

Annual Directed Energy Science & Technology Symposium



**UPDATES TO AGENDA
DENOTED IN RED**

Technical Program

**25 – 29 April 2022
Mobile, Alabama**

General Information

Security

- Attendees will be issued conference specific badges on site and must have valid government ID available at all Symposium events.
- Wireless electronic devices are prohibited in classified sessions.
- No cameras or photography allowed.
- Audio and video recording is prohibited.
- Security concerns should be addressed to a DEPS Security Team member.
- Failure to adhere to security standards could result in denied/revoked Symposium registration and your information forwarded to authorities.

MONDAY

SHORT COURSES

All Courses at Renaissance Riverview Plaza Hotel

Morning Courses 0800-1200

- Introduction to HEL Systems
- Introduction to HPM Systems (*Distro C*)
- Windows & Coatings for HEL Systems
- Laser Weapon System Thermal Management (*Distro D*)
- Introduction to High Power Semiconductor Lasers for DE Applications

Afternoon Courses 1300-1700

- Atmospheric Laser Propagation (*Distro C*)
- HPM Directed Energy Weapons and Their Effects (*Distro C*)
- Introduction to Pulse Lasers: Interactions, Propagation, and Systems (*Distro C*)
- Artificial Intelligence for DE Systems
- Directed Energy Systems Engineering

Current students, early career professionals and DEPS mentors

Join Us for A

Roundtable Reception*

1730-1900

**Renaissance Mobile
Riverview Plaza Hotel**

**Appetizers and 1 drink ticket will be provided
(Must be 21 or older)**

**Please note, this event is limited to attendees
in the categories listed above only*

**AUDIO AND VIDEO RECORDING IS
PROHIBITED AT ALL DEPS SPONSORED EVENTS**

TUESDAY MORNING

Plenary Session (Open)

Convention Center, Grand Ballroom

- 0700 **Breakfast and Registration at Convention Ctr**
- 0800 **National Anthem and Opening Remarks**
Mr. Mark Neice, DEPS Executive Director
- 0810 *Dr. Jim Trebes, OUSD R&E, Director for Directed Energy (C/Export Con)*
- 0840 *Dr. Kip Kendrick, OUSD R&E, Interim Director, Joint DE Transition Office (C/Export Con)*
- 0910 *Dr. Brad Hoff, AFRL/RD, Senior Scientist, High Power Electromagnetics (C)*
- 0940 *Dr. Chris Lloyd, NSWG Dahlgren, SSTM for Navy Laser Weapon Systems Lethality (C)*
- 1010 **Break**
- 1040 *Mr. Corry Cox, RCCTO, Chief Engineer for Army DE Systems (A)*
- 1110 **How DE-IFC Technologies Provide Enhanced Competition in Gray Zone Missions and Below Armed Conflict (A)**
Mr. David Law, JIFCO, Sr Scientist for Non-Lethal Systems
- 1140 **Breakthrough Starshot Photon Engine (A)**
Mr. Wesley Green, Breakthrough Starshot, Chief Engineer for Photon Engines
- 1210 **Session Adjourns**
Lunch

TUESDAY AFTERNOON

Student Workshop (Open/Dist A)

Convention Center, Room 201C

Chair: *Mr. Mark Neice*

- 1300 **AFIT Directed Energy Summer Intern Program**
Jaclyn Schmidt, Air Force Inst of Technology
- 1320 **Time Domain Thermoreflectance and Advantages of Long Time Delay Configuration**
Taylor Gray, U.S. Naval Academy
- 1340 **The Effect of Metamaterials on Wave Propagation in Reverberation Chambers**
Allison Dockum, Naval Research Laboratory
- 1400 **Machine Learning Enabled Prediction of Optical Turbulence from No-Ref Imaging**
Skyler Schork, U.S. Naval Academy
- 1420 **Characterization of 3D Printed Objects Using Distributed Optical Fiber Sensors**
Alexander Krupinsky, U.S. Naval Academy
- 1440 **Spatial Variability of Optical Turbulence in the Coastal Region on an Aerial Platform**
Ryan Yamaguchi, Naval Postgraduate School
- 1500 **Break**
- 1520 **Competencies in Fiber Laser Fabrication: the Importance of Primary Skills**
Nicholas Vail, University of Central Florida
- 1540 **Measurements of Potassium Fine-Structure Quenching Cross-Sections, Methane Buffer Gas**
Quincy Zawadzky, U.S. Air Force Academy
- 1600 **Developing Predictive Tools for System Effectiveness: (DE M-SHORAD)**
Mitchell Miller, U.S. Military Academy
- 1620 **The Legality of High Energy Lasers in Modern War**
Ashley Clegg, U.S. Military Academy
- 1640 **Laguerre-Gaussian Laser Beams**
Hollis Fitzgerald, U.S. Military Academy
- 1700 **Eye Safety Considerations from Scattering of HEL Prop in Adverse Weather Conditions**
Charles Rinehart, U.S. Military Academy
Yerger Withdrawn
- 1720 **Session Adjourns**
- 1730 **Exhibitors Reception**

TUESDAY AFTERNOON

Beam Control: Optical Components

Convention Center, Room 201A

Chairs: *Dr. Mike Steinbock and Mr. Don Seeley*

- 1330 **Big Aperture Shack Hartmann Measurements (D/Export Con)**
Dr. Brett Hokr, Radiance Technologies
- 1400 **MRL Improvement for Large OAP Mirror Manufacturing for DE Applications (D)**
Felix Radesi, Optimax SI
- 1430 **Beam Jitter Mitigation via Optimized Lattice Optical Mounts (C/Export Con)**
James Davidson, Cornerstone Research Group, Inc.
- 1500 **Break**
- 1530 **High Strehl Ratio Coating Research at AFRL (C/Export Con)**
Colton Bigler, AFRL/RDSS
- 1600 **Particle Contamination of Optics for CW Laser Damage Testing: A Better Predictor of Random Failure for DE Optics (A)**
Joseph Talghader, University of Minnesota
- 1630 **High Speed Photonic Crystal Slab Spatial Light Modulators (A)**
Prof. Weidong Zhou, University of Texas at Arlington
- 1700 **Session Adjourns**
- 1730 **Exhibitors Reception**

Accepting abstracts for the
**UK/US Directed Energy
Workshop**

**18 – 22 July 2022
Swindon, UK**

www.deps.org

TUESDAY AFTERNOON

DE IFC 1 - General

Convention Center, Room 201D

Chair: *Mr. Dave Law*

- 1330 **Introduction to the Directed Energy Intermediate Force Capabilities Conference Sessions (A)**
Dave Law, JIFCO
- 1400 **The Future of RF-HPM Vehicle Stopping Technologies at the JIFCO (A)**
Adam Clark, JIFCO
- 1430 **The Future of RF-HPM Vessel Stopping Technologies at the JIFCO (A)**
Adam Clark, JIFCO
- 1500 **Break**
- 1515 **The Evolution of Reconfigurable Metamaterial-Enabled Antennas for High-Power Microwave Applications (A)**
Sawyer Duane Campbell, JIFCO
- 1545 **JIFCO's Pre-Emplaced Electrical Vehicle Stopper (PEVS) Pilot Program Results and the Future of Non-Contact Pre-Emplaced Vehicle Stopper (Near-Field HPM) Project at the JIFCO (A)**
Steve Parrish, JIFCO
- 1615 **The Future of Active Denial Technologies and Enabling Technologies (A)**
Dr. Simin Feng, JIFCO
- 1645 **The Future of Non-Lethal Laser Induced Plasma Effects Portfolio at the JIFCO (A)**
Brittany Lynn, JIFCO
- 1715 **Updates on Sound & Light Directed Energy - Intermediate Force Capabilities (A)**
Dave Law, JIFCO
- 1745 **Session Adjourns**
- 1730 **Exhibitors Reception**

TUESDAY AFTERNOON

HPM and Effects I

Convention Center, Room 202B

Chair: *Mr. Matt McQuage*

**Session starts later, Lancaster Withdrawn,
Schneider moved back 30 min**

- 1400 **Ultrawide Bandgap Photoconductive Semiconducting Switches (A)**
Joseph Schneider, Lawrence Livermore National Laboratory
- 1430 **Simulation and Study of a Compact Blumlein Pulse Forming Line (A)**
Tyler Murphy, Missouri Institute for Defense & Energy
- 1500 **Break**
- 1530 **Ogive-Conformal HPM-Capable Leaky-Wave Antenna for Radiating an On-Axis Circularly-Polarized High-Gain Beam (D/Export Con)**
Dr. Robert Koslover, SARA, Inc.
- 1600 **Spiral Generator Lifetime Improvements Using Liquid Dielectrics (A)**
Dr. Aaron King, Radiance Technologies
- 1630 **Ultrabroadband RF Generation by Femtosecond Filamentation (A)**
Dr. Travis Garrett, Air Force Research Laboratory
- 1700 **Session Adjourns**
- 1730 **Exhibitors Reception**

TUESDAY AFTERNOON

AI and Machine Learning

Convention Center, Room 203A

Chair: *Ms. Sandra Biedron*

- 1330 **Aided Image Metadata Data Synthesis (AIMS) for Target Tracker Development and Evaluation (D/Export Con)**
Dr. Robert Pawlak, Gryphon Technologies
Johnson Withdrawn
- 1355 **Training Supervised Machine Learning Models for Prediction and Optimization of UWB Antenna Arrays (A)**
Sai Sampreeth Indharapu, Missouri Institute for Defense & Energy, University of Missouri - KC
- 1420 **Machine Learning Method for the Control of Ultrafast Laser (A)**
Aasma Aslam, University of New Mexico
- 1445 **Extended Break**
- 1530 **A Beaconless Machine Learning Adaptive Optics Technique (D/Export Con)**
Dr. Jason Michael Hindes, U.S. Naval Research Laboratory
- 1555 **Simulating Laser Beam Propagation Through Underwater Optical Turbulence Generated by Rayleigh-Benard Convection (A)**
John McCarthy, United States Naval Academy
- 1620 **Measurements of Optical Turbulence and Analysis Using a Machine Learning Regression Model (A)**
Amanda Coleman, Naval Postgraduate School
- 1645 **A Multi-Channel Adaptive Neural Network for Real Time C_n^2 Estimation (A)**
Justin Reyes, University of Central Florida
- 1710 **Session Adjourns**
- 1730 **Exhibitors Reception**

TUESDAY AFTERNOON

Atmospheric Propagation I

Convention Center, Room 201B

Chair: *Dr. Steve Hammel*

- 1330 **Effects of Molecular Resonances on Propagation of Ultra-Short-Pulse-Lasers in the Infrared Region** (D/Export Con)
Remington Reid, US Air Force Research Laboratory
- 1355 **The Effect of Reciprocity-Breaking on Fine Track Tip/Tilt Systems** (D/Export Controlled)
Dr. Joshua Isaacs, US Naval Research Laboratory
- 1420 **Propagation of Laguerre-Gaussian Beams in Turbulence** (A)
Samantha Gregory, University of Alabama in Huntsville, Radiance Technologies
- 1445 **Scintillation Reduction by Incoherent Combining of Multiple Laser Beams Propagating through Atmospheric Turbulence** (A)
Luis Angel Medina, United States Naval Academy
- 1510 **Session Adjourns**
- 1530 **Join Us in the AI and Machine Learning Session in Room 203A for more presentations relevant to Atmospheric Propagation**
- 1730 **Exhibitors Reception**

TUESDAY AFTERNOON

Power and Thermal for Directed Energy I

Convention Center, Room 202A

Chair: *Mr. Joseph Dana Teague*

- 1330 **New Generation TMS for DE** (D/Export Con)
Igor Vaisman, Booz Allen Hamilton
- 1355 **Thermal Management Achievements and Challenges for Directed Energy Laser Systems** (D/Export Con)
Aleksandra Shepsis, Lockheed Martin
- 1420 **A Brief Survey of Energy Storage Devices for Directed Energy Systems** (D/Export Con)
Logan Caskey, Radiance Technologies
- 1445 **Power and Thermal S&T for Airborne DE** (D/Export Con)
Katie Sheets, Air Force
- 1510 **Break**
- 1530 **Direct Vapor Compression Cooling Enabling Components** (C/Export Con)
Dr. David Sykes, Mainstream Engineering Corporation
- 1555 **Exploiting Multifunctional Solid-Solid Thermal Energy Storage Materials to Enable Transient High Power Payloads** (D/Export Con)
Dr. Darin Sharar, U.S. Army Research Laboratory
- 1620 **ColdFire Solutions for Compact, Deep Magazine Power and Thermal Management** (D)
Timothy Unton, Rolls-Royce North American Technologies (LibertyWorks)
- 1645 **Experimental and Computational Study of a Multi-Microchannel Evaporator Under Transient Heating Conditions** (A)
Caleb Anderson, Colorado State University
- 1710 **Session Adjourns**
- 1730 **Exhibitors Reception**

WEDNESDAY MORNING

Applying Lessons Learned from Past High-Power HEL Systems to Current Generation Systems

Convention Center, Grand Ballroom

Chair: *Dr. Iain McKinnie*

0700 Breakfast and Registration at Convention Ctr

0800 Lessons Learned from the Development and Operations of the Airborne Laser (ABL) Beam Control & Fire Control (BCFC) System (D/Export Con)
Paul Shattuck, Lockheed Martin Space

0820 Lessons Learned from THEL/MTHEL (D)
John Wachs, Scientic, Inc.

0840 Advanced Tactical Laser (ATL) Lessons Learned (D/Export Con)
Dave DeYoung, Gryphon Technologies

0900 Navy LaWS Exposed - Lessons From the First Deployed Laser Weapon (D/Export Con)
Dr. Robert Pawlak, Gryphon Technologies

0920 Panel Discussion (Limited Distribution)
Paul Shattuck, Lockheed Martin Space
John Wachs, Scientic, Inc.
Dave DeYoung, Gryphon Technologies
Dr. Robert Pawlak, Gryphon Technologies
Bryan Kelchner, Teknikare, Inc.

1030 Panel Ends

1200 Lunch
Scholarship Awards and Fellows Recognition

WEDNESDAY MORNING

Assuring Survivable EMS Systems

Convention Center, Room 201C

Chair: *Mr. Ken Miller*

0700 Breakfast and Registration at Convention Ctr

0800 Session Introduction: Assuring Survivable EMS Systems
Mr. Ken Miller, Association of Old Crows

0810 Reflections on the Electromagnetic Spectrum Superiority Strategy (EMSSS) and Implementation Plan (A)
R. Scott Oliver, Booz Allen Hamilton

Clark Withdrawn

0900 Electromagnetic Defense and Domestic Electromagnetic Spectrum Operations (A)
Dr. John Huggins, National Security Collaboration Center at the University of Texas at San Antonio

0930 Break to clear room

0935 Photonic Time-Stretch as Applied to Carry Out Single-Shot RF and Microwave Measurements Generated by Ultrashort Laser Pulses (D/Export Con)
Nicholas Barbieri, U.S. Army Research Laboratory

1015 3D-Printed HPM Array (A)
Dr. Andrew Long, Southwest Research Institute

1045 Session Adjourns

1200 Lunch
Scholarship Awards and Fellows Recognition

Poster Session (Open/Dist A) 1030-1200

Convention Center, Exhibitor Area

3D Digital Holographic Imaging with Motion Compensation

Matthias Banet, University of Rochester

Progress on High Power Fiber Laser Development

Justin Cook, University of Central Florida

Antenna Design Considerations for a Nonlinear Transmission Line

Travis Crawford, Purdue University

Source Reconstruction Method for Distributed Ports in Cavities

Evelyn Dohme, University of New Mexico

Learning All About Lasers as a New Graduate Student

Ryan Ellis, Laser Plasma Laboratory

Increased Generation Efficiency of Broadband Microwave Fields From Laser-Induced Air Plasmas

Alexander Englesbe, Naval Research Laboratory

Time Domain Thermoreflectance and Advantages of the Long Time Delay Configuration

Taylor Gray, U.S. Naval Academy

Trending: Ultra-Narrow Pump Source is Key to High-Efficiency Power-Scalable Transverse-DPAL

Bill Hersman, University of New Hampshire and Xemed

Numerical Simulation: Amplified Spontaneous Emission Limits DPAL Efficiency

Bill Hersman, University of New Hampshire and Xemed

Characterization of 3D Printed Objects Using Distributed Optical Fiber Sensors

Alexander Krupinsky, United States Naval Academy

Scintillation Reduction by Incoherent Combining of Multiple Laser Beams Propagating

Luis Medina, U.S. Naval Academy

Simulation and Study of a Compact Blumlein Pulse Forming Line

Tyler Murphy, Missouri Institute for Defense & Energy

Source Size Analysis of X-Rays Driven by Laser Wakefield Acceleration

Isabella Pagano, University of Texas at Austin

Metamaterial and Photonic Crystals Constructed from 2D

Matthew Paliwoda, University of Illinois

Open Poster Session (continued)

Integrated Laser Triggering of Spark Gaps for Compact Pulsed Power

Jon Pouncey, Naval Surface Warfare Center-DD

Two Methods of Fabrication for Photonic Crystal Surface

Kevin Reilly, The University of New Mexico

Instrumentation Capabilities of TISTEF

Matthew Salfer-Hobbs, University of Central Florida

Machine Learning Enabled Prediction of Optical Turbulence from No-Reference Imaging

Skyler Schork, United States Naval Academy

Differential Disturbance Tracker

Melissa Siver, Laser Plasma Laboratory at UCF

Army Officer Gaining Valuable Experience in Fiber Laser Research at UCF

Jordan Smith, University of Central Florida

Stitching Ultrashort Laser Pulses to Enhance Filament Properties

LaShae Smith, University of Central Florida

AI Enhanced Controls for Particle Accelerators

Salvador Sosa Guitron, University of New Mexico

Using Laser Velocimetry to Characterize the Flight of High Speed Projectiles

Benjamin Stanish, United States Naval Academy

Drift-Step Recovery Diode Optimization

Thanh Tran, University of Missouri-Kansas City, MIDE

High Efficiency Plasma Diffraction Gratings Generated in Cluster Jets

Stefan Waczynski, University of Maryland

Spatial Variability of Optical Turbulence in the Coastal Region from In Situ Measurements

Ryan Yamaguchi, Naval Postgraduate School

High Speed Photonic Crystal Slab Spatial Light Modulators

Weidong Zhou, University of Texas at Arlington

PCSELSim: High Power Photonic Crystal Surface Emitting Laser Modeling and Simulation Tool

Weidong Zhou, University of Texas at Arlington

WEDNESDAY MORNING

CUI Poster Session 1030–1200

Convention Center, Room 201D

Research on Epitaxial Growth of DSRD and TSRD for Low-Cost Solid-State Opening Switches (D)

Caitlin Chapin, Lawrence Livermore National Laboratory

Secondary Radiation Studies (C)

Patrick Grugan, Naval Research Lab

New Solutions for Electromagnetic Shielding of Facilities, Equipment, and Platforms

Nathan Hansen, Conductive Group

DoD's High Performance Computers Boost HEL Propagation Analyses for Wave Optics (C)

John Lane, Radiance Technologies

Simulating Laser Beam Propagation Through Underwater Optical Turbulence Generated by Rayleigh-Benard Convection (D)

John McCarthy, United States Naval Academy

Directed Energy Scattering and Absorption in Propagation: Nomograph of Contributing Factors

Craig Siders, Lawrence Livermore National Laboratory

Sensor Analysis for Tracking of Dim Objects in Geosynchronous Orbit (C)

Michael Steinbock, AFRL/RDSS

Improved Single Switch Distributed Marx Pulse Generator for High Power Microwave System Applications (D)

Zac Shotts, Integrated Solutions for Systems (IS4S)

Application of Design of Experiments (DOE) Techniques to HEL Propagation Analyses (C)

Bill Thomas, Radiance Technologies

New Generation TMS for DE (D)

Igor Vaisman, Booz Allen Hamilton

WEDNESDAY MORNING

Power and Thermal for Directed Energy II

Convention Center, Room 202A

Chair: *Mr. Joseph Dana Teague*

1030 Immersion Cooling of Laser Diodes for High Brightness Applications (C)

Nicole Cassada, Colorado State University

1100 Pulse Power System Design for Mobile Directed Energy Applications (A)

John Stevens, United States Naval Academy

1130 SEPIC Capacitor Charging System (A)

Christopher Martino, United States Naval Academy

1200 Lunch

Scholarship Awards and Fellows Recognition

Join us for the
**Directed Energy
Systems Symposium**

14 - 18 November 2022
La Jolla, California

www.deps.org

WEDNESDAY MORNING

Atmospheric Propagation II

Convention Center, Room 201B

Chair: *Dr. Steve Fiorino*

- 1030 **Directed Energy Scattering and Absorption in Propagation: Nomograph of Contributing Factors (C)**
Dr. Craig W Siders, Lawrence Livermore National Laboratory
Kim presentation withdrawn
- 1200 **Lunch**
Scholarship Awards and Fellows Recognition

WEDNESDAY AFTERNOON

DE Student Workshop (Open/Dist A)

Convention Center, Room 201C

Chair: *Mr. Mark Neice*

- 1300 **Materials Mitigation of Optical Non-linearities for High Power Fiber Lasers**
Bailey Meehan, Clemson University
- 1320 **Fully Kinetic Simulations of Laser-Plasma Interactions with Flying Focus Laser Pulses**
Jacob Pierce, UCLA
- 1340 **Efficient Modeling of the Transverse Mode Instability Using the Phase-Matched Model**
Joshua Young, Baylor University
- 1400 **Ultra-Broadband Pulse Generation Through Molecular Impulsive Alignment**
Zhanna Rodnova, University of Connecticut
Waczynski moved to Thurs PM
- 1420 **Corrective Coatings for Multi-Wavelength Phase Variation in Adaptive Optics**
Zach Tebow, University of Minnesota
- 1440 **Extended Break**
- 1520 **Deformable Mirror Coating Design for High-Power Laser Annealing Stress Relief**
John Hunt, University of Minnesota
- 1540 **Two Methods of Fabrication for PCSEs by Molecular Beam Epitaxy**
Kevin Reilly, The University of New Mexico
- 1600 **Comparison of Filamentation in Near and Long Wave Infrared**
Owen Thome, University of Central Florida
- 1620 **Pulse Characterization from the Near to Long-Wavelength Infrared**
Brandin Davis, University of Connecticut
- 1640 **Using Laser Velocimetry to Characterize the Flight of High Speed Projectiles**
Benjamin M. Stanish, U.S. Naval Academy
- 1700 **3D Digital Holographic Imaging With Motion Compensation**
Matthias Banet, University of Rochester
- 1720 **Session Adjourns**

WEDNESDAY AFTERNOON

Beam Control: Aero-Optics and Sensors

Convention Center, Room 201A

Chairs: *Dr. Mike Steinbock and Mr. Don Seeley*

- 1330 **Numerical Studies of Transonic Flow Over a Hemispherical Turret (D/Export Con)**
Spencer Nyquist, AFRL Laser Modeling/ Simulation
- 1400 **Numerical Analysis of a Laser Pod Design (FLaPS) (D/Export Con)**
Chung-Jen Tam, AFRL/RDLEM
- 1430 **Variable Elevation Aero-Optical Effects Analysis for an Airborne Laser System (D/Export Con)**
Benjamin Shaffer, Air Force Research Lab
- 1500 **Break**
- 1530 **CCID99 - Low-Noise, Fast-Framing CCD (D/Export Con)**
Dr. Daniel Schuette, MIT Lincoln Laboratory
- 1600 **A High Frame Rate 2D-3D SWIR Active Imaging Sensor (D/Export Con)**
Richard Scritchfield, Leonardo DRS
- 1630 **Gated Fast Framing SWIR EBAPS Sensor for 2D Fine Tracking & Adaptive Optics (C/Export Con)**
Verle Aebi, Intevac Photonics, Inc.
- 1700 **Asynchronous Geiger-mode Avalanche Photodiode Fine Track Sensor Architecture for High Energy Laser Directed Energy Systems (C/Export Con)**
Channing Philbrick, Ball Aerospace & Technologies Corporation
- 1730 **Session Adjourns**

WEDNESDAY AFTERNOON

Thermal Blooming

Convention Center, Room 202A

Chair: *Dr. Joe Penano*

- 1330 **Pump/Probe Interferometer Measurements of Aerosol-Induced Thermal Blooming (C/Export Con)**
Dr. Richard Fischer, NRL
- 1355 **Aerosol Induced Thermal Blooming Measurements at the Solid State Laser Test (SSLT) Facility (C/Export Con)**
Dr. Jay Land, US Army-SMDC
- 1420 **Laboratory Quantification of Ambient Aerosol Effects on Laser Thermal Blooming (C/Export Con)**
Capt Benjamin Rinaldi, Air Force Institute of Technology (AFIT)
- 1455 **ADDED PRES Thermal Blooming Mitigation Via Atmospheric Absorption Analysis, Engineering Trades and Laser Line Localization for Spectrally Combined High Energy Lasers (C/export con)**
Adam Willitsford, JHU/AP
- 1510 **Break**
- 1530 **Overview of Model Validation Efforts for the Thermal Blooming Initiative (C/Export Con)**
Noah Van Zandt, Air Force Research Laboratory, Directed Energy Directorate
- 1555 **Impact of Beam Shape on Thermal Blooming (C/Export Con)**
Dr. Jeffrey Barchers, Nutronics, Inc.
- 1620 **Thermal Blooming Scaling Model for 1.06 μm Wavelength HEL (C/Export Con)**
Dr. Brian Strickland, USASMD/ARSTRAT
- 1645 **A Simulation Based Investigation of Adaptive Optics Compensation Using a Cooperative Beacon in the Presence of Thermal Blooming (D/Export Con)**
Joe Riley, MZA Associates Corporation
- 1710 **Tracking and Higher Order Thermal Blooming Compensation in Tactical Engagements (D/Export Con)**
George Lewandowski, MZA Associates
- 1735 **Session Adjourns**

WEDNESDAY AFTERNOON

DE IFC 2 - RF-HPM

Convention Center, Room 201D

Chairs: *Mr. Adam Clark and Mr. Steve Parrish*

- 1330 **HERO Analysis and Test Results at 95 GHz**
(C/Export Con)
Dr. Simin Feng, Joint Intermediate Force Capabilities Office
- 1400 **JIFCO High Peak-Power Radio-Frequency Assessment and Capability Development (HIPR ACTv) Project Updates & Testing Results** (C/Export Con)
Steven Parrish, JIFCO
- 1430 **Development of Functional Metamaterials Implemented into Ruggedized Reconfigurable Slotted Waveguide Antenna Arrays** (C/Export Con)
Dr. Galestan Mackertich-Sergerdy, Penn State University
- 1500 **Break**
- 1530 **Vessel Incapacitating Power Effect Radiation (VIPER) System Update, by Parsons**
(C/Export Con)
Jason Hochman and Mike Hoffman, Parsons
- 1600 **Focused Directed Energy Antenna System with Resonant Parallel Structure Frequency Notching** (D)
Sean Torrez, Physical Sciences Inc.
- 1630 **8 MW Light Weight, High Power, Vane and Strap Magnetron** (D/Export Con)
Mike Worthington, Stellant Systems
- 1700 **JIFCO Long Range IFC Payloads for Unmanned Systems** (C/Export Con)
Steven Parrish, JIFCO
- 1730 **Session Adjourns**

WEDNESDAY AFTERNOON

HPM Technologies and Effects II

Convention Center, Room 202B

Chair: *Dr. Robert Thomas*

- 1330 **Navy High Power Microwave (HPM) Counter Unmanned Aerial System (CUAS) Lethality Overview** (D/Export Con)
Maddy Cevallos and Matthew McQuage, NSWCDD
- 1400 **A Statistical Approach to Gain Optimization for Time-Reversal Pulse Compression Cavities** (D)
Dr. Bisrat Addissie and Victor Mendez, U.S. Naval Research Laboratory
- 1430 **HPM CUAS Data Collection Standard and Design of Experiment** (D/Export Con)
Yeong-Jer (Jack) Chen, NSWCDD
- 1500 **Break**
- 1530 **New Solutions for Electromagnetic Shielding of Facilities, Equipment, and Platforms** (C/Export Con)
Dr. Nathan Hansen, Conductive Group
- 1600 **Radiance STORM Laboratories: HPM Susceptibility Testing of Electronic Systems with Component-Based Profiles** (D/Export Con)
Zachary Roberts, Radiance Technologies
- 1630 **Effects of Changing Pulse Length on Plasma Parameters and RF Generation of a USPL Driven Plasma Filament** (D/Export Con)
Erin Thornton, University of North Texas
- 1700 **Session Adjourns**

Atmospheric Propagation: Field Instrumentation

Convention Center, Room 201B

Chair: *Dr. Conor Pogue*

- 1330 **Improving Multi-Camera based Turbulence Profiling Using Noise Rejection Techniques (A)**

Benjamin Wilson, AFIT

- 1400 **Break to Clear Room**

- 1405 **Interferometric Refractive Index Sensor Development at SMDC (C/Export Con)**
Jay Land, US Army-SMDC

- 1435 **NIR Transmission and Aerosol Measurement Test Results (C/Export Con)**
Jay Land, US Army-SMDC

- 1505 **Break**

- 1530 **Extinction and Optical Turbulence from NWP Enhanced with Nodal/Point Sonic Anemometer and Particle Count Measurements for Near-Realtime HEL Propagation Assessments (D)**
Dr. Steven Fiorino, AFIT/ENP

- 1600 **Seaside Propagation Analysis Range for Turbulent Atmospheres (SPARTA) (C)**
Kevin McBryde, NIWC Pacific

- 1630 **Characterizing Far-Field Laser Beam Profiles with the Remote Beam Profiling System (RBPS) in Open-Air Environments on the Potomac River Test Range (PRTR) (D/Export Con)**
Evan Bates, Naval Surface Warfare Center Dahlgren Division

- 1700 **Experiments in Long-Range Laser Beam Propagation with Spectral Analysis (D/Export Con)**
Aaron Schweinsberg, DEVCOM Army Research Laboratory

- 1730 **Session Adjourns**

USPL Developments and Filamentation

Convention Center, Room 203A

Chair: *Mr. Dan Matyas*

- 1330 **Spatio-Temporal Filament Engineering (C)**
Jessica Pena, Center for Directed Energy, University of Central Florida

- 1355 **Confinement and Guiding of Continuous Wave Laser Radiation Using Structured Ultrashort Pulse Laser Light (A)**
Dr. Anthony Valenzuela, DEVCOM ARL

- 1420 **Self-Guiding of 20J Multi-Terawatt 10 μ m Picosecond Pulses Over Long Distances in Air (A)**
Sergei Tochitsky, Department of Electrical Engineering, UCLA

- 1445 **Analysis of Nonlinear Focusing of an Ultrashort Laser Pulse in Turbulent Atmosphere (A)**
Dr. Joseph Penano, U.S. Naval Research Laboratory

- 1510 **Break**

- 1530 **NRL Ultrashort Pulse Laser Beam Control Studies Using Diogenes Mobile Laboratory (D/Export Con)**
Dr. Michael Helle, U.S. Naval Research Laboratory

- 1555 **Kinetic Simulations of Femtosecond Filamentation (C)**
Charles Armstrong, Air Force Research Laboratory High Power Electromagnetics Division

- 1620 **Long-Range Demonstration of USPL Burst Mode Propagation (C)**
LaShae Smith, Laser Plasma Laboratory at University of Central Florida

- 1645 **Multispectral GHz Radiation from Ultrafast Laser-Solid Interactions (C)**
Patrick Grugan, Naval Research Laboratory

- 1710 **Session Adjourns**

THURSDAY MORNING

Atmospheric Propagation: Modeling and Simulation I & II

Convention Center, Room 201B

Chairs: *Ms. Jaclyn Schmidt and Mr. Kevin McBryde*

- 0700 **Breakfast and Registration at Convention Ctr**
- 0800 **Data Assimilation Strategies for Numerical Modeling of Optical Turbulence (A)**
Udaysankar Nair, University of Alabama in Huntsville
- 0825 **Modeling Cn^2 Profiles Using a Single-Column Model (A)**
Dr. Qing Wang, Naval Postgraduate School
- 0850 **Simulations of Long Plasma Channel Generation in the Atmosphere Through Mid-IR Pulsed Bessel Beams (A)**
Paris Panagiotopoulos, James C Wyant College of Optical Sciences University of Arizona
- 0915 **Break to clear room**
- 0920 **Experimental and Numerical Studies of Convective Blooming at 1 & 2 μm (C)**
Justin Cook, University of Central Florida
- 0945 **SHaRE Enhancements with Numerical Weather Prediction and LEEDR (D/Export Con)**
Dr. Eric Magee, MZA Associates Corporation
- 1010 **Break**
- 1025 **Random Irradiance Profiles for Target-in-the-Loop Simulations (D/Export Con)**
Dr. Eric Magee, MZA Associates Corporation
- 1050 **Path Characterization System Ship-track EO Predictive Capabilities (D)**
Dr. Conor Pogue, Naval Information Warfare Center Pacific
- 1115 **Optical Turbulence Comparisons Between Operational Mesoscale Numerical Weather Prediction and Measurements Collected on the Potomac River Test Range (D/Ex Con)**
Matt Wilbanks, Naval Surface Warfare Center Dahlgren Division
- 1140 **Navy Numerical Weather Prediction Innovation for Emerging Directed Energy System Requirements (D/Export Con)**
James Campbell, Naval Research Laboratory
- 1200 **Lunch**
DEPS Annual Report

THURSDAY MORNING

Beam Control: Adaptive Optics

Convention Center, Room 201A

Chair: *Dr. Mike Steinbock*

- 0700 **Breakfast and Registration at Convention Ctr**
- 0800 **Digital Adaptive Optics for Turbulence Mitigation and Dazzle Immunity in ISR Systems (D/Export Con)**
Kyle Drexler, Naval Information Warfare Center Pacific
- 0830 **Field Demonstrations of Digital Holography-Based Beam Control and ISR Functions (D/Export Con)**
Dr. Lawton Lee, Lockheed Martin ATC
- 0900 **3D Digital Holographic Imaging With Motion Compensation: Simulations and Experiments (D/Export Con)**
Matthias Banet, University of Rochester, The Institute of Optics
- 0930 **Towards Obscuration-Free Phasing of a Coherent Tiled fiber Array Laser System with Giant Numbers of Fiber Tiles (D)**
Dr. Mikhail Vorontsov, University of Dayton
- 1000 **Break**
- 1030 **Update on US Navy's HELCAP Beam Control (D/Export Con)**
Matthew Ketner, Office of Naval Research
- 1100 **Perspectives on Practical AO: Design, Calibration, and Validation (C/Export Con)**
Dr. Michael Steinbock, AFRL
- 1200 **Lunch**
DEPS Annual Report

THURSDAY MORNING

Laser Source Developments I

Convention Center, Room 203A

Chair: *Mr. Dan Matyas*

- 0700 **Breakfast and Registration at Convention Ctr**
- 0800 **Low Cost Dichroic Spectrally Combined High Energy Laser (D/Export Con)**
Wade Porter, Radiance Technologies
- 0830 **Multicore Fiber Amplifier for DEW Energy Scaling (D/Export Con)**
Kyle Hong, MIT LL
- 0900 **Tm Fiber Lasers: From Low to High Power (C)**
Nicholas Vail, Laser Plasma Laboratory, Center for Directed Energy, University of Central Florida
- 0930 **Study on Optimizing an Anti-Resonant Hollow Core Fiber for Extremely Low-Loss Optical Power Transmission of Blue Light (D/Export Con)**
Joseph Wahlen, UCF/CREOL
- 1000 **Break**
- 1030 **The State of the Art in High-Power Laser Delivery via Nested Hollow Core Fibers (A)**
Joseph Wahlen, UCF/CREOL
- 1100 **Achieving Excellent Beam Quality via Gain Tailored kW class Ultra-Low NA LMA Fiber Laser (A)**
Joseph Wahlen, UCF/CREOL
- 1200 **Lunch**
DEPS Annual Report

THURSDAY MORNING

HPM Technologies & Effects III

Convention Center, Room 202B

Chair: *Mr. Jake Walker*

- 0700 **Breakfast and Registration at Convention Ctr**
- 0800 **Real-Time Waveform Estimation for Optimal Coupling to Electronics Using Time-Reversal Techniques (C/Export Con)**
Zach Drikas, U.S. Naval Research Laboratory
- 0830 **Characterization of HPM Effects Mechanisms in Receiver Components (C)**
Leonardo Rossetti, Naval Research Laboratory
- 0900 **Design and Effects of a Compact 250-kV Marx Spark Gap Self-Resonant Bicone (D/Export Con)**
Travis Fields, University of Missouri-Kansas City
Croman Withdrawn
- 0930 **Extended Break**
- 1030 **Radiofrequency Emission from High Repetition Rate Ultrashort Pulse Laser Ionization of Air (D)**
Jennifer Elle, AFRL
- 1100 **Conformal Slotted Waveguide Antenna Array for High Power Microwave Applications (D/Export Con)**
Douglas Wilson, NSWC Dahlgren
- 1200 **Lunch**
DEPS Annual Report

THURSDAY MORNING

Bioeffects

Convention Center, Room 201C

Chair: *Dr. Robert Thomas*

- 0700 **Breakfast and Registration at Convention Ctr**
- 0800 **Laser Dazzle: Advances in Education and Training Methods and Modeling Through Magnifying Optics (D)**
Wesley Kinerk, AFRL Bioeffects Division
- 0830 **Broadband Active Filtering of Light with Electrofluidics (D)**
Dr. Michael Ghebrebrhan, US Army AFC DEVCOM Soldier Center
- 0855 **Characterization of Thermal Damage Propagation and Ablation Due to High-Energy Near-Infrared Las Exposure (D/Export Con)**
Dr. Michael DeLisi, SAIC
- 0920 **Computational Modeling of Thermal Damage Propagation and Ablation Due to High-Energy Near-Infrared Laser Exposure (D)**
Chad Oian, AFRL Bioeffects Division
- 0945 **HEL Field Reflectance Measurements - Reflected Irradiance Measurement System (RIMS) (D)**
Dr. Semih Kumru, AFRL Bioeffects Division
- 1005 **Break**
- 1015 **Observed Reductions in the Viability of Coronavirus (BCov) Bioaerosols Under Repetitively Pulsed RF Exposure (C)**
Dr. Brad Hoff, Air Force Research Laboratory
- 1040 **Evaluating the Severity of Retinal Injury from Common Battlefield Lasers (C/Ex Con)**
Francesco Echeverria, Air Force Research Laboratory
- 1105 **Evaluating Corneal Alterations Using UV and NIR Lasers (C/Export Con))**
Francesco Echeverria, Air Force Research Laboratory
- 1130 **Estimations of Ablation Kinetics Using Rotary Mirror Strobe Photography at 1 Million Frames Per Second (A)**
Dr. Joel Bixler, Air Force Research Laboratory
- 1200 **Lunch**
DEPS Annual Report

THURSDAY MORNING

DE IFC 3

Convention Center, Room 201D

Chairs: *Mr. Adam Clark and Mr. Steve Parrish*

- 0700 **Breakfast and Registration at Convention Ctr**
- 0800 **High Power Density Systems for Directed Energy Weapons (DEW) (C/Export Con)**
Hernando Munevar, Candent Technologies, Inc.
- 0830 **Compact Prime Power Generator (CPPG) for DEW Systems (C/Export Con)**
Adam Clark, JIFCO
- 0900 **Second-Generation Advanced Ultra-High Voltage, Prototype, Nanodielectric, Capacitor Development, Fabrication, and Testing (C/Export Con)**
Dr. Randy Curry, Sandia National Laboratory
- 0930 **A Transportable High Peak and Average Power, High Efficiency, L and S -Band Gyrotron (C/Export Con)**
Jagadishwar Sirigiri, Bridge12 Technologies, Inc.
- 1000 **Break**
- 1030 **JIFCO's Laser Induced Plasma Effects Prototype Development Updates (C/Export Con)** *Brittany Lynn, Naval Information Warfare Center Pacific*
- 1100 **Broadband Counter Electronic Weapon (BCEW) for Vehicle & Vessel Stopping (D/Export Con)**
Adam Clark, JIFCO
- 1200 **Lunch**
DEPS Annual Report

THURSDAY MORNING

HEL Lethality & Effects I

Convention Center, Room 202A

Chairs: *Dr. Chris Lloyd and Mr. Dave Loomis*

- 0700 **Breakfast and Registration at Convention Ctr**
- 0800 **Flat Plate Calorimeter for Profiling and Diagnostics (D/Export Con)**
Rebecca McGilvery, NSWC Dahlgren Division
- 0825 **Advanced Metrics for High Energy Laser Target Boards (C)**
David Ward, SemQuest Inc
- 0850 **Curve Fitting Analysis of Laser Spot Images Collected at Remote Standoff (D/Export Con)**
Dr. Christopher Wolfe, DEVCOM Army Research Laboratory
- 0915 **Material Failure Analysis in Aluminum Test Articles after Exposure to HEL Beam (D/Export Con)**
Nick Videtich, NSWCDD
- 0940 **Break**
- 1010 **Analysis of Aimpoint Bias on Target Vulnerability Calculations (C/Export Con)**
Bryan Knott, NSWCDD
- 1040 **Characterization of Radio Frequency Radiation from Ultra-Short Pulse Laser-Solid Interactions for Different Material Properties and Drive Laser Wavelengths (D/Export Con)**
Oli Sale, Leidos
- 1105 **Spectral Broadening of Mid-Wave Infrared Ultrashort Pulsed Lasers in Cleartran and Zinc Selenide (D/Export Con)**
Dr. Laura Vanderhoef, DEVCOM Army Research Laboratory
- 1130 **Laser Lethality Against Armored and Unarmored Fiber Optic Cabling (D/Export Con)**
Nick Videtich, NSWCDD
- 1200 **Lunch**
DEPS Annual Report

THURSDAY AFTERNOON

DE Student Workshop (Open/Dist A)

Convention Center, Room 201C

Chair: *Mr. Mark Neice*

- 1300 **Antenna Design Considerations for a Nonlinear Transmission Line (A)**
Travis Crawford, Purdue University
- 1320 **Metal Oxide Varistor Response to Fast-Transient Electromagnetic Pulses (A)**
Cameron Harjes, AFRL/Univ of New Mexico
- 1340 **DC and Pulsed Evaluation of Altered Dielectric Insulation Materials (A)**
Shawn Scoggin, Univ of Texas at Arlington
- 1400 **Source Size Analysis of X-Rays Driven by Laser Wakefield Acceleration (A)**
Isabella Pagano, Univ of Texas at Austin/LLNL
- 1420 **Study and Analysis of Hollow Dielectric Loading for Gain Enhancement (A)**
Al-moatasem Al-hinaai, MIDE-UMKC
- 1440 **Data Acquisition System of an Electromagnetic Launcher (A)**
Brett Pickard, Univ Texas at Arlington
- 1500 **Break**
- 1520 **Shockwave Enhancement from Temporal Filament Engineering (A)**
Jessica Pena, Univ of Central Florida
- 1540 **VIRTUAL Back Lobe Analysis Technique for High Power Microwave Antennas (A)**
Derek Mantzke, Air Force Inst of Technology
- 1600 **VIRTUAL Simplified Analysis of a Scaling Law for Active Tracking (A)**
Derek Burrell, AFRL Directed Energy Directorate
- 1620 **VIRTUAL Efficient and Compact Broadband Integrated Phase Modulator Array (A)**
Michael Nickerson, University of California
- 1640 **VIRTUAL Multidisciplinary Study & Analysis of RF Antennas for UAV Integration (A)**
Meshal Alenezi, MIDE-UMKC
- 1700 **Waczynski pres from Wed**
VIRTUAL High Efficiency Plasma Diffraction Gratings Generated in Cluster Jets (A)
Stefan Waczynski, University of Maryland College Park
- 1720 **Session Adjourns**

THURSDAY AFTERNOON

Beam Control: Tracking

Convention Center, Room 201A

Chair: *Dr. Robert Pawlak*

- 1330 **Advanced Beam control Locating and Engagement (ABLE) - Enhanced Tracking System (ETS) Overview** (D/Export Con)
Cassandra Byrnes, Naval Surface Warfare Center Dahlgren Division
- 1400 **Tracking and Aimpoint Maintenance using 3D Digital Holography** (D/Export Con)
Dr. Yakov Diskin, MZA Associates Corporation
- 1430 **Uncertainty Quantification for Target Tracking Simulations Using ETEM** (D/Export Con)
Dr. Edwin Ahn, Air Force Research Laboratory
- 1500 **Break**
- 1530 **Edge-AI Tracking Applications for Counter-UAS HEL** (D/Export Con)
Dr. Blake Anderton, Radiance Technologies
- 1600 **Tracking Algorithm Comparison for Aimpoint Maintenance in Directed Energy Applications** (D)
Benjamin Shaffer, Air Force Research Lab
- 1630 **Layered Laser Defense: Image Processing Algorithms and Acquisition Tracking Software** (C/Export Con)
Alexis Drayton, Lockheed Martin Missiles and Fire Control
- 1700 **Session Adjourns**

THURSDAY AFTERNOON

DE IFC 4

Convention Center, Room 201D

Chairs: *Mr. Dave Law and Dr. Simin Feng*

- 1330 **Radio Frequency Vehicle Stopper (RFVS) Scorpion V2.0 Status and Potential Technological Upgrades** (D/Export Con)
Dr. Robert Barchfield, NSWC Dahlgren
- 1400 **Radio Frequency Vehicle Stopper (RFVS) Cyclops: Long Range Vehicle Stopping Development Plans** (D/Export Con)
Dr. Robert Barchfield, NSWC Dahlgren
- 1430 **Raytheon's Solid State Active Denial Technology Submodule Concept, Design, Development, and Fabrication** (D/Export Con)
Dr. Nicholas Koliass, Raytheon Technologies Missiles and Defense
- 1500 **JIFCO's Vessel Stopping Prototypes - VIPER System Evaluation** (C/Export Con)
Adam Clark, JIFCO
- 1530 **Session Adjourns**

THURSDAY AFTERNOON

Atmospheric Propagation: Path Profiling and Real-Time Prediction

Convention Center, Room 201B

Chair: *Dr. Steve Hammel*

- 1330 **Meteorological Profile Measurements in Support of HEL Weapons System Employment (C)**
Dr. Leda Sox, Georgia Tech Research Institute
- 1400 **Optical Turbulence Vertical Profile Comparisons Between Measured and Modeled Outputs on the Potomac River Test Range (PRTR) (D/Export Con)**
Jordan McCammon, Naval Surface Warfare Center Dahlgren Division
- 1430 **Single-Ended Atmospheric Characterization Instrumentation and Techniques for Shipboard Laser Weapon Systems (D/Export Con)**
William Filkoski, Naval Surface Warfare Center Dahlgren Division
- 1500 **Break**
- 1530 **Integrating Turbulence Modeling with the DEWS Operator Console for Real-Time Situational Awareness (D/Export Con)**
Dr. Yakov Diskin, MZA Associates Corporation
- 1600 **Towards the Integration of In-Situ Atmospheric Turbulence Sensing with Real-Time Predictive Atmospheric Propagation Modeling and Simulations (A)**
Dr. Mikhail Vorontsov, University of Dayton
- 1630 **Session Adjourns**

THURSDAY AFTERNOON

Laser Source Developments II

Convention Center, Room 203A

Chair: *Mr. Dan Matyas*

- 1330 **Trending: Ultra-Narrow Pump Source is Key to High-Efficiency Power-Scalable Transverse-DPAL (A)**
Bill Hersman, University of New Hampshire and Xemed
- 1400 **Numerical Simulation: Amplified Spontaneous Emission Limits DPAL Efficiency in Some Longitudinally-Pumped Geometries (A)**
Bill Hersman, University of New Hampshire and Xemed
- 1430 **PCSELSim: High Power Photonic Crystal Surface Emitting Laser Modeling and Simulation Tool (A)**
Weidong Zhou, University of Texas at Arlington
- 1500 **Break**
- 1530 **DEW Illuminator in the Eye-Safe 1550-nm Wavelength (C/Export Con)**
Dr. Charles Yu, Lawrence Livermore National Laboratory
- 1600 **Eyesafe Variable PRF Track Illuminator Laser (C/Export Con)**
David Mordaunt, Ball Aerospace
- 1630 **Pulsed 2µm Target Illuminator Laser (C/Export Con)**
Steven Rako, Arete
- 1700 **High Power Diffraction-Limited Tapered Diode Lasers (A)**
Dr. Jenna Campbell, Freedom Photonics
- 1730 **Session Adjourns**

THURSDAY AFTERNOON

HEL Lethality & Effects II

Convention Center, Room 202A

Chairs: *Dr. Chris Lloyd and Mr. Dave Loomis*

- 1330 **HELCAP Preliminary Control Fin Testing**
(D/Export Con)
Bayasgalan Bayandalai, Naval Surface Warfare Center Dahlgren Division
- 1355 **Mechanistic Model for HEL Lethality of Carbon Fiber Reinforced Polymer Composites** (D/Export Con)
Nickolaus Weise, Naval Research Laboratory
Helle Withdrawn
- 1420 **Obtaining General HEL Lethality Equations through Finite Element Modeling**
(D/Export Con)
Matthew Searight, USN NPS
- 1445 **Extended Break**
- 1530 **Data Analytics via Machine Learning for HEL Lethality (D)**
Matthew Winger, Naval Surface Warfare Center, Corona
- 1555 **Enhanced HEL Ablation with Temporally Structured Pulses (C)**
Haley Kerrigan, Laser Plasma Laboratory, Center for Directed Energy (CDE), University of Central Florida
- 1620 **High Energy Pulsed Laser Systems for Enhanced Ablation Applications (A)**
Dr. Daniel Thul, Spectral Energies, LLC
- 1645 **Session Adjourns**

FRIDAY MORNING

Closing Plenary / Outbrief Session

Convention Center, Room 201A

- 0700 **Breakfast and Registration at Convention Ctr**
- 0800 **Summaries of Each Session and Closing Remarks**
- 1100 **Session Adjourns**

Symposium Chair

Jeff Maloney

Program Committee

**Artificial Intelligence and
Machine Learning**
Sandra Biedron

HEL Lethality and Effects
Chris Lloyd
Dave Loomis

Atmospheric Propagation
Steve Hammel

HPM Technologies
Brad Hoff
John Luginsland

**Beam Control Systems and
Technologies**
Don Seeley
Michael Steinbock

LASER Sources
Dan Matyas

Bio-Effects
Robert Thomas

**Prior Program Lessons
Learned**
Iain McKinnie

**DE Intermediate Force
Capabilities**
Dave Law

Power and Thermal for DE
Dana Teague

EW/EMS
Ken Miller

Student Workshop
Mark Neice

Thermal Blooming
Joseph Peñano

Symposium Coordinator
Cynnamon Spain

Registration Coordinator
Dawn Guterrez

Security Officer
Kat Gonzales

Technical Program Coordinator and Short Courses
Cristina Crowson

Presentations and Releases
Carolyn Bowman

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