM	➤ Welcome Remarks	A. Icenhour, ORNL
10:55 AM	➤ Advanced Manufacturing of Materials for Extreme Environments	R. Dehoff, ORNL
11:15 AM	➤ NRC Perspectives on Advanced Manufacturing	J. Christensen, NRC
<b>11:35 PM Working Lunch “Food for Thought”</b>		
	➤ Transformational Challenge Reactor (TCR)	J. Cirtain, ORNL
<b>Tours</b>		
1:05 PM	➤ Manufacturing Demonstration Facility 2 & 3 Tours	
	<b>Advanced Manufacturing And The Supply Chain</b>	<b>NIC - Chair</b>
2:05 PM	➤ Industry Vision for Advanced Manufacturing in Nuclear	D. Blee, NIC / M. Nichol, NEI
2:35 PM	➤ SMR Supply Chain Readiness	S. Wolbert, NuScale
2:55 PM	➤ Non-LWR SMR Supply Chain Readiness	R. Rickman, Terrestrial
<b>3:15 PM Break/Networking</b>		
3:45 PM	➤ PANEL: Manufacturers Interest In Advanced Manufacturing	NIC - Chair
4:45 PM	➤ Summarize Day	A. Worrall, GAIN
<b>5:00 PM Adjourn</b>		
6:00 PM	Post-Workshop Networking Reception	<b>Sponsored by</b>
7:30 PM	Chesapeake’s Restaurant (~5mile/10minute drive from the meeting venue)	<b>US Nuclear Industry Council</b>

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## AGENDA

### Day 2 – Wednesday, December 5, 2018

Time	Topic	Chair /Presenter
	<b>Advanced Manufacturing – AMM Project Reviews</b>	Bruce Landrey, AMM - Chair
8:00 AM	➤ SMR RPV Manufacturing & Fabrication Technology Development	D. Gandy, EPRI
8:40 AM	➤ Development of Low-Temperature Powder Spray for Fuel Cladding	K. Sridharan, University of WI
9:10 AM	➤ Additive Manufacturing of Fuel Assembly Components	G. Pabis / C. Gramlich, NovaTech
9:40 AM	➤ Pulsed Thermal Tomography Non-Destructive Evaluation	A. Heifetz, ANL
10:10 AM	➤ Irradiation Testing of Materials Produced by Additive Mfg.	J. King, Colorado School of Mines
10:40 AM	<b>Break/Networking</b>	
11:10 AM	➤ Enhancing Irradiation Tolerance of Steels via Nano-Structuring	H. Wen, ISU/MUST
11:40 AM	➤ ICME and In-situ Monitoring for Rapid Qualification of Components	D. Gandy, EPRI
12:10 PM	<b>Working Lunch “Food for Thought”</b>	
	➤ Advanced Manufacturing at ORNL including MDF Business and Operating Model	B. Peter, ORNL
	<b>Tours</b>	
1:40 PM	➤ Manufacturing Demonstration Facility 2 & 3 Tours	
	<b>Additive Manufacturing – Other Activities</b>	
2:40 PM	➤ Data Analytics and Computing for Advanced Manufacturing	EPRI - Chair V. Paquit / A. Plotowski, ORNL
3:10 PM	➤ Feedstock Supply for Additive Manufacturing	D. Novatnak, Carpenter
3:40 PM	<b>Break/Networking</b>	
4:10 PM	➤ PANEL - Challenges for Development and Deployment of Advanced Manufacturing	NIC – Chair
5:10 PM	➤ Summarize Day	A. Worrall, GAIN
5:25 PM	<b>Adjourn</b>	

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### Day 3 – Thursday, December 6, 2018

Time	Topic	Chair /Presenter
	<b>Welding / Joining / Cladding – AMM Project Reviews</b>	Bruce Landrey, AMM – Chair
8:00 AM	➤ Advanced Surface Plasma Nitriding for ATF Cladding	L. Shao, Texas A & M University
8:40 AM	➤ Improving Weld Productivity and Quality Through Real-Time Monitoring	J. Chen, ORNL
9:10 AM	➤ All Position Cladding by Friction Stir Additive Manufacturing	Z. Feng, ORNL
9:40 AM	<b>Break/Networking</b>	
	<b>Qualifying &amp; Certifying Advanced Manufacturing Nuclear Components</b>	Bruce Landrey, AMM – Chair
10:10 AM	➤ Pre-Fabricated High Strength Rebar and Concrete for Accelerated Construction	Y. Kurama, Notre Dame
10:50 AM	➤ PANEL - Qualifying & Certifying Advanced Manufacturing Nuclear Components	NEI – Chair
	<b>Summarize and Close Workshop</b>	GAIN - Chair
11:50 AM	➤ Summarize key items from workshop, findings, key actions, gaps, needs, etc.	GAIN
12:20 PM	<b>Working Lunch “Food for Thought”</b>	
	➤ Private Public Partnership In Advanced Manufacturing	J. Jones, Volunteer Aerospace
1:20 PM	<b>Adjourn</b>	

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## ACRONYMS

AMM	Advanced Methods for Manufacturing
ANL	Argonne National Laboratory
ATF	Accident Tolerant Fuel
BWXT	BWX Technologies, Inc.
DOE-NE	Department of Energy-Nuclear Energy
EPRI	Electric Power Research Institute
GAIN	Gateway for Accelerated Innovation in Nuclear
GE	General Electric
ICME	Integrated Computational Materials Engineering
ISU	Idaho State University
LWR	Light Water Reactor
MDF	Manufacturing Demonstration Facility
MUST	Missouri University of Science & Technology
NEI	Nuclear Energy Institute
NIC	Nuclear Industry Council
NRC	Nuclear Regulatory Commission
ORNL	Oak Ridge National Laboratory
RPV	Reactor Pressure Vessel
SMR	Small Modular Reactor
TCR	Transformational Challenge Reactor
UT	University of Tennessee