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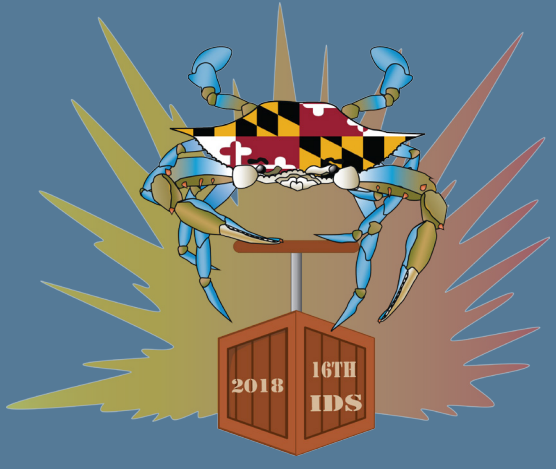
Preliminary Program

16th International Detonation Symposium

July 15-20, 2018

Hyatt Regency Chesapeake Bay

Cambridge, Maryland



Choptank Ballroom

(GS-I) Monday, July 16 8:00 APM - 9:40 AM

GENERAL SESSION I

1. **8:20 Predicting the Effects of Density and Microstructure on Shock Initiation of Explosives**
   W. Lee Perry, Los Alamos National Laboratory
   Topic: Molecular and Mesco-Scale Effects

2. **8:40 Ability of Metalized Gelled Nitromethane to Accelerate a Flyer Plate**
   Jason Loiseau, Royal Military College of Canada
   Topic: New / Non-Traditional Materials

3. **9:00 Ignition and Growth Modeling of the Shock Initiation of the TATB-based Explosives LX-17 and PBX 9502 at Eight Initial Temperatures Spanning a 446K Range**
   Craig M. Tarver, Lawrence Livermore National Laboratory
   Topic: Modeling

4. **9:20 The Shell Acceleration Experiment (SAX) – A Modern Corner-Turning Experiment**
   Eric V. Bukovsky, Los Alamos National Laboratory
   Topic: Advanced and Novel Experimental Techniques

9:40 BREAK

Choptank Ballroom

(GS-II) Monday, July 16 10:00 AM - 12:00 PM

GENERAL SESSION II

1. **10:00 Sensitivity and Performance Characterization of Insensitive Explosives**
   Richard J. Lee, Naval Surface Warfare Center, Indian Head EOD Technology Division
   Topic: Advanced and Novel Experimental Techniques

2. **10:20 HMX as Villain and Hero**
   Cary B. Skidmore, Los Alamos National Laboratory
   Topic: Detonation and Sub-Detonative Phenomena

3. **10:40 Microstructural Effects on Initiation Threshold Behavior of HMX Based Materials**
   Christopher D. Molek, Air Force Research Laboratory/Munitions Directorate/RWME
   Topic: Molecular and Mesco-Scale Effects

4. **11:00 Gap Test and Critical Diameter Calculations and Correlations**
   Ernest L. Baker, Munitions Safety Information Analysis Center
   Topic: Modeling

5. **11:20 Mesoscale Modeling of Explosives at Sandia National Laboratories: Past and Future Directions**
   Cole D. Yarrington, Sandia National Laboratory
   Topic: Molecular and Mesco-Scale Effects

6. **11:40 Can the Large-Scale-Gap-Test Mislead Us**
   Douglas E. Kooker, Bennett Aerospace, Incorporated
   Topic: Detonation and Sub-Detonative Phenomena

12:00 LUNCH

Choptank Ballroom

(A1) Monday, July 16 1:00 PM - 3:00 PM

ADVANCED AND NOVEL EXPERIMENTAL TECHNIQUES

1. **1:00 Proton Radiography as a High Explosive Diagnostic Tool**
   Matthew S. Freeman, Los Alamos National Laboratory

2. **1:20 Steel as a Copper Alternative in Large Scale Cylinder Expansion Tests**
   Forrest R. Svingala, Los Alamos National Laboratory

3. **1:40 Time Resolved Small Angle X-ray Scattering Measurements of Carbon Coagulation for Normal and Reflected Wave Detonations**
   Rachel C. Huber, Los Alamos National Laboratory

4. **2:00 Fast & Slow Cook-off Experiments of LX-17 Using Induction & Resistance Heating**
   Evan M. Kahl, Lawrence Livermore National Laboratory

5. **2:20 Compositional One-Dimensional Time to Explosion**
   Greg L. Klunder, Lawrence Livermore National Laboratory

6. **2:40 Extracting Accurate Shock Kinematics from SWIFT Experiments**
   Michael John Murphy, Los Alamos National Laboratory

3:00 BREAK

Chesapeake Ballrooms EFG

(A2) Monday, July 16 1:00 PM - 3:00 PM

DETONATION AND SUB-DETONATIVE PHENOMENA

1. **1:00 Thermal Explosions of LX-17**
   John M. Densmore, Lawrence Livermore National Laboratory

2. **1:20 Thermal Safety Characterization of Energetic Materials in the ODTX/P-ODTX System**
   Peter C. Hsu, Lawrence Livermore National Laboratory

3. **1:40 Isothermal and Shock Hugoniot EOSs of TATB: A Combined Experimental and Theoretical Study**
   Joseph M. Zaug, Lawrence Livermore National Laboratory

4. **2:00 Features of Superdetonation in Liquid Explosives**
   Dana M. Dattelbaum, Los Alamos National Laboratory

5. **2:20 Evolution of HMX Crystallinity During Thermal Decomposition**
   Pamela R. Bowlan, Los Alamos National Laboratory

6. **2:40 Optical Initiation of Energetic Materials**
   Maija M. Kukla, University of Maryland

3:00 BREAK

Choptank Ballroom

(A3) Monday, July 16 3:20 AM - 5:20 PM

ADVANCED AND NOVEL EXPERIMENTAL TECHNIQUES

1. 3:20 **Ignition and Growth Response via Cutback Testing**
   Erik T. Wrobel, US Army Armament Research, Development, and Engineering Center

2. 3:40 **Characterization of Hypervelocity Fragments and Subsequent HE Initiation**
   Daniel R. Guildenbecher, Sandia National Laboratories

3. 4:00 **Medium-format Shadowgraph and Schlieren Imaging of Explosions Using Pulsed Lasers**
   Kevin L. McNesby, US Army Research Laboratory

4. 4:20 **Optical Temperature Sensors for use in Explosions**
   Hergen Eilers, Washington State University

5. 4:40 **Diverging Spherical Run-Distance to Detonation Characterization**
   Thomas Elia, CEA, DAM

6. 5:00 **Low Impedance Window Characterization for Unreacted Equation of State Measurements in Explosives**
   Paul E. Specht, Sandia National Laboratories

Chesapeake Ballroom EFG

(A4) Monday, July 16 3:20 PM - 5:20 PM

DETONATION AND SUB-DETONATIVE PHENOMENA

1. 3:20 **Understanding Sub-detonative Burning and Variability in DDT Characteristics for Granular HMX in Polycarbonate Tubes**
   Gary R. Parker, Los Alamos National Laboratory

2. 3:40 **Initiation of Detonation in Very Non-Ideal Explosives.**
   Harold W. Sandusky, Naval Surface Warfare Center Indian Head EODTD

3. 4:00 **Manipulation of Corner-turning Behavior in High Explosives via Additive Manufacturing**
   Andrew M. Schmalzer, Los Alamos National Laboratory

4. 4:20 **High Pressure Deflagration of Heated LX-17, an Insensitive High Explosive**
   Jon L. Maienschein, MH Chew and Associates

5. 4:40 **A Volumetric Approach to Shock Initiation of PBX9404**
   Mike DW Bowden, AWE Plc

6. 5:00 **Observations of the Mechanism of EBW Detonator Function**
   Laura B. Smilowitz, Los Alamos National Laboratory

Chesapeake Ballroom BCD

(B1) Tuesday, July 17 8:00 AM - 9:40 AM

MODELING

1. **8:00 Corner Turning Modeling of PBX 9502 Snowball Experiments**
   Peter A. Vitello, Lawrence Livermore National Laboratory

2. **8:20 Temperature- and Pressure-Dependent Reaction Rates in Nitromethane and PETN from Density Functional Tight Binding Molecular Dynamics**
   Romain Perriot, Los Alamos National Laboratory

3. **8:40 Development of 3D Mesh-free Detonation Front Tracking Capabilities**
   Jin Yao, Lawrence Livermore National Laboratory

4. **9:00 A Numerical Methodology for Simulating Plasma Arc-initiated Detonations**
   Louisa Michael, University of Cambridge

5. **9:20 Validation of the AWSD Reactive Flow Model with PBX 9502 Experiments**
   Matthew A. Price, Los Alamos National Laboratory

9:40 BREAK

Chesapeake Ballroom EFG

(B2) Tuesday, July 17 8:00 AM - 9:40 AM

THERMAL AND MECHANICAL PROPERTIES

1. **8:00 Thermal Characteristics of LLM-105 and its Plastic Bonded Formulations**
   Alexander E. Gash, Lawrence Livermore National Laboratory

2. **8:20 Fracture Toughness Measurement of PBX 9502 High Explosive**
   Cheng Liu, Los Alamos National Laboratory

3. **8:40 Mesoscale Mechanics of Energetic Materials: A Coordinated Experiment-theory Effort Using New In Situ Probes**
   David J. Walters, Los Alamos National Laboratory

4. **9:00 Energy Lost to Fragmentation for Various Inert Warhead Casing Materials**
   Nicholas A. Poirier, University of Illinois Urbana-Champaign

5. **9:20 Development of a New Density and Mechanical Mock for HMX**
   John D. Yeager, Los Alamos National Laboratory

9:40 BREAK

Chesapeake Ballroom BCD

(B3) Tuesday, July 17 10:00 AM - 12:00 PM

MODELING

1. **10:00 Thermal Safety Modeling of TATB-based Explosive**
   Jason S. Moore, Lawrence Livermore National Laboratory

2. **10:20 Heated Cyclotol Transport and Ignition Modeling**
   David K. Zerkle, Los Alamos National Laboratory

3. **10:40 Computational Modeling of Detonations in Branching HE Structures for Plane Wave Generator Applications**
   Bradley W. White, Lawrence Livermore National Laboratory

4. **11:00 Numerical Optimization Procedure to Design Specific Effects Explosive Formulations**
   Nicolas Arnaud, ArianeGroup

5. **11:20 Modelling the Threshold Characteristics of Exploding Bridgewire Detonators**
   Rod C. Drake, Atomic Weapons Establishment

6. **11:40 Modeling of Detonation and Desensitization in Condensed Phase Explosives of Complex Geometry**
   Eleftherios Ioannou, University of Cambridge

12:00 LUNCH

Chesapeake Ballroom EFG

(B4) Tuesday, July 17 10:00 AM - 12:00 PM

THERMAL AND MECHANICAL PROPERTIES

1. **10:00 Safety Assessments of Thermally Damaged Energetic Materials**
   John G. Reynolds, Lawrence Livermore National Laboratory

2. **10:20 The Effect of Density on the Detonation Response of a TATB-Based Explosive**
   Philip Rae, Los Alamos National Laboratory

3. **10:40 Evolved Gas Analysis of the Thermal Decomposition of TATB and TATB Based Plastic Bonded Explosives from the Small to Large Scales**
   Benjamin J. Yancey, Lawrence Livermore National Laboratory

4. **11:00 Mechanical and Thermomechanical Properties of PBX 9502**
   Paul B. Mirkarimi, Lawrence Livermore National Laboratory

5. **11:20 Raman Thermometry of Shocked Explosives**
   Shawn D. McGrane, Los Alamos National Laboratory

6. **11:40 Development of a Small Scale Thermal Violence Test**
   Malcolm David Cook, AWE plc

12:00 LUNCH

Chesapeake Ballroom BCD

(B5) Tuesday, July 17 1:20 PM - 2:40 PM

MODELING

1. **1:20 A Mesoscale Study on Explosively Dispersed Granular Materials**
   Huangrui Mo, University of Waterloo

2. **1:40 ALE3D Simulation of Thermal Decomposition and Violence in Slow Cookoff Experiments with LX-17, a TATB-Based Explosive**
   Matthew A. McClelland, Lawrence Livermore National Laboratory

3. **2:00 A Phonon Boltzmann Study of Microscale Thermal Transport in α-RDX Cook-Off**
   Peter W. Chung, Department of Mechanical Engineering, University of Maryland

4. **2:20 Implementation of a CREST Multistate Reactive Burn Model in CTH for two Solid Explosives EDC37 and PBX9502**
   David E. Kittell, Sandia National Laboratories

2:40 BREAK

Chesapeake Ballroom EFG

(B6) Tuesday, July 17 1:20 PM - 2:40 PM

MOLECULAR AND MESCO-SCALE EFFECTS

1. **1:20 The Use of Detailed Kinetic Models in the Shock to Detonation Transition Field: Review and Validation Proposal**
   Vincent Chuzeville, Commissariat à l'Energie Atomique et aux Energies Alternatives

2. **1:40 Sub Critical Diameter Structural Effects Exploited by Additive Manufacturing of High Explosive Components**
   Alexander H. Mueller, Los Alamos National Laboratory / Explosive Science and Shock Physics/ High Explosive Science and Technology

3. **2:00 Time-resolved X-ray Imaging of Void Collapse in Silicone and TNT**
   Michael R. Armstrong, Lawrence Livermore National Laboratory

4. **2:20 The Influence of Realistic Pore Geometries in Pressed HMX**
   Jesus O. Mares, National Research Council - Air Force Research Laboratory

2:40 BREAK

Chesapeake Ballroom BCD

(B7) Tuesday, July 17 3:00 PM - 5:00 PM

DETONATION AND SUB-DETONATIVE PHENOMENA / MOLECULAR AND MESO-SCALE EFFECTS

1. 3:00 **Determination of Shock-to-Detonation Transitions and Equations of State of Additively Manufactured High Explosive Feedstocks**
   Patrick R. Bowden, Los Alamos National Laboratory

2. 3:20 **Ring-up Induced Shock Initiation of a TATB Based Polymer Bonded Explosive with Reactive Burn Modeling**
   Malcolm J. Burns, AWE Plc (seconded to LANL)

3. 3:40 **Viscous Heating via Low-Velocity Crushing Impact of High Explosives**
   Matthew D. Holmes, Los Alamos National Laboratory

4. 4:00 **A Global Chemical Mechanism of PETN, HMX and TATB: Applications to Detonation**
   Bryan F. Henson, Los Alamos National Laboratory

5. 4:20 **Scaling Law for Criticality Conditions in Heterogeneous Energetic Materials under Shock Loading**
   Anas Nassar, The University of Iowa

6. 4:40 **HP-HT Structural and Chemical Stability of TKX-50: Molecular Mechanisms**
   Zbigniew A. Dreger, Naval Surface Warfare Center IHEODTD

Chesapeake Ballroom EFG

(B8) Tuesday, July 17 3:00 PM - 5:00 PM

MOLECULAR AND MESO-SCALE EFFECTS / MODELING

1. 3:00 **Microscale Electromagnetic (RF) Heating in Heterogeneous Energetic Materials Based on X-ray Computed Tomography**
   David S. Moore, Los Alamos National Laboratory

2. 3:20 **Examining the Effects of Crystal Structure and Bonding on Explosive Impact Sensitivity**
   Virginia W. Manner, Los Alamos National Laboratory

3. 3:40 **Connecting Novel Microstructure Characterization Techniques for Pentaerythritol Tetranitrate (PETN) Pellet Aging to Performance**
   Peter A. Schulze, Los Alamos National Laboratory

4. 4:00 **Initiation Phenomenology from Hypervelocity to Low Velocity Impacts**
   Werner A. Arnold, MBDA-TDW

5. 4:20 **Aluminum Powder Heat and Combustion Modeling Inside The Detonation Products of High Explosives**
   Gérard Baudin, CEA, DAM

6. 4:40 **Simulation of the Spatial Distribution of Absorbed Energy Upon Laser Initiation of Powder Explosive Detonation**
   Andrei E. Mukhanov, Dukhov Research Institute of Automatics

Chesapeake Ballroom BCD

(C1) Wednesday, July 18 8:00 AM - 10:00 AM

NEW / NON-TRADITIONAL MATERIALS

1. **8:00 Comprehensive Approach to Design High Explosives**
   Roman Tsyshevskiy, University of Maryland College Park

2. **8:20 Development of Reactive Fragments**
   Jack RH Mellor, MBDA UK Ltd

3. **8:40 On-the-fly Mixing and Direct Printing of Reactive Materials**
   Kyle T. Sullivan, Lawrence Livermore National Laboratory

4. **9:00 Parameters of Detonation of Nano-dispersed Low-density High Explosives Based on PETN, RDX, and HMX**
   Konstantin A. Ten, Lavrentyev Institute of Hydrodynamic

5. **9:20 Impact Fragmentation of Reactive Materials**
   Joseph P. Hooper, Naval Postgraduate School

6. **9:40 A Large Scale Study of Blast Effects from a Structural Reactive Material Solid under Explosive Loading**
   Fan Zhang, Defence Research and Development Canada / University of Waterloo

10:00 BREAK

Chesapeake Ballroom EFG

(C2) Wednesday, July 18 8:00 AM - 10:00 AM

DETONATION AND SUB-DETONATIVE PHENOMENA

1. **8:00 Detonation Behavior in Vapor-deposited 3,4-bis(4-nitro-1,2,5-oxadiazol-3-yl)-1,2,5-oxadiazole 2-oxide (BNFF)**
   Alexander S. Tappan, Sandia National Laboratories

2. **8:20 The Loss of Detonation Confinement: The Evolution from a 1D to a 2D Detonation Reaction Zone**
   John B. Bdzil, Los Alamos National Laboratory

3. **8:40 Shock Initiation Sensitivities of Cast TNT-based Explosives: Cyclotol and Octol**
   Dana M. Dattelbaum, Los Alamos National Laboratory

4. **9:00 The Los Alamos Enhanced Corner Turning (ECOT) Test**
   Larry G. Hill, Los Alamos National Laboratory

5. **9:20 Temperature Measurement of a Shocked TATB-based Explosive using Raman Spectroscopy**
   Philippe A. Hébert, CEA

6. **9:40 Shock-induced Ultrafast Reactions in Pentaerythritol Tetranitrate (PETN) Thin Films**
   Samuel Park, Sandia National Laboratories

10:00 BREAK

Chesapeake Ballroom BCD

(C3) Wednesday, July 18 10:0 AM - 12:20 PM

NEW / NON-TRADITIONAL MATERIALS

1. 10:20 **Properties of Explosives Charges Based on TKX-50**
   Peter Gerber, Fraunhofer ICT

2. 10:40 **Detonation and Metal Acceleration of Aluminum-Water Mixtures**
   Jason Loiseau, Royal Military College of Canada

3. 11:00 **Blast Testing and Analysis of Cast-cured Explosives**
   Edward D. Cooke, US Army Armament Research, Development, and Engineering Center

4. 11:20 **Microwave Ignition of Thermites**
   Amanda L. Duque, Los Alamos National Laboratory

5. 11:40 **Mechanochemically-assisted Phase Transitions in Nitrogen**
   Jennifer A. Ciezak-Jenkins, Army Research Laboratory

6. 12:00 **Laser Initiation of Photothermally Active Metal-Ligand Charge Transfer (MLCT) Complexes for Detonator Applications**
   Kathryn E. Brown, Los Alamos National Laboratory

Chesapeake Ballroom EFG

(C4) Wednesday, July 18 10:00 AM - 12:20 PM

DETONATION AND SUB-DETONATIVE PHENOMENA

1. 10:20 **Diameter Effect Observations in Pressed HMX-Aluminum Explosive Formulations**
   Bryce C. Tappan, Los Alamos National Laboratory / High Explosive Science and Technology

2. 10:40 **Double-Shock Initiation of a TATB Based Explosive: Influence of Preshock Pressure and Duration on the Desensitization Effect**
   Arnaud Sollier, CEA

3. 11:00 **Detonation Thermochemistry: From Equation of State to Kinetic Modeling**
   Sorin Bastea, Lawrence Livermore National Laboratory

4. 11:20 **Exploring the Effect of Aluminum Placement on the Performance of TNT/Al Explosive Composites**
   Michael D. Grapes, Lawrence Livermore National Laboratory

5. 11:40 **Modeling of Condensed Phase Explosives with a Temperature Dependent Rate Law**
   Simon D. Wilkinson, University of Cambridge

6. 12:00 **Characterisation of Stress-Waves Formed by Exploding Bridgewires in Porous and Condensed Media Applied to the Shock-to-Detonation Theory**
   William D. Neal, AWE

Chesapeake Ballroom BCD

(D1) Thursday, July 19 8:00 AM - 9:40 AM

ADVANCED AND NOVEL EXPERIMENTAL TECHNIQUES

1. **8:00 CT Scan Characterization of Thermally Damaged Energetic Materials**
   William W. Erikson, Sandia National Laboratories

2. **8:20 A Vision for Future Energetic Materials Experiments at X-Ray Light Sources: Requirements for the Matter-Radiation Interactions in Extremes (MaRIE) Project**
   Cris W. Barnes, Los Alamos National Laboratory

3. **8:40 High Speed Temperature Measurement in Explosive Fireballs Using Tunable Diode Laser Absorption Spectroscopy**
   Christopher M. Murzyn, University of Illinois at Urbana-Champaign

4. **9:00 The Explosive Skeleton Key: Using Multiple Wave Interactions as an Initiation Tool**
   Elizabeth G. Francois, Los Alamos National Laboratory

5. **9:20 Quantitative Investigation of Fracture Process in Brittle/Quasi-Brittle Solids**
   Cheng Liu, Los Alamos National Laboratory

9:40 BREAK

Chesapeake Ballroom EFG

(D2) Thursday, July 19 8:00 AM - 9:40 AM

THERMAL AND MECHANICAL PROPERTIES

1. **8:00 Evaluating the Ignitibility of PETN and PETN Formulations by Aged Slappers**
   William L. Shaw, Lawrence Livermore National Laboratory

2. **8:20 Mutiphysics Modeling of Density Shift and Decomposition Response to Thermal Insult in Plastic Bonded Explosive Formulation PBX 9502**
   Genevieve L. Watt, Los Alamos National Laboratory

3. **8:40 USANS and SANS Studies of Artificially Aged PETN**
   Joseph T. Mang, Los Alamos National Laboratory

4. **9:00 In-Situ SANS and USANS Measurements of Thermally Elevated TATB and PBX 9502**
   Christopher L. Armstrong, Los Alamos National Laboratory

5. **9:20 Analysis of the Kinetics of Crystallization and Melting of Different Lots of TNT and Tritonal**
   Benjamin J. Yancey, Lawrence Livermore National Laboratory

9:40 BREAK

Chesapeake Ballroom BCD

(D3) Thursday, July 19 10:00 AM - 12:00 PM

ADVANCED AND NOVEL EXPERIMENTAL TECHNIQUES

1. **10:00 Dynamic Exploding Foil Initiator Imaging at the Advanced Photon Source**
   Nate J. Sanchez, Los Alamos National Laboratory

2. **10:20 Development of Low Explosive Mass Plane Wave Generators for Explosively Driven Flyer Experiments**
   Robert V. Reeves, Lawrence Livermore National Laboratory

3. **10:40 Simulation and Analysis of Smaller-Scale Explosive Experiments**
   Gerrit T. Sutherland, US Army Research Laboratory

4. **11:00 Shear Ignition Experiments of a Plastic Bonded Explosive under Long Duration Impact Conditions**
   Tao Li, Laboratory for Shock Wave and Detonation Physics, Institute of Fluid Physics, CAEP

5. **11:20 The High Explosive Survivability Test**
   Adam J. Wilkins, Air Force Research Laboratory - Munitions Directorate - Energetic Materials Branch

6. **11:40 Simultaneous Shock and Particle Velocities Measurement using a Single Microwave Interferometer on Pressed TATB Composition T2 submitted to Plate Impact**
   Alexandre S. Lefrançois, CEA, DAM

12:00 LUNCH

Chesapeake Ballroom EFG

(D4) Thursday, July 19 10:00 AM - 12:00 PM

DETONATION AND SUB-DETONATIVE PHENOMENA

1. **10:00 Effects of Confinement on Detonation Behavior of Vapor-deposited Hexanitrostilbene (HNS) Films**
   Robert Knepper, Sandia National Laboratories

2. **10:20 Quantitative Details of Exploding Wires with Application to Single Pore Collapse Validation**
   Joseph Olles, Sandia National Laboratories

3. **10:40 Effect of Microscale Defects on Shock and Detonation Propagation in Pentaerythritol Tetranitrate (PETN) Films**
   Eric C. Forrest, Sandia National Laboratories

4. **11:00 Laser-Driven Flyers for Shock Initiation in PBX materials: Observation of Hot Spots**
   Will P. Bassett, University of Illinois

5. **11:20 Progress in Understanding Chemical Reaction Rates and Equations of State in the Non-Equilibrium Zeldovich-von Neumann-Doring (NEZND) Model of Detonation**
   Craig M. Tarver, Lawrence Livermore National Laboratory

6. **11:40 Shock-induced Collapse of Multiple Cavities in Liquid Nitromethane**
   XiaoCheng Mi, McGill University

12:00 LUNCH

Chesapeake Ballroom BCD

(D5) Thursday, July 19 1:20 PM - 3:00 PM

MODELING

1. **1:20 Reactive Burn Model Parameterizations to Predict Ignition Response to Shaped Charge Jets**
   Robert J. Dorgan, Air Force Research Laboratory/Munitions Directorate

2. **1:40 On the Development of a Phenomenological, Macro-scale Composite Reactive Flow Model for Multicomponent Explosive Formulations**
   Sunhee Yoo, Torch Technologies

3. **2:00 Temperature Dependent Reactive Flow Model for a Porous Explosive**
   Yehuda Partom, Retired from RAFAEL

4. **2:20 Mesoscale Simulations of HMX and PETN**
   Thomas L. Jackson, University of Florida

5. **2:40 Shock-induced Chemical Reactivity in CO on Picosecond Time Scales**
   Michael R. Armstrong, Lawrence Livermore National Laboratory

3:00 BREAK

Chesapeake Ballroom EFG

(D6) Thursday, July 19 1:20 PM - 3:00 PM

MOLECULAR AND MESO-SCALE EFFECTS

1. **1:20 Influence of Chemistry in HMX-based PBX Initiation**
   Christopher M. Miller, Georgia Institute of Technology

2. **1:40 High-Pressure Characterization of a Melt Castable Biisoxazole Energetic**
   Jonathan C. Bennion, US Army Research Laboratory

3. **2:00 Nanosecond Evolution of the Visible Absorption Spectra of Shocked High Explosives**
   Kathryn E. Brown, Los Alamos National Laboratory

4. **2:20 Computational and Experimental Study of TATB Shock Initiation at the Grain Scale**
   Joseph M. Zaug, Lawrence Livermore National Laboratory

5. **2:40 Modeling the Effects of Microstructure and Chemical Kinetics on the Short Pulse Shock Initiation Behavior of HMX-Based Explosives**
   H. Keo Springer, Lawrence Livermore National Laboratory

3:00 BREAK

Chesapeake Ballroom BCD

(D7) Thursday, July 19 3:20 PM - 4:40 PM

MODELING

1. **3:20 Understanding the Role of Microstructure in Energetic Material Composites Using Coarse-Grain Modeling and Simulation**
   John K. Brennan, U.S. Army Research Laboratory

2. **3:40 Ignition and Growth Modelling of RS-RDX Based Explosive ARX-2014**
   Jing-Ping Lu, Defence Science & Technology Group

3. **4:00 Reactive Burn Modelling of Experiments to Study the Transverse Initiation Behaviour of the TATB-Based Explosive PBX 9502**
   Nicholas John Whitworth, AWE

4. **4:20 Reactive Flow Modeling of Small Scale Corner Turning Experiments**
   I-Feng W. Kuo, Lawrence Livermore National Laboratory

Chesapeake Ballroom EFG

(D8) Thursday, July 19 3:20 PM - 4:40 PM

MOLECULAR AND MESO-SCALE EFFECTS

1. **3:20 Multiscale Modeling of Frictional Hotspot Generation in Energetic Materials**
   Grant D. Smith, Wasatch Molecular

2. **3:40 Reaction Dynamics in RDX at GPa Pressures**
   Igor V. Schweigert, Naval Research Laboratory

3. **4:00 Effect of Void Morphological and Spatial Features on the Sensitivity of HMX**
   Sidhartha Roy, University of Iowa

4. **4:20 Carbon Chemistry and Formation of Hierarchical Nanocarbons Under Extreme Conditions Produced by High Explosive Detonations**
   Millicent A. Firestone, Los Alamos National Laboratory

Chesapeake Ballroom BCD

(E1) Friday, July 20 8:00 AM - 9:40 AM

MODELING

1. **8:00 Modeling Multi-Shock Scenarios with XHVRB**
   Leah W. Tuttle, Sandia National Laboratories

2. **8:20 LX-17 Failure Described with an Acceleration, Velocity, and Curvature Relationship**
   Jin Yao, Lawrence Livermore National Laboratory

3. **8:40 Numerical Modeling Comparing Slab to Cylinder Test Expansion Geometries for PBX 9501**
   Marvin A. Zocher, Los Alamos National Laboratory

4. **9:00 Validation of a PETN Equation of State using Optically Diagnosed Explosively Driven Flying Plates**
   Matthew P. Maisey, AWE Plc

5. **9:20 High Explosive Shock Initiation Model Based on Hot Spot Temperature**
   Laurence E. Fried, Lawrence Livermore National Laboratory

9:40 BREAK

Chesapeake Ballroom EFG

(E2) Friday, July 20 8:00 AM - 9:40 AM

DETONATION AND SUB-DETONATIVE PHENOMENA

1. **8:00 Effect of Pressure Pulse Duration and Lateral Distribution on Fragment Impact Initiation of High Explosives**
   Magnus Bergh, Swedish Defence Research Agency

2. **8:20 Explosive Desensitization in Multi-Dimensional Scenarios**
   Leah W. Tuttle, Sandia National Laboratories

3. **8:40 Effects of TATB Texture and Ratchet Growth on PBX 9502 Corner Turning**
   Darla G. Thompson, Los Alamos National Laboratory

4. **9:00 Detonation Corner Turning, Dead Zones and Detonation Extinction**
   Caroline A. Handley, AWE

5. **9:20 Microclad Parameter Study for the Initiation of PETN**
   Matthew M. Biss, Los Alamos National Laboratory

9:40 BREAK

Chesapeake Ballroom BCD

(E3) Friday, July 20 10:00 AM - 12:00 PM

MODELING

1. **10:00 A Selection Rule for Flyer Plate and a Generalized Measure of Shock Sensitivity**
   Yasuyuki Horie, University of Dayton Research Institute

2. **10:20 Energetic Parameterization with 2D Datasets**
   James D. Davis, Air Force Research Laboratory

3. **10:40 Toward a Morphology Aware Detonation Model**
   Albert L. Nichols, Lawrence Livermore National Laboratory

4. **11:00 Shock Initiation Response of PBX 9502 Considering Rarefaction Wave Effects**
   Brad E. Clements, Los Alamos National Laboratory

5. **11:20 Hydrodynamics of Pyrotechnic Explosions**
   Allen L. Kuhl, Lawrence Livermore National Laboratory

11:40 CONFERENCE WRAP UP
Joel Carney and Chad Stoltz, Naval Surface Warfare Center

Chesapeake Ballroom EFG

(E4) Friday, July 20 10:00 AM - 12:00 PM

DETONATION AND SUB-DETONATIVE PHENOMENA

1. **10:00 JCZS3--An Improved Database for EOS Calculations**
   Michael L. Hobbs, Sandia National Laboratories

2. **10:20 The Transverse Radial Initiation Dynamics of PBX 9502**
   Terry R. Salyer, Los Alamos National Laboratory

3. **10:40 Complete Mie-Grüneisen Equation of State for Several Explosives and Universal Unreacted Hugoniot Relations**
   Vincent Chuzeville, Commissariat à l'Energie Atomique et aux Energies Alternatives

4. **11:00 Deflagration To Detonation During Impact Type Accidents**
   Malcolm David Cook, AWE plc

5. **11:20 Optimum Non-Equilibrium Carbon Phase Relationships for Detonation Calculations**
   Leonard I. Stiel, L.I. STIEL, Chemical Engineer

11:40 CONFERENCE WRAP UP
Joel Carney and Chad Stoltz, Naval Surface Warfare Center

ADVANCED AND NOVEL EXPERIMENTAL TECHNIQUES

P-ANET-001

Fiber Light Relay System (FLRS) in Non-Ideal Granular Explosives for Shock Front Monitoring
Karmen N. Lappo, Sandia National Laboratories

P-ANET-002

Embedded Fiber Pressure Measurement Diagnostic for Thermal Ignition Experiments in High Explosives
George Rodriguez, Los Alamos National Laboratory

P-ANET-003

Isothermal Equations of State of Polymer Bonded Explosives via Optical-Microscopy-Interferometry (OMI) Measurements
Elissaios Stavrou, Lawrence Livermore National Laboratory

P-ANET-004

Relating Quantified Damage due to Periodic Loading with Shock Sensitivity in Energetic Materials
Nick R. Cummock, Purdue University

P-ANET-005

Measuring Detonation Propogation and Run to Detonation Using Embedded Optical Diagnostics
James W. Ferguson, AWE

P-ANET-006

Explosive Particle Image Velocimetry
Christopher F. Tilger, Los Alamos National Laboratory

P-ANET-007

Time-resolved Small Angle X-ray Scattering during the Formation of Detonation Nanodiamond
Michael Bagge-Hansen, Lawrence Livermore National Laboratory

P-ANET-008

Experimental Study of an Explosively Driven Flat Plate Launcher
Erik H. Haroz, Los Alamos National Laboratory

DETONATION AND SUB-DETONATIVE PHENOMENA

P-DSDP-001

Air Gaps in the Cylinder Test
Lisa M. Lauderbach, Lawrence Livermore National Laboratory

P-DSDP-002

Effect of Mechanoactivation on Detonation Ability of Mixtures of Ammonium Perchlorate with Aluminum
Aleksandr Yu Dolgoborodov, Joint Institute for High Temperatures of Russian Academy of Sciences (JIHT)

P-DSDP-003

Modeling Shock Sensitivity of Explosive PBXN-109
Douglas E. Kooker, Bennett Aerospace, Incorporated

P-DSDP-004

Cyclotol Detonation Performance as a Function of Scale and Geometry
Eric K. Anderson, Los Alamos National Laboratory

P-DSDP-005

Detonation of Highly Porous Explosives
Ivan A. Rubtsov, Lavrentyev Institute of Hydrodynamics SB RAS

P-DSDP-006

Carbon Condensation during Detonation of High Explosives of Various Diameters
Ivan A. Rubtsov, Lavrentyev Institute of Hydrodynamics SB RAS

P-DSDP-007

Multi-Shock Experiments on the TATB Based Explosive PBX 9502 and the HMX Based Explosive PBX 9501
Richard L. Gustavsen, Los Alamos National Laboratory

P-DSDP-008

Front Curvature Rate Stick Experiments of JB-9014 Over a Wide Temperature Range
Liuwei Guo, Institute of Fluid Physics, China Academy of Engineering Physics

P-DSDP-009

Convective Burning in Confined Explosive Cracks of HMX-based PBX under Non-shock Initiation
Haibo Hu, Laboratory for Shock Wave and Detonation Physics, Institute of Fluid Physics, CAEP

P-DSDP-010

The Required Margin for the Reliable Functioning of Exploding Foil Initiator Detonators
Elizabeth A. Lee, AWE Plc

P-DSDP-011

Condensation of Carbon During the Detonation of Condensed Explosives Using Two Methods of Analysis - The Method of Labeled Atoms and the Method of Electrical Conductivity - is considered
Alexey O. Kashkarov, Lavrentyev Institute of Hydrodynamics of SB RAS

P-DSDP-012

Chemical Reaction Zone of TATB based PBX
Yong Han, Institute of Chemical Materials, CAEP

P-DSDP-013

Reaction Build-up of TATB-based explosive JB-9014 under Different Initiation Pressures
Xu Zhang, Institute of Fluid Physics, China Academy of Engineering Physics

DETONATION AND SUB-DETONATIVE PHENOMENA - CONTINUED

P-DSDP-014

Heat of Detonation of Pure TATB Under Constant Pressure and Vacuum at Various Densities
Octavio Cervantes, Lawrence Livermore National Laboratory

P-DSDP-015

Experimental Study of the Detonation Properties of Tetranitromethane/ nitrobenzene Mixture
Valentina Mochalova, Institute of Problems of Chemical Physics RAS

P-DSDP-016

Ultrafast Mid-Infrared Spectroscopy on Shocked Thin Film Explosive Crystals
Michael S. Powell, Purdue University/Los Alamos National Laboratory

P-DSDP-017

Insensitive High Explosive Shock-to-Detonation Transition Criteria
Micha Gresshoff, Lawrence Livermore National Laboratory

P-DSDP-018

Conversion of Size-Effect Curves to Detonation Velocity Versus Curvature Relationships using Particle Swarm Optimisation
Alexander N. Hodgson, AWE Plc

P-DSDP-019

Experimental Determination of Chapman-Jouguet Pressure Using Disc Acceleration eXperiment (DAX) Data
Marcos Chaos, Lawrence Livermore National Laboratory

P-DSDP-020

Explosively Generated Plasma Interaction with Confined Explosives
Paul M. Giannuzzi, Naval Surface Warfare Center, Indian Head EOD Technology Division

P-DSDP-021

Dynamic Measurements of Solid Carbon Cluster Growth and Morphology in High Explosive Detonation Products
Erik B. Watkins, Los Alamos National Laboratory

P-DSDP-022

Computer Simulations to Study the Post-ignition Violence of HMX Explosives in the Steven Test
John E. Reaugh, Lawrence Livermore National Laboratory

P-DSDP-023

Arrhenius Reactive Burn Model Calibration for Hexanitrostilbene (HNS)
Graham D. Kosiba, Lawrence Livermore National Laboratory

P-DSDP-024

Design Considerations and Test Results for PBX 9502 in Large Scale, Overly Confined DDT Tubes
Ian D. Lopez-Pulliam, Los Alamos National Laboratory

P-DSDP-025

Pressure Amplification Off High Impedance Barriers in DDT
Eric M. Heatwole, Los Alamos National Laboratory

DETONATION AND SUB-DETONATIVE PHENOMENA - CONTINUED

P-DSDP-026

Investigation of Simple and New Experimental Method on Shock to Detonation Transition Process
Shiro Kubota, National Institute of Advanced Industrial Science and Technology

P-DSDP-027

Failure Cone Test in TATB-base High-explosive
Remy Sorin, CEA

P-DSDP-028

Parameterization of a Cookoff Model for LX-07
Cuauhtemoc Aviles-Ramos, Los Alamos National Laboratory

P-DSDP-029

Multiscale Modeling of Shock-to-Detonation Transition of Pressed Energetic Materials
Oishik Sen, University of Iowa

P-DSDP-030

Ceria as a Catalyst for Explosive Energy Release
David K. Amondson, University of Illinois Urbana Champaign

MOLECULAR AND MESO-SCALE EFFECTS

P-MME-002

Aging of RDX Crystal Qualities Investigated by Means of X-ray Diffraction Rocking Curves
Michael J. Herrmann, Fraunhofer ICT

P-MME-003

Developing Accurate Semi-Empirical Quantum Models for CNHO Chemistry at Detonation Conditions
Matthew P. Kroonblawd, Lawrence Livermore National Laboratory

P-MME-004

Adhesion Controlled by Crystal Surface Roughness and The Creep Properties of LX07 Explosive
Amir Weitz, RAFAEL

P-MME-005

A Chemometric Approach in Correlating Critical Physical Property Metrics to Explosives Performance
Josh M. Ottaway, Lawrence Livermore National Laboratory

P-MME-006

Microstructural Response of HE Crystals Subjected to Nonhydrostatic Loading in DAC Experiments
Zbigniew A. Dreger, Naval Surface Warfare Center IHEODTD

MODELING

P-MOD-001

Mesoscale Numerical Analysis of Thermal–mechanical–chemical Responses of Polymer-bonded Explosives under Impact Loading
Xinjie Wang, Beijing Institute of Technology

P-MOD-002

Machine Learning of Energetic Material Properties
Brian C. Barnes, US Army Research Laboratory

P-MOD-003

Cluster Evolution during the Early Stages of Heated and Shocked Explosives
Yushi Wen, China Institute of Chemical Materials, CAEP

P-MOD-004

Modeling the Response of a Plastic Bonded Explosive to Complex Shock Stimuli using the Extended History Variable Reactive Burn Model
John Starkenberg, Survice Engineering Company

P-MOD-005

Effects of Crystal Morphology on Impact Sensitivity of LLM-105 Based Explosives
Xinjie Wang, Beijing Institute of Technology

P-MOD-007

Modeling of Shock-induced α-γ (\alpha-\gamma) Phase Transformation in RDX Using a Level Set Approach
Suvranu De, Rensslaer Polytechnic Institute

MODELING - CONTINUED

P-MOD-008

Validation of the SURF Implementation in FLAG with the LANL Gapstick Experiment
Carl E. Johnson, Los Alamos National Laboratory

P-MOD-010

Uncertainty in the Sensitivity Prediction of Porous HMX: Effects of Constitutive and Reactive Models
Nirmal Rai, University of Iowa

P-MOD-011

PX-80 Shock Initiation Characteristics Based on Large Scale Gap Test (LSGT) Experimental Setup
Valentin Ognev, Rafael

NEW / NON-TRADITIONAL MATERIALS

P-NNTM-001

Structural Analyses of Detonation Nanodiamonds and Their Correlations with Impurities
Chi-Chin Wu, US Army Research Laboratory

P-NNTM-002

Nanostructured Composites of Explosives and Single-Walled Carbon Nanotubes
Alexey O. Kashkarov, Lavrentyev Institute of Hydrodynamics of SB RAS

P-NNTM-003

Glassy Organic Energetics
Rajen B. Patel, US Army Armament Research, Development, and Engineering Center

P-NNTM-004

Synthesis of Novel Energetic Materials
Leah A. Wingard, Army Research Laboratory

P-NNTM-005

Processing and Characterization of Nanoenergetics-based Comp B
Hongwei Qiu, Leidos

P-NNTM-006

Detonation Performance Characterization of Energetic Cocrystals
Vasant S. Vuppuluri, Purdue University

THERMAL AND MECHANICAL PROPERTIES

P-TMP-001

Wider Strain-rate Dependent Damage Constitutive Model for PBX Explosive and its Application in Penetrating Concrete Target Simulations
Yanqing Wu, Beijing Institute of Technology

P-TMP-002

Direct Observation of Thin Layers of Pure Energetic Materials when Heated to Elevated Temperatures Under Confinement
Andrew David Wood, Syanco Ltd

P-TMP-003

The Response of Energetic Materials in the First 50 Picoseconds Following Thermal Excitation
Nhan C. Dang, U.S. Army Research Laboratory

P-TMP-004

A Constitutive Model for Polymer Bonded Explosives under Confining Pressures
Qiang Wei, Institute of Systems Engineering, China Academy of Engineering

P-TMP-005

Viscoelastic-Viscoplastic Material Model for PBX
Roman Kositski, Rafael Ltd.

P-TMP-006

Magnitude of Response to Frictional Ignition by Oblique Impact of High Explosives Formulations
Robert M. Broilo, Los Alamos National Laboratory

THERMAL AND MECHANICAL PROPERTIES - CONTINUED

P-TMP-007

Determination of Spall Strength in Pressed Energetics
Jacob C. Dodson, Air Force Research Laboratory, Munitions Directorate, Fuzes Branch

P-TMP-008

PBX 9502 Gas Generation Throughout Long-Duration Thermal Exposure and Cookoff
Michael A. Englert-Erickson, Los Alamos National Laboratory