

15th Ablation Workshop

Nov 18–20, 2025

New Mexico State University

<https://ablation.engr.uky.edu/>

Hosted and Organized by:



AGENDA

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Monday

Nov 17, 2025

18:00 Welcome Cocktail Mixer and Registration

Tuesday

Nov 18, 2025

08:00 Registration and Breakfast

08:40 Welcome Remarks - Assc. Dean of Research Dr. Misra

Technical Session #1: Overviews and Applications Chair: Prof. Torres-Herrador

08:50 Ablators modeling: Past, Present and Future
Nagi N. Mansour (*University of Illinois Urbana-Champaign*)

09:20 Aerospace Activities at the New Mexico State University (NMSU)
Jay I. Frankel (*New Mexico State University*)

09:40 Exomars Rosalin Franklin Mission: Heatshield Development and Testing Activities
Gregory Pinaud (*ArianneGroup*)

10:00 Overview of the Kentucky Reentry Universal Payload System (KRUPS) project
Savio J. Poovathingal (*University of Kentucky*)

10:20 Coffee Break

Technical Session #2: Numerical I Chair: Dr. Peluchon

10:40 Σ MIT: A large-scale simulation framework for the analysis of complex (aero)-thermo-chemo-mechanics and failure of Thermal Protection Systems
Raul Radovitzky (*Massachusetts Institute of Technology*)

11:00 Subsonic Boundary Condition for ICP Wind Tunnel Simulations
Thomas J. Gross (*University of Minnesota*)

11:20 Physics-based radiative model in TPS materials
Ahmed H. Yassin (*University of Kentucky*)

12:00 Lunch

Technical Session #3: Gas-Surface Interactions Chair: Prof. Lachaud

13:00 The role of oxygen (absence) on the spallation of charring ablators
Francesco Panerai (*University of Illinois at Urbana-Champaign*)

13:20 Study of the passive to active transition of SiC in the atmospheric pressure UT Austin ICP torch via PLIF measurements of Si and SiO

Greyson Kale (*The University of Texas at Austin*)

14:00 Coffee Break

Technical Session #4: AI and stochastic modelling *Chair: Prof. Panerai*

14:20 AI-experiment-theory intergrated analysis of the role of molecular structure in determining char yield of ablative polymers

Jaeyoung Cho (*The University of Texas at El Paso*)

14:40 Nano-scale characterization of thermal protection system materials using destructive techniques and deep learning models

Luis A. Chacon (*University of Kentucky*)

15:00 Model Error Effects on Hypersonic Ground-to-Flight Extrapolation

Anabel del Val (*University of Minnesota*)

Visit to Spaceport America

15:30 Departure from NMSU

16:30 Visit Spaceport America

19:00 Return to Las Cruces

 Wednesday

Nov 19, 2025

 08:00 Breakfast

Technical Session #5: Numerical II *Chair: Dr. Blades*
08:40 Modeling Swelling and Shrinkage with PATO's Pyromechanics Framework: Where We Stand and What's Next
Jean Lachaud (*University of Bordeaux*)
09:00 Conservative numerical modeling of an ablative charring heat shield under deformations
Alexis Cas (*CEA-CESTA*)
09:20 A Non-Equilibrium Boundary Layer Framework for Ablation Modeling
Domenico Lanza (*University of Illinois at Urbana-Champaign*)
09:40 Surface pattern formation due to differential ablation
Blaine Vollmer (*University of Illinois Urbana-Champaign*)
10:00 Oxidation transitions and interface bubbling in silicon carbide spacecraft TPS — An in-depth multiphysics modeling approach
Théo Rulko (*Massachusetts Institute of Technology*)
10:20 Coffee Break
Technical Session #6: Hypersonic flow *Chair: Prof. Martin*
10:40 Summary of Oxford Experiments on Heat and Shear Stress Augmentation due to Roughness and Blowing with Hypersonic Boundary Layer Edge Conditions
Matthew McGilvray (*University of Oxford*)
11:00 Modeling and measurement of carbon-carbon ablation in the Sandia Hypersonic Shock Tunnel at various enthalpies and surface temperatures
John S. Murray (*Sandia National Laboratories*)
11:20 CARS temperature and species measurements in Illinois Plasmatron X
Sean P. Kearney (*University of Illinois Urbana-Champaign,*)
11:40 Development of an Arc-Jet Preheating System within an Expansion Tube Facility for Hypervelocity Flow Testing of Ablating Test Models
Eric Won Keun Chang (*University of Oxford*)
12:00 Lunch
Technical Session #7: Thermochemistry *Chair: Prof. Del Val*
13:00 Pre-tabulated finite-rate ablation via Damkohler thermochemistry tables
Jeffrey D. Engerer (*Sandia National Laboratories*)

13:20 Attempted Characterization of Arrhenius Parameters and Implementation to the Material Response SolverH Berk Gur (*University of Kentucky*)**13:40 Characterization of PICA-NuSil Catalytic Recombination Efficiency in Air**Kenneth McAfee (*University of Maryland*)**14:00 A Multi-Component Carbon Ablation Model from Molecular Beam Data**John-Paul R. Heinzen (*University of Minnesota*)**14:20 Coffee Break****Technical Session #8: Experiments** *Chair: Prof. Poovathingal***14:40 Anisotropy and hysteresis of PICA under compression**Claire Kent (*University of Colorado Boulder*)**15:00 Building Sustainable Data Infrastructure for NASA Thermal Protection Research: The BEAST Initiative**Alexandre M. Quintart (*Flying Squirrel*)**15:20 Building an Experimental and Computational Framework for Ablative Thermal Protection Systems**Francisco Torres-Herrador (*New Mexico State University*)**15:45 Poster Session****18:30 Gala Dinner: Farm & Ranch Museum**

Thursday

Nov 20, 2025

08:30 Breakfast

ITAR Session at PSL *Chair: Prof. Martin*

**09:10 Validation of Multiphysics Ablation Modeling Simulation Capability:
Comparison to Arc Jet Data for High-Temperature Materials Subject to
Combined Environments**
Eric L. Blades (*ATA Engineering, Inc.*)

09:30 Acusil IV Model Development
Chuck Bersbach (*Raytheon Missiles and Defense - an RTX Company*)

09:50 C/SiC Oxidation Limit
Chuck Bersbach (*Raytheon Missiles and Defense - an RTX Company*)

**10:10 Mapping ablative atmospheric entry onto the conditions of ground-test
facilities**
Jeffrey D. Engerer (*Sandia National Laboratories*)

10:30 Coffee Break

11:00 Air-Carbon Ablation in Wave Rotor Environments
Michael Nucci (*ATA Engineering*)

11:20 Historical Particle Ablation Experiments Applied to Modern Environments
Kyle Gorkowski (*Los Alamos National Laboratory*)

11:40 Thermal Conductivity Measurements in FRCI
James D. Senig (*University of Kentucky*)

Posters

- **Towards Realistic Surface Ablation Modeling of 3D Orthogonal Architectures**
Efrain Hernandez-Rivera, Xiongjun Wu, Jennifer Sietins, Andrew Gaynor
- **Investigating optical transmissivity of windows coated by laser-ablated PICA**
Keaghan Knight, Tina Tong, Zachary Wasson, Ambrose Seo
- **Modeling Thermal Protection System (TPS) Ablation with the Unified Flow-Material Solver under High-Enthalpy Conditions**
Bruno Dias, Brandon van Gogh, Nagi N. Mansour
- **Bayesian Learning of Air Carbon Ablation Model Parameters**
Graham Larson, Anabel Del Val
- **Surface Analysis of High-Temperature Graphite under N₂/Ar Plasma**
Kubra Asena Gelisli, Matthew Konnik, Nicholas Anderson, Francisco Torres-Herrador, Francesco Panerai
- **Design and Characterization of a Spinning Disk Flow Reactor for Graphite Oxidation Kinetics**
Madhura N. Sabhahit, Nicholas A. Anderson, Francesco Panerai
- **Modeling of Graphite Material Damage Under Hypersonic Flight Conditions**
Ioannis Pothos, Jamshid Ochilov, Suraj Ravindran, Thomas E. Schwartzentruber
- **miniSTARscan: A Portable 3D Photogrammetry Rig for Arcjet Sample Scanning**
Alexandre M. Quintart, Magnus A. Haw, Sebastian V. Colom
- **Engineering-Fidelity Damkohler Ablation Model Simulation Results**
John-Paul R. Heinzen, Jeffrey D. Engerer, Lincoln N. Collins
- **Finite-Rate Oxidation Modeling of Silicon Carbide in US3D**
Bryce D. Daniels, Thomas E. Schwartzentruber
- **Response of Carbon-Phenolic Ablators and Preforms to Combustion**
Henry X. Varona, Tulio Ricciardi, Gregory S. Elliott, Jonathan B. Freund, Francesco Panerai
- **Graphite Ablation: A Review of Theory and Comprehensive Comparison of Experimental Data**
Nicholas A. Anderson, Jeffrey D. Engerer, Francesco Panerai
- **Experimental Verification of Calibration Based Approach to Determine Inverse Heat Transfer Material Parameters**
Luke Vergeer, Julian Marin Olivas, Jay Frankel, Fangjun Shu

- **Surface Temperature Field Measurement Using Thermographic Phosphor Thermometry**

Andrea Gallegos Quintana, Allianna R. Chavez, Shabnam Mohammadshahi

- **Investigation of spallation and volumetric ablation in TPS materials through plasma facility experiments**

Kate B. Rhoads, Kristen J. Price, Stefan Loehle, Savio J. Poovathingal, Alexandre Martin

- **Tomography And Lattice Boltzmann Exploration (I): Image Segmentation**

Andres Ibarra-Gonzalez, Hubert Quintana III, Rayce Becerra, Yanxing Wang, Francisco Torres-Herrador

- **Modeling spalled particles in the HyMETS arc jet using a modified dissipation sensor**

Kate B. Rhoads, Ares Barrios-Lobelle, Kristen J. Price, Alexandre Martin

- **Tomography And Lattice Boltzmann Exploration (II): flow through porous media using LBM**

Kelsey Sanchez, Luis Diaz, Francisco Torres-Herrador, Yanxing Wang

- **Determination of Thermal Conductivity of Syntactic Foams with Transient Plane Source Technique**

Eduardo Chavira-Duran, Hubert Quintan, Fidel Baez Avila, Alessandro Finazzi, Francesco Panerai, Francisco Torres-Herrador

- **Towards Modeling of RTV Intumescence in PATO**

Sreevishnu Oruganti, Francesco Panerai

- **Re-radiation model in the Unified Solver**

Seungyong Baeg, Alexandre Martin

- **Estimation of evaporation and sublimation rates of a phase-change material in post-hypersonic shock conditions**

Carlos E. Americo, Ethan H. Huff, Ahmed H. Yassin, Savio J. Poovathingal

- **Modeling of a high velocity oxygen fuel (HVOF) torch**

Joseph Chaplin, Gehr Fergusson, Kenneth Kane, Alexandre Martin

- **Fluidic nose tip for shape stability of hypersonic vehicles**

Megan Sieve, Hassan Saad Ifti

- **Pyrolysis Mechanisms of Phenolic Resin in Cured SC-1008, PICA-D, and 3MDCP-IL**

Celeste H. Guiles, Yanice Benitez, Gavin N. Morales, Timothy K. Minton

- **Molecular Beam Studies of the Oxidation of Vitreous Carbon and Isostatically**

Molded Graphite at High Temperatures

Chenbiao Xu, Samer Hammoodi, James R. J. Montoya, Brian E. Riggs, Timothy K. Minton

- **Modeling and validation of radiative properties of porous composites**

Ayan Banerjee, Ahmed Yassin, Savio J. Poovathingal

- **Efficient parallel generation of extracted volume and material properties using the HERMES tool**

Luis A. Chacon, Ayan Banerjee, Savio J. Poovathingal

- **The numerical study of effect of structural mechanics on thermal response of ablating material using fluid-material-structural coupled framework**

Bibin Joseph, Caleb Thomas, Anthony Knutson, Graham V. Candler, Rui Fu, Alexandre Martin

- **Assessment of Accessible Precursor Solutions for Thermal Protection Systems Fabricated using Additive Manufacturing Technique.**

Stephen Northrup, Corwyn Shaughnessy-Spath, Jesus Diaz, Chaitanya Mahajan, Francisco Torres-Herrador

- **Development of a Laser-Heated Facility to Investigate Coking in Ablators**

Junhao Zhang, Andres Ibarra-Gonzalez, Francisco Torres-Herrador

Workshop Organizing Committee

General Chairs

- Prof. Alexandre Martin, *University of Kentucky*
- Prof. Savio J. Poovathingal, *University of Kentucky*

Local Chairs

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