

## 47<sup>th</sup> IPS Seminar Daily Agenda

Monday, 7/15/2024

8:00 a.m. **Introduction: Dr. Greg Knowlton - President, IPSUSA Seminars, Inc.**

8:10 a.m. **Welcome: Noah Lieb and Cathleen Freeman, Seminar Co-Chairs**

**Session A: Material Reactivity: Pyrotechnic Applications**

**Session Chair: Dr. Anthony Shaw**

8:20 a.m. **KEYNOTE ADDRESS: Mr. Mike Siirila, Chief Engineer, Estes Energetics**  
***Presents on the Rebuilding and Reshoring Production of Black Powder and Critical Chemicals***

9:20 a.m. *Black Powder Ignitibility Framework for Large Systems*  
Christopher Csernica, Adrian Blot, Ryan Hanc (USA)

9:40 a.m. *Investigation of Sparkler Compositions and Boron-based Pyrotechnic Formulations*  
Magdalena Rusan, (GERMANY)

10:00 a.m. *Demonstration of a Fully Green M213 Fuze System for M67 Hand Grenade*  
Daniel Perkins, Maciej Puszyński, Anthony Shaw, Jay Poret, Rajinder Gill, Neha Mehta (USA)

BREAK/POSTER SETUP 10:20 a.m. - 10:50 a.m.

**Session B: Material Processing: Additive Manufacturing & Coatings**

**Session Chair: Dr. Zac Doorenbos**

10:50 a.m. *3D Printing of some Gas Generating Composition using Vat Photopolymerization Method*  
Takahiro Okano, Kosuke Shirase, Shingo Date (JAPAN)

11:20 a.m. *3D Printing of Potassium Perchlorate-based Composition using Vat Photopolymerization Method*

Shingo Date, Takahiro Okano, Kosuke Shirase, Sakura Sakakibara (JAPAN)  
11:40 a.m. *Coating of HMX Particles by NTO to Formulate Nano-Core-Shell Particles by Spray Flash Evaporation (SFE)*  
Maxime BLANCHON, Anna OTT, Bastien LALLEMAND, Antoine OSMONT, Denis SPITZER (FRANCE)

LUNCH 12:00 p.m. - 1:20 p.m.

**Session C: Analytical Techniques: Material Characterization Methodologies**

**Session Chair: Chris Csernica**

1:20 p.m. *Apparatus and Method for High-Throughput Screening of Pyrotechnic Compositions*  
Nicholas E. Carlucci, Anthony P. Shaw, Mark D. Motyka, Jay C. Poret, Kelsey M. Westerkamp (USA)

- 1:40 p.m. *Laser Induced Breakdown Spectroscopy (LIBS) Efficacy in Hydrogen Quantification in Metal Hydrides*  
Stewart Youngblood, Doinita Neiner, Ronald Goeke, Russell Jarek, Danielle Hartstein, Michael Thomas, Daniel C. Bufford (USA)
- 2:00 p.m. *Pressure Resistant Designs to Withstand Hydrogen-Oxygen Deflagration to Detonation Transitions: Experimental Evaluation and Numerical Modeling Validation*  
Greg Dutro, Scott Davis, John Pagliaro, Mohsen Sanai (USA)

BREAK/POSTER SETUP 2:20 p.m. - 2:40 p.m.

**Session D: Material Reactivity: Formulations**  
**Session Chair: Maciej Puszynski**

- 2:40 p.m. *The Effects of Oxygen Content in Strontium Peroxide on Igniters*  
Jamie Lee, Christopher Csernica (USA)
- 3:00 p.m. *Janus-type Hypergolic Fuels for Hybrid Systems Using H<sub>2</sub>O<sub>2</sub> and HAN-based Oxidizers*  
Michael Gozin, Natan Petrutik, Ilia Kaminker, Eli Flaxer, Daniel Shem-Tov, Tsabar Giladi, Yossi Bar-Bechor, Jagadish Das (ISRAEL)
- 3:20 p.m. *Graphene Oxide's Role in Aluminum Combustion: A Study on Oxygen-to-Carbon Ratios*  
Sebastian Yongsan Quek, Wenbin Gong, Jun Jing Teh, Sreekumar Pisharath, Huey Hoon Hng, Kwan Wee Tan (SINGAPORE)

6:00 p.m. to 10:00 p.m. *Picnic Mixer in the Outdoor Special Events Pavilion*  
*Everyone is invited; including children, friends, etc.*

Tuesday, 7/16/2024

**Session E: Material Reactivity: Explosives**  
**Session Chairs: Alex Schweiger & Dr. Magdalena Rusan**

- 8:00 a.m. **INVITED SPEAKER – Troy Gardner, Testing & Classifications Manager, Safety Management Services, Inc.**  
*Summary of SMS's Test Results, Findings and Recommendations from the Five-year U.S. DOT PHMSA Thermite Research Project*
- 8:50 a.m. *TKX-50 in Thermobaric Formulations*  
Thomas M. Klapötke, Stanisław Cudziło, Waldemar A. Trzcíński, Józef Paszula (GERMANY)
- 9:10 a.m. *Blast and Explosion Research and Testing*  
 Mohsen Sanai, Sean Cooper, Waylon Weber, Joe Crepeau (USA)
- 9:30 a.m. *Deflagration to Detonation Transition Test on Mixed HMX - LLM105 Explosive using a High Containment Steel Tube*  
E. Testard, A. Beaucamp, A. Keromnes-Wuillaume, V. Mineau, A. Morancey, E. Pionneau (FRANCE)

BREAK/POSTERS 9:50 a.m. - 10:10 a.m.

**Session F: Analytical Techniques: Material Properties**

**Session Chair: Prof. Lori Groven**

- 10:10 a.m. *Investigation of Reaction Processes in Aluminized Blast Explosives*  
J. Keith Clutter, Mike Hobbs (USA)
- 10:30 a.m. *Simultaneous Measurements of Heat Flow and NO and NO<sub>2</sub> Gas Concentrations During Decomposition of Double Base Propellants*  
Jan Puszynski, Jacek Swiatkiewicz, Daniel Perkins, Neha Mehta (USA)
- 10:50 a.m. *Energetic Properties of Dianhydrohexitol Dinitrates*  
Rafał Lewczuk, Marcin Hara, Martyna Niedolistek, Józef Paszula, Mateusz Gratzke, Dominika Sobczuk, Weronika Rodzoś (POLAND)
- 11:10 a.m. *An Investigation into PETN Acidity using Heat Flow Calorimetry*  
A. F. Macdonald, J. Mansell, A. J. McMorrin (UK)

GROUP PHOTO & LUNCH 11:30 a.m. - 12:50 p.m.

**Session G: Material Processing: Synthesis**

**Session Chair: Alex Tappan**

- 12:50 p.m. **BERNIE DOUDA YOUNG SCIENTIST AWARD WINNER**  
**Ryosuke Omori**  
Presented by Dr. Magdalena Rusan, Vice President, IPS
- 1:00 p.m. *Combustion Characteristics of Energetic Ionic Liquids using an Electrolysis Ignition Combustor*  
Ryosuke Omori, Noboru Itouyama, Kento Shiota, Yu-ichiro Izato, Atsumi Miyake (JAPAN)
- 1:20 p.m. *Rapid Synthesis of Fuel: Oxidizer Composite Crystals for Energetic Applications*  
Tristan W. Kenny, Lori J. Groven (USA)
- 1:40 p.m. *An Optimized and Safe Synthesis of DBX-1*  
Dr. Braja Pradhan, Neha Mehta, Keyur Patel (USA)
- 2:00 p.m. *Synthesis and Characterization of the Energetic Plasticiser Bu-AENA*  
Stefan Ek, Jonas Johansson, Mona Brantlind, Marita Sjöblom (SWEDEN)
- 2:20: p.m. *Structural Reactives via Coupled Cold-spray and Friction Stir Processing*  
Shakole M. Rugh, Michael Carter, Grant Crawford, Lori J. Groven

BREAK/POSTERS 2:40 p.m. – 3:00 p.m.

**Session H: Material Processing: Mixing, Nitration & Nitrolysis**

**Session Chair: Dr. Stefan Ek**

- 3:00 p.m. *Flow Nitration of Cellulose Powders*  
Jos van den Elshout, Joost van Lingen, Denise Meuken, Mark Fuller, Lee Goetz, Richard Bouma (NETHERLANDS)
- 3:20 p.m. *New Mixing Technologies for Pyrotechnic Composition Manufacture*  
Mark Bradley (UK)

3:40 p.m. *The <sup>15</sup>N-Nitro Labeling of  $\alpha$ -Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX) by the Nitrolysis of Unenriched 1,5-diacetyloctahydro-3,7-dinitro-1,3,5,7-tetrazocine (DADN-ue) using a H<sup>15</sup>NO<sub>3</sub> and Polyphosphoric Acid (PPA) System*  
Hope T. Sartain, Sheana Schneidereit, Kevin J. Pedersen, Andrew J. Horan, Benjamin P. Wilkins (USA)

4:00 p.m. *Particle Deposition for Energetic Materials*  
Andrew Bok, Monique McClain (USA)

4:20 p.m. - 6:30 p.m. Poster Session in the Aztec room

Wednesday, 7/17/2024

**Session I: Material Sensity: Intrinsic & External Effects**

**Session Chair: Nicholas Carlucci**

8:10 a.m. **FRANK CARVER BURSARY AWARD WINNER**

**Declan Williams**

Presented by Dr. Magdalena Rusan, Vice President, IPS

8:20 a.m. *The Challenges of Moving from Batch to Flow for the Synthesis of HMX and 2,4,6-Trinitroethylbenzene (TNEB)*  
Declan H. Williams, Robert Claridge (UK)

8:40 a.m. *Effects of Micron-Sized Silicon Dioxide Particles on the Sensitivity of PETN*  
Rebekah L. Travis, Robert E. Ferguson, Claire E. O'Malley, Steven F. Son, Daniel R. Guildenbecher (USA)

9:00 a.m. *Small Scale Impact Sensitivity Testing of Energetic Materials under Temperature and Relative Humidity*  
Romuald Van Riet, Alexande Esposito, Christopher Hollands, Christelle Collet (BELGIUM)

BREAK/POSTERS 9:20 a.m. - 9:50 a.m.

**Session J: Material Environmental Effects**

**Session Chair: Dr. Joost van Lingen**

9:50 a.m. *A Thermodynamic Connection Between Electrochemical and Pyrotechnic Reactions*  
Anthony P Shaw

10:10 a.m. *Investigation of Nitrogen-rich Heterocycles as Environmentally Friendly Pyrotechnical Compounds*  
Alexander Schweiger, Thomas M. Klapötke (GERMANY)

10:30 a.m. *PFAS in Energetics*  
William S. Eck, Ph.D., Brian Hubbard (USA)

10:50 a.m. *Navigating Regulatory Complexity and Addressing Educational Gaps in the Energetics Field: Challenges and Opportunities*  
Lea Davis, Dr. Vilem Petr (USA)

11:10 a.m. *Energetic Composite Nanomaterials Based on Activated Carbon Filled with Oxidizing Agents*  
Romuald Van Riet (BELGIUM)

*Wednesday afternoon is free time.  
No lunch will be provided on this day.*

Thursday, 7/18/2024

**Session K: Analytical Techniques: Testing Methodologies**  
**Session Chair: Marcin Rosol**

8:30 a.m. *Development of a Pilot Plant for High Explosives Synthesis*  
Suzanne Hurrey, Nate Zuckerman, Alec Cielinski (USA)

8:50 a.m. *Manometric Bomb: from Design to Final Validation Testing*  
Sébastien BOUSSAC, Romain BOISSON, Sergio CAVALLI (FRANCE)

9:10 a.m. *Assessing Chemical Compatibility of Energetic Materials – Is following just standards adequate?*  
Manfred A. Bohn (GERMANY)

9:30 a.m. *The Henkin-McGill Critical Temperature Test Revisited*  
Jason J. Phillips (USA)

BREAK/POSTERS 9:50 a.m. - 10:20 a.m.

**Session L: Analytical Techniques: Modeling**  
**Session Chair: Scott Hall**

10:40 a.m. *Understanding the Effects of Ionizing Radiation on Explosives and Energetic Functional Groups*  
Patricia L. Huestis, Nicholas Lease, Brooke R. Baumgarten, Chris E. Freye, Lisa M. Klamborowski, Tammie Gibson, Virginia W. Manner (USA)

11:00 a.m. *Estimation of the Coefficient of Thermal Expansion of Energetic Composites with Application to the Estimation of the Bulk Modulus*  
Kevin Jaansalu, Léo Tinchon (BELGIUM)

11:20 a.m. *Improving the Accuracy of Calculated Formation Enthalpies for Energetic Salts*  
Erwan Ott, Julien Glorian, Didier Mathieu (FRANCE)

11:40 a.m. *Numerical Prediction of Erosion in a Rocket Motor*  
Flint Pierce, Joshua Smith, Jeremiah Dickey, Nigel Brassington (USA)

LUNCH 12:00 a.m. - 1:00 p.m.

**Session M: Analytical Techniques: Testing & Facility Capabilities**  
**Session Chair: Jamie Lee**

1:00 p.m. *Forensic Detection of Pyrotechnic Mixtures by using FTIR-ATR*  
Karol Zalewski, Mateusz Szala (POLAND)

1:20 p.m. *High-Pressure Shock-Tube Experiments to Study the Response of Building Façade Materials*  
Mohsen Sanai, Joe Crepeau, Waylon Weber, Sean P. Cooper (USA)

1:40 p.m. *New Fast-Dynamics Facility for Tests on Reactive Material*  
Raphael RODIER, Romain BOISSON, Sergio CAVALLI (FRANCE)

BREAK/POSTERS 2:00 p.m. - 2:20 p.m.

**Session N: Material Reactivity: Propellants & Pressure Generation**  
**Session Chair: Gretel Raibeck**

2:20 p.m. *Development and Study of an AP/HTPB based Composite Solid Propellant Base Bleed Grain for 155 mm Artillery Projectile*

Amir Mukhtar, Habib Nasir, Hizba Waheed (PAKISTAN)

2:40 p.m. *Sustainable Development of Gas Generant Formulations for Application in Automotive Airbags*

Steven Butler, Justin Park, Zayn Rhodes, Ivan Mendenhall (USA)

3:00 p.m. Dr. Magdalena Rusan, Announcement for the 48<sup>th</sup> IPS for 2025

3:40 p.m. Dr. Gregory Knowlton, Parting words from the President of IPSUSA

4:00 p.m. **International Pyrotechnics Society**  
**Business Meeting**

IPS members and non-members are encouraged to attend

5:30 p.m. to 9:30 p.m. ***El Pinto Restaurant***  
(Open to all IPS Attendees and their families/friends/associates)

**\* All posters MUST be removed by Thursday at 5:00 PM \***

## **POSTERS**

- 1) *120mm Tank Ammunition Tracer System Design Improvements*  
John Adams (USA)
- 2) *High Throughput Initiation Threshold Characterization of BNFF*  
Will Bassett (USA)
- 3) *An Investigation of Flammability in Low-GWP Refrigerants for Military Applications*  
Claire O'Malley, Rebecca D. Lu, Steven F. Son, Davide Ziviani (USA)
- 4) *Determining Hydrogen Content in Titanium Hydrides*  
Doinita Neiner, Ronald Goeke, Russel Jarek, Danielle Hartstein, Steward Youngblood, Michael Thomas, Daniel C. Bufford (USA)
- 5) *Application of NATO AOP-4147 for the Compatibility Testing of High Explosives*  
Charlotte Shailes (UK)
- 6) *Pyrotechnics Automation Summary*  
Marcin Rosol (USA)

- 7) *Mesoscale Packing Models of Multi-Formulation Ammonium Perchlorate Composite Propellant with Different Burning Rates*  
James J. Plotzke, Cameron W. McCoy, Nicholas R. Torgerson, Monique S. McClain (USA)
- 8) *Cure Characteristics of Novel Polymer-Bonded Explosive Molding Powder*  
Ismar Chew, Monique McClain, Ellen Ma (USA)
- 9) *Formulation and Characterization of Metal Filled Polymer Energetics*  
Trigg S. Peasley, Lori J. Groven (USA)
- 10) *Particle Distribution Measurement of Pyrotechnic Mixtures using High Resolution Scanning Electron Microscopy (SEM) and Energy Dispersive Spectroscopic (EDS) Imaging*  
Adam Pimentel, Robert Knepper (USA)
- 11) *Exploring Rheology and Combustion of MgB<sub>2</sub> Catalyzed Ammonium Perchlorate Composite Propellant*  
Jake Martinelli, Lori J. Groven (USA)
- 12) *Rheological Assessment Towards Conformable Pyrotechnic Delays*  
Alyssa Robinson, Lori J. Groven (USA)