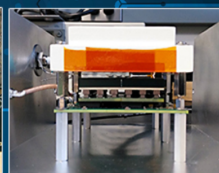


Workshop on Radiation Detection Materials and Applications (WoRDMaP)

Hosted by Brookhaven National Laboratory
March 12–14, 2024

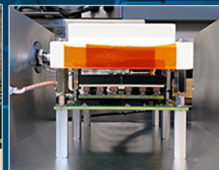
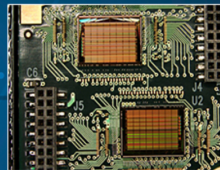


Agenda

Event Contact	Giuseppe Camarda, 631-806-4935 (cell), giuseppec@bnl.gov Collen Michael 347-218-1939 (cell), cmichael@bnl.gov		
Time	Event	Lead	Place
Day 1: Tuesday, March 12th			
7:45am	Workshop Check-in <i>Check in will open at 7:45am come anytime from 7:45-8:30</i>	Colleen Michael	Building 488 Lobby
8:00am – 9:00am	Breakfast/Coffee and Poster Setup*	*Posters displayed all three days	Building 488 Lobby
9:00am - 9:30am	Welcome, Introduction to WoRDMaP and Roadmap	David Asner Hank Zhu Giuseppe Camarda Federico Moretti	Building 488 Auditorium
9:30am – 10:30am	Government Overviews	Hank Zhu (DNN R&D) Chris Blessinger (ORNL/NSDD) Charles Weaver (JPEO) Thomas McKnight (DTRA) Alan Janos (CWMD)	Building 488 Auditorium
10:30am – 11:00am	Coffee Break		Building 488 Lobby
11:00am – 12:00pm (20-minute presentations)	Topic Overviews: Inorganic Scintillators Semiconductors Organic Scintillators	Federico Moretti Weronika Wolszczak <i>"Perspectives on Inorganic Scintillators Research"</i> Ralph James Giuseppe Camarda <i>"Compound Semiconductor Radiation Detectors: Science Fiction, Horror Story, or Headlines?"</i> Natalia Zaitseva Patrick Feng <i>"Motivated Development of Organic Scintillators: From Lab to Product"</i>	Building 488 Auditorium
12:00pm – 1:00pm	Lunch		Building 488 Lobby and Cafeteria
1:00pm – 2:30pm (30-minute presentations)	Plenary Talks Industry Point of View	Paul Schotanus (Scionix) <i>"Scintillator research: Quo Vadis? The route between development of new scintillation materials and industrial applications"</i>	Building 488 Auditorium

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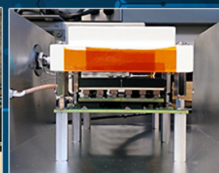
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		Chuck Hurlbut (Eljen) <i>"Organic Scintillators: Manufacturing & Innovation Issues"</i> Matthew Petryk (H3D) <i>"RTSD Commercial Development at H3D"</i>	
2:30pm – 3:30pm	Poster Session		Building 488 Lobby
3:30pm – 4:00pm	Coffee Break		Building 488 Lobby
4:00pm – 5:30pm Working Group Session Format: Intro: 10 min Speaker 1: 20 min Speaker 2: 20 min Discussion: 40 min (Group discussion might follow each presentation)	Inorganic Scintillators Working Group <i>Research on Crystal Growth</i>	Federico Moretti Weronika Wolszczak Jeffrey Derby (UM) <i>"How modeling has provided understanding to overcome challenges in radiation detector materials crystal growth"</i> Anton Tremsin (UCB) <i>"Optimization of crystal growth and material parameters through neutron imaging"</i> Group Discussion	Building 488 Auditorium
4:00pm – 5:30pm Working Group Session Format: Intro: 10 min Speaker 1: 20 min Speaker 2: 20 min Discussion: 40 min	Semiconductor Working Group <i>Gamma Spectroscopy and Imaging</i>	Ralph James Giuseppe Camarda Ling-Jian Meng (UIUC) <i>"Semiconductor Imaging Sensors for Nuclear Medicine: Clinical Needs, Technical Challenges, and Future Opportunities"</i> Zhong He (UM) <i>"Room-Temperature 3D Pixelated Semiconductor Gamma-Ray Imaging Spectrometers, Current Status and Path Forward"</i> Group Discussion	Building 488 Meeting Room B
4:00pm – 5:30pm	Organic Scintillators Working Group <i>Application Overview and Challenges</i>	Natalia Zaitseva Patrick Feng	Building 488 Meeting Room A

Workshop on Radiation Detection Materials and Applications (WoRDMaP)

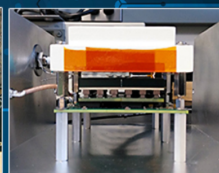
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Working Group Session Format: Intro: 10 min Speaker 1: 20 min Speaker 2: 20 min Discussion: 40 min (Group discussion might follow each presentation)		Shaun Clarke (UM) <i>"Organic Scintillators for Nuclear Nonproliferation Applications"</i> Paul Schotanus (Scionix) <i>"Organic scintillation materials for security applications: challenges for the future"</i>	
Day 2: Wednesday, March 13th			
Time	Event	Lead	Place
8:00am – 8:30am	Breakfast		Building 488 Lobby
	Welcome & Review of Day 1	Federico Moretti Weronika Wolszczak Ralph James Giuseppe Camarda Natalia Zaitseva Patrick Feng	Building 488 Auditorium
9:00am – 10:30am Working Group Session Format: Intro: 10 min Speaker 1: 20 min Speaker 2: 20 min Discussion: 40 min (Group discussion might follow each presentation)	Inorganic Scintillators Working Group <i>Engineering and applications</i>	Federico Moretti Weronika Wolszczak Markus Neuer (InnoRIID) <i>"Requirements of radiation detector materials for commercial acceptability in nuclear security products"</i> Jaroslav Glodo (RMD) <i>"TI-based scintillators"</i> Group discussion	Building 488 Auditorium
9:00am – 10:30am Working Group Session Format: Intro: 10 min Speaker 1: 20 min Speaker 2: 20 min Discussion: 40 min (Group discussion might follow each presentation)	Semiconductor Working Group <i>Material Defects Limiting Detector Performance</i>	Ralph James Giuseppe Camarda Jim Christian (RMD) <i>"Large-volume TlBr Gamma-ray Detectors"</i> Aleksey Bolotnikov (BNL) <i>"Material Defects Limiting the Performance of CdZnTe, TlBr, and CsPbBr₃ Position-Sensitive Virtual Frisch-grid Detectors"</i> Group Discussion	Building 488 Meeting Room B
9:00am – 10:30am	Organic Scintillators Working Group	Natalia Zaitseva Patrick Feng	Building 488 Meeting Room A

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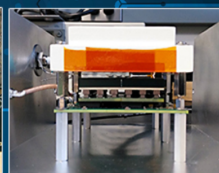
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Working Group Session Format: Intro: 10 min Speaker 1: 20 min Speaker 2: 20 min Discussion: 40 min (Group discussion might follow each presentation)	<i>Scintillator Design 1</i>	Guillaume Bertrand (CEA-Sarlay) “Application driven chemical design of organic scintillators” Alan Sellinger (CO School of Mines) “Efficient PSD capable scintillators based on organic polymers, organic glasses, polysiloxanes, reactive dopants, and photocuring”	
10:30am – 11:00am	Coffee Break		Building 488 Lobby
11:00am – 12:30pm Working Group Session Format: Intro: 10 min Speaker 1: 20 min Speaker 2: 20 min Discussion: 40 min (Group discussion might follow each presentation)	Inorganic Scintillators Working Group <i>Basic and applied materials science</i>	Federico Moretti Weronika Wolszczak Nerine Cherepy (LLNL) “Transparent ceramic scintillators” Federico Moretti (LBNL) “Scintillator materials science: trends and opportunities” Group discussion	Building 488 Auditorium
11:00am – 12:30pm Working Group Session Format: Intro: 10 min Speaker: 20 min Discussion: 60 min	Semiconductor Working Group <i>Technology Gaps and Priority Directions for Gamma Detection I</i>	Ralph James Giuseppe Camarda Paul Sellin (University of Surrey) “Material Challenges for Perovskite Semiconductor and Scintillator Detectors” Group Discussion	Building 488 Meeting Room B
11:00am – 12:30pm Working Group Session Format: Intro: 10 min Speaker 1: 20 min Speaker 2: 20 min Discussion: 40 min (Group discussion might follow each presentation)	Organic Scintillators Working Group <i>Scintillator Design 2</i>	Natalia Zaitseva Patrick Feng Andrew Glenn (LLNL) “LLNL developments of crystal, plastic, and liquid scintillators with pulse shape discrimination” Patrick Feng (SNL) “Molecular Design and Fabrication of Organic	Building 488 Meeting Room A

Workshop on Radiation Detection Materials and Applications (WoRDMaP)

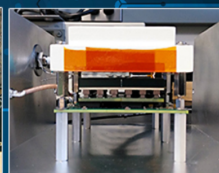
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		<i>Glasses for Radiation Detection and Imaging</i>	
12:30pm – 1:30 pm	Photo Shoot/Lunch		Building 488 Lobby and Cafeteria
1:30pm – 3:00pm Working Group Session Format: Intro: 10 min Speaker 1: 20 min Speaker 2: 20 min Discussion: 40 min (Group discussion might follow each presentation)	Inorganic Scintillators Working Group <i>Scintillation physics/mechanisms</i>	Federico Moretti Weronika Wolszczak Weronika Wolszczak (LBNL), <i>"The Future of Scintillation Materials Research and Engineering: Towards Deliberate Design"</i> Stephen Payne (LLNL), <i>"Fundamental Material and Optical Physics of Scintillators"</i>	Building 488 Auditorium
1:30pm – 3:00pm Working Group Session Format: Intro: 10 min Speaker 1: 20 min Speaker 2: 20 min Discussion: 40 min (Group discussion might follow each presentation)	Semiconductor Working Group <i>Technology Gaps and Priority Directions for Gamma Detection II</i>	Ralph James Giuseppe Camarda KiHyun Kim (Korea University) <i>"Enhanced detector performance in selenium-added CdTe compounds"</i> Amlan Datta (CapeSym) <i>"Material Insights and Industrial Perspectives for Thallium Bromide Radiation Detectors"</i> Group Discussion	Building 488 Meeting Room B
1:30pm – 3:00pm Working Group Session Format: Intro: 5 min Speaker 1: 20 min Speaker 2: 20 min Speaker 3: 20 min Discussion: 25 min (Group discussion might follow each presentation)	Organic Scintillators Working Group <i>Characterization and Applications</i>	Natalia Zaitseva Patrick Feng Erik Brubaker (SNL) <i>"Organic scintillator needs for neutron localization and imaging"</i> Thibault Laplace (UCB) <i>"Ionization quenching in organic scintillators for neutron detection"</i> Paul Hausladen (ORNL) <i>"Perspectives on Organic Scintillators for Fast Neutron Imaging"</i>	Building 488 Meeting Room A
3:00pm – 3:30pm	Coffee Break		Building 488 Lobby
3:30pm – 5:00pm	Inorganic Scintillators Working Group	Federico Moretti Weronika Wolszczak	Building 488 Auditorium

Workshop on Radiation Detection Materials and Applications (WoRDMaP)

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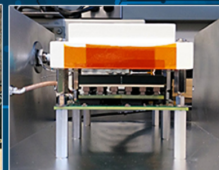
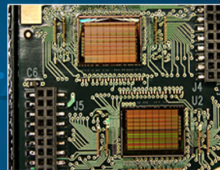
Working Group Session Format: Intro: 10 min Speaker 1: 20 min Speaker 2: 20 min Discussion: 40 min (Group discussion might follow each presentation)	<i>Large scale production</i>	Jindřich Houžvička (CRYTUR), “Single crystal growth of oxide scintillators on an industrial scale” Borys Grynyov (ISMA) “Scintillation Materials in Ukraine. Today and in the Future”	
3:30pm – 5:00pm Working Group Session Format: Intro: 10 min Speaker: 20 min Discussion: 60 min	Semiconductor Working Group <i>Solid-State Neutron and Germanium Gamma Detectors</i>	Ralph James Giuseppe Camarda Francesca Capodicasa (BNL) “Navigating Challenges in Germanium Detector: Insights from BNL Developments” Group Discussion	Building 488 Meeting Room B
3:30pm – 5:00pm Working Group Session Format: Intro: 5 min Speaker 1: 20 min Speaker 2: 20 min Speaker 3: 20 min Discussion: 25 min (Group discussion might follow each presentation)	Organic Scintillators Working Group <i>Additives and Fabrication</i>	Natalia Zaitseva Patrick Feng Nathaniel Bowden (LLNL) “⁶Li-loaded organic scintillators for antineutrino detection applications” Sean O’Neal (LLNL) “Metal loaded plastic scintillators” Juan Manfredi (AFIT) “Additive Manufacturing for Plastic Scintillators”	Building 488 Meeting Room A

Day 3: Thursday, March 14th

Time	Event	Lead	Place
8:00am – 8:30am	Breakfast		Building 488 Lobby
8:30am – 9:00am	Welcome & Review of Day 2	Federico Moretti Weronika Wolszczak Ralph James Giuseppe Camarda Natalia Zaitseva Patrick Feng	Building 488 Auditorium
9:00am – 10:30am	Inorganic Scintillators Working Group	Federico Moretti Weronika Wolszczak	Building 488 Meeting Room A

Workshop on Radiation Detection Materials and Applications (WoRDMaP)

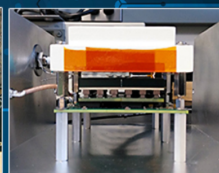
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Session Format: Intro: 10 min Speaker: 20 min Discussion: 60 min	<i>From research labs to industrial production</i>	Rastgo Hawrami (Fisk University) “Issues in R&D to High Yield, Low-Cost Bulk Crystal Production” Discussion	
9:00am – 10:30am Working Group Session Format: Intro: 10 min Speaker: 20 min Discussion: 60 min	Semiconductor Working Group <i>Readout: SiPMs, Alternative Photodetectors, and ASICs</i>	Ralph James Giuseppe Camarda Niccolo Gallice (BNL) “Silicon PhotoMultipliers: state of art, applications, and future developments” Group Discussion	Building 488 Meeting Room B
9:00am – 10:30am Working Group Session Format: Intro: 10 min Speaker 1: 20 min Speaker 2: 20 min Discussion: 40 min (Group discussion might follow each presentation)	Organic Scintillators Working Group <i>Scintillator Design 3</i>	Natalia Zaitseva Patrick Feng Tyler Borgwardt (ORNL) “Enhancing Fast Neutron Spectroscopy: The Role of Deuterated Organics” Guang Yang (BNL) “Development of Water-based organic Liquid Scintillators at BNL”	Building 488 Meeting Room C
10:30am – 11:00am	Coffee Break		Building 488 Lobby
11:00am – 12:30pm 30-minute discussion per working group	Working Group Out-Briefs	Federico Moretti Weronika Wolszczak Ralph James Giuseppe Camarda Natalia Zaitseva Patrick Feng	Building 488 Auditorium
12:30pm – 1:00pm	Lunch		Building 488 Lobby and Cafeteria

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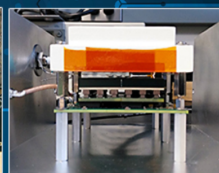


Presentations

Date/Time	Location	Presenter	Title
03/12 - 11:00am	Building 488 Auditorium	Federico Moretti, Weronika Wolszczak (LBNL)	<i>Perspectives on Inorganic Scintillators Research</i>
03/12 - 11:20am	Building 488 Auditorium	Ralph James (SRNL)	<i>Compound Semiconductor Radiation Detectors: Science Fiction, Horror Story, or Headlines?</i>
03/12 - 11:40am	Building 488 Auditorium	Natalia Zaitseva (LLNL)	<i>"Motivated Development of Organic Scintillators: From Lab to Product"</i>
03/12 - 1:00pm	Building 488 Auditorium	Paul Schotanus (Scionix)	<i>Scintillator research: Quo Vadis? The route between development of new scintillation materials and industrial applications</i>
03/12 - 1:30pm	Building 488 Auditorium	Chuck Hurlbut (Eljen)	<i>Organic Scintillators: Manufacturing & Innovation Issues</i>
03/12 - 2:00 pm	Building 488 Auditorium	Matthew Petryk (H3D)	<i>RTSD Commercial Development at H3D</i>
03/12 - 4:00pm	Building 488 Auditorium	Jeffrey Derby (UM)	<i>How modeling has provided understanding to overcome challenges in radiation detector materials crystal growth</i>
03/12 - 4:00pm	Building 488 Auditorium	Anton Tremsin (UCB)	<i>Optimization of crystal growth and material parameters through neutron imaging</i>
03/12 - 4:00pm	Building 488 Meeting Room B	Ling-Jian Meng (UIUC)	<i>Semiconductor Imaging Sensors for Nuclear Medicine: Clinical Needs, Technical Challenges, and Future Opportunities</i>
03/12 - 4:00pm	Building 488 Meeting Room B	Zhong He (UM)	<i>Room-Temperature 3D Pixelated Semiconductor Gamma-Ray Imaging Spectrometers, Current Status and Path Forward</i>
03/12 - 4:00pm	Building 488 Meeting Room A	Shaun Clarke (UM)	<i>Organic Scintillators for Nuclear Nonproliferation Applications</i>
03/12 - 4:00pm	Building 488 Meeting Room A	Paul Schotanus (Scionix)	<i>Organic scintillation materials for security applications: challenges for the future</i>
03/13 - 9:10am	Building 488 Auditorium	Markus Neuer (InnoRIID)	<i>Requirements of radiation detector materials for commercial acceptability in nuclear security products</i>
03/13 - 9:30am	Building 488 Auditorium	Jaroslav Glodo (RMD)	<i>TI-based scintillators</i>
03/13 - 9:10am	Building 488 Meeting Room B	Jim Christian (RMD)	<i>Large-volume TlBr Gamma-ray Detectors</i>
03/13 - 9:30am	Building 488 Meeting Room B	Aleksey Bolotnikov (BNL)	<i>Material Defects Limiting the Performance of CdZnTe, TlBr, and CsPbBr₃ Position-Sensitive Virtual Frisch-grid Detectors</i>
03/13 - 9:10am	Building 488 Meeting Room A	Guillaume Bertrand (CEA-Sarlay)	<i>Application driven chemical design of organic scintillators</i>
03/13 - 9:30am	Building 488 Meeting Room A	Alan Sellinger (CO School of Mines)	<i>Efficient PSD capable scintillators based on organic polymers, organic glasses, polysiloxanes, reactive dopants, and photocuring</i>
03/13 - 11:10am	Building 488 Auditorium	Nerine Cherepy (LLNL)	<i>Transparent ceramic scintillator</i>
03/13 - 11:30am	Building 488 Auditorium	Federico Moretti (LBNL)	<i>Scintillator materials science: trends and opportunities</i>
03/13 - 11:10am	Building 488 Meeting Room B	Paul Sellin (University of Surrey)	<i>Material Challenges for Perovskite Semiconductor and Scintillator Detectors</i>
03/13 - 11:10am	Building 488 Meeting Room A	Andrew Glenn (LLNL)	<i>LLNL developments of crystal, plastic, and liquid scintillators with pulse shape discrimination</i>
03/13 - 11:30am	Building 488 Meeting Room A	Patrick Feng (SNL)	<i>Molecular Design and Fabrication of Organic Glasses for Radiation Detection and Imaging</i>

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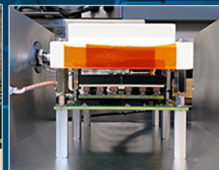
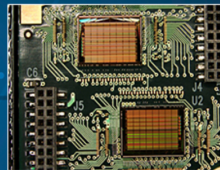
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03/13 - 1:40pm	Building 488 Auditorium	Weronika Wolszczak (LBNL)	The Future of Scintillation Materials Research and Engineering: Towards Deliberate Design
03/13 - 2:00pm	Building 488 Auditorium	Stephen Payne (LLNL)	<i>Fundamental Material and Optical Physics of Scintillators</i>
03/13 - 1:40pm	Building 488 Meeting Room B	Ki Hyun Kim (Korea University)	<i>Enhanced detector performance in selenium-added CdTe compounds</i>
03/13 - 2:00pm	Building 488 Meeting Room B	Amlan Datta (CapeSym)	<i>Material Insights and Industrial Perspectives for Thallium Bromide Radiation Detectors</i>
03/13 - 1:35pm	Building 488 Meeting Room A	Erik Brubaker (SNL)	<i>Organic scintillator needs for neutron localization and imaging</i>
03/13 - 2:05pm	Building 488 Meeting Room A	Thibault Laplace (UCB)	<i>Ionization quenching in organic scintillators for neutron detection</i>
03/13 - 2:25pm	Building 488 Meeting Room A	Paul Hausladen (ORNL)	<i>Perspectives on Organic Scintillators for Fast Neutron Imaging</i>
03/13 - 3:40pm	Building 488 Auditorium	Jindřich Houžvička (CRYTUR)	<i>Single crystal growth of oxide scintillators on an industrial scale</i>
03/13 - 4:00pm	Building 488 Auditorium	Borys Grynyov (ISMA)	<i>Scintillation Materials in Ukraine. Today and in the Future</i>
03/13 - 3:40pm	Building 488 Meeting Room B	Francesca Capodicasa (BNL)	<i>Navigating Challenges in Germanium Detector: Insights from BNL Developments</i>
03/13 - 3:35pm	Building 488 Meeting Room A	Nathaniel Bowden (LLNL)	<i>⁶Li-loaded organic scintillators for antineutrino detection applications</i>
03/13 - 4:05pm	Building 488 Meeting Room A	Sean O'Neal (LLNL)	<i>Metal loaded plastic scintillators</i>
03/13 - 4:25pm	Building 488 Meeting Room A	Juan Manfredi (AFIT)	<i>Additive Manufacturing for Plastic Scintillators</i>
03/14 - 9:00am	Building 488 Auditorium	Rastgo Hawrami (Fisk University)	<i>Issues in R&D to High Yield, Low-Cost Bulk Crystal Production</i>
03/14 - 9:10am	Building 488 Meeting Room B	Niccolo Gallice (BNL)	<i>Silicon PhotoMultipliers: state of art, applications, and future developments</i>
03/14 - 9:10am	Building 488 Meeting Room A	Tyler Borgwardt (ORNL)	<i>Enhancing Fast Neutron Spectroscopy: The Role of Deuterated Organics</i>
03/14 - 9:30am	Building 488 Meeting Room A	Guang Yang (BNL)	<i>Development of Water-based organic Liquid Scintillators at BNL” for Plastic Scintillators</i>

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Posters (displayed all three days)

Presenter	Title
Muller, Erik <emuller@bnl.gov>	Diamond Neutron Detectors: Charge and Scintillation
Lukosi, Eric Daniel <elukosi@utk.edu>	The Potential of Lithium-Containing Semiconductors in Neutron Scattering Facilities
Qibing Pei <qpei@seas.ucla.edu>	Nanocomposite Scintillators
Rumaiz, Abdul <rumaiz@bnl.gov>	Multi-Element Germanium Detectors with Integrated Readouts
Chung, Duck Young <dychung@anl.gov>	Recent Progress in R&D for CsPbBr ₃ Semiconductor for g-Ray Radiation Detector Applications
Camarda, Giuseppe <giusepppec@bnl.gov>	Characterization Techniques for Radiation Detection Materials and Devices: An Overview
Balaji Raghothamachar <balaji.raghothamachar@stonybrook.edu>	X-ray Topography Techniques for Characterization of SiC Single Crystals for Radiation Detection and Other Applications