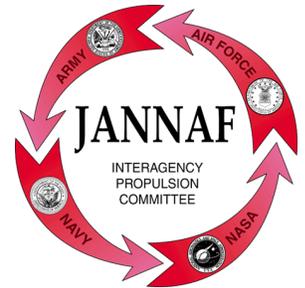


JANNAF INTERAGENCY PROPULSION COMMITTEE

JOINT ARMY-NAVY-NASA-AIR FORCE

43rd Structures and Mechanical Behavior (SMBS)
39th Propellant and Explosives Development
and Characterization (PEDCS)
30th Rocket Nozzle Technology (RNTS)
28th Safety and Environmental Protection (SEPS)
Programmatic and Industrial Base (PIB)
Joint Subcommittee Meeting



Meeting Invitation

Salt Lake Marriott Downtown
at City Creek
Salt Lake City, Utah
7 - 10 December 2015

Last updated 11/11/15

JANNAF Meeting Invitation - December 2015

You are invited to attend the December 2015 meeting of the Joint Army-Navy-NASA-Air Force (JANNAF), which will consist of the Programmatic and Industrial Base meeting; and the Joint Meeting of the 43rd Structures and Mechanical Behavior, 39th Propellant and Explosives Development and Characterization, 30th Rocket Nozzle Technology, and 28th Safety and Environmental Protection Subcommittees. This meeting will be held **Monday through Friday, 7 - 10 December 2015**, at the **Salt Lake Marriott Downtown at City Creek in Salt Lake City, Utah**.



The Program Chair for the meeting is **Mr. Paul F. Jones**, Air Force Research Laboratory, Edwards AFB. A complete list of Program Committee Members can be found on pages 6-8.

The JANNAF Interagency Propulsion Committee coordinates fundamental research, exploratory development, and advanced development programs; standardizes procedures for nomenclature; promotes and facilitates the exchange of technical information; and accomplishes problem solving in the areas of joint agency interest on propulsion systems for missiles, rockets, boosters, spacecraft, satellites, and guns.

Table of Contents

Meeting Scope	2
Meeting Site / Hotel Information	3
Transportation and Parking	3
Registration Information	3-4
DoD Meeting Approval	4
General Meeting Information	4-5
Upcoming JANNAF Meetings	5
Program Planning Committee	6-8
Program Highlights / Keynote	9-10
Daily Schedule	10-13

The **Programmatic and Industrial Base** areas of interest include integrated program plans and key decision points; industrial base assessments; risks and opportunities with respect to skills, knowledge, and experience; identification of commonality, innovative acquisition, and partnership opportunities; integrated assessments to identify rocket propulsion industrial base (RPIB) rationalization opportunities; special actions from senior agency, department, or Executive Office of the President (EOP) leadership; and information provided to decision makers for either situational awareness or policy decisions.

JANNAF subcommittees focus their resources on technical issues of interest to the JANNAF agencies.

The **Structures and Mechanical Behavior Subcommittee (SMBS)** addresses the development, application, and verification of experimental, analytical, and statistical techniques required in the preliminary or detailed structural design of solid propellant rocket motors and gun ammunition, the assessment of their structural integrity, and the prediction of their service life based on structural or chemical aging mechanisms.

The scope of **Propellant and Explosives Development and Characterization Subcommittee (PEDCS)** comprises work and issues associated with propellants, explosives, and other energetic formulations used in the development, manufacture, performance, and operation of weapons, propulsion systems, and gas generator devices. This subcommittee covers the technology areas required to develop, manufacture, and characterize propellants and ingredients. The manufacturing technologies of interest include mixing procedures, sampling and quality control, safety and handling practices, and the design and operation of mixing equipment. The characterization tests involve classical wet chemistry, instrumental analysis, chemical stability, compatibility, and calorimetric measurements.

The **Rocket Nozzle Technology Subcommittee (RNTS)** focuses on the application of advanced composite materials, including carbon-carbon, ceramic matrix, and carbon phenolic composites, and other advanced materials, as applied to solid rocket nozzles and their components, nozzle-based propulsion control systems; and related technology developments for liquid and electric propulsion.

CADRE provides technical and administrative support to the JANNAF Interagency Propulsion Committee
JHU Center for Aerospace-Defense Research and Engineering - 10630 Little Patuxent Parkway, Suite 202, Columbia, MD 21044-3286
Telephone: (410) 992-7300 - Telefax (410) 730-4969 - Email: info@cadre.jhu.edu - www.cadre.jhu.edu

JANNAF Meeting Invitation - December 2015

The **Safety and Environmental Protection Subcommittee (SEPS)** sessions will cover chemical propulsion safety and environmental protection issues such as space launch range safety; risk assessments of rocket propellants, explosives and pyrotechnics; environmental and health effects of propellants and explosive compounds, precursors, combustion products, wastes, etc.; packaging, storage and transportability; propellant handling and use; demilitarization, disposal, and reclamation of energetic materials; emergency management activities; explosives safety aspects of propellants and related energetic materials; and manufacturing/processing hazards of energetic materials.

Meeting Site

All sessions will be held at the **Salt Lake Marriott Downtown at City Creek Hotel** in Salt Lake City, Utah. Information about the hotel can be found below.

Hotel Information

Sleeping rooms have been reserved with the **Salt Lake Marriott Downtown at City Creek**, located at 75 South West Temple, Salt Lake City, UT 84101. Amenities include complimentary high speed internet access in guestrooms and a 25% discount on self-parking rates.



Sleeping rooms have been reserved with the **Salt Lake Marriott Downtown at City Creek**, located at 75 South West Temple, Salt Lake City, UT 84101. Amenities include complimentary high speed internet access in guestrooms, and a 25% discount on self-parking rates.

The room rate per night for government attendees with a valid government employee i.d. will be at the GSA FY 2016 per diem rate, currently \$108 plus tax (currently 12.6%) for single or double occupancy. The discounted rate for all other attendees is \$159 plus tax.

Each individual is responsible for his/her own reservation. Reservations may be made either on the Web (recommended) or by telephone.

WEB: Click on the applicable reservation link (**Government** or **Non-Government**) on the **Hotel Page** of the meeting website to make your reservation. Using these links will give you direct access to the JANNAF meeting discounted room block.

TELEPHONE: Call Marriott reservations at (800) 228-9290 or (801) 531-0800. Please refer to the JANNAF conference when making your reservation in order to receive the applicable discounted group rate.

Need to cancel your reservation? Be sure to do so no less than 24 hours prior to arrival to avoid paying a cancellation penalty.

Transportation and Parking

Express Shuttle is offering a discounted rate for attendees of the December JANNAF meeting. Save \$1 each way on transportation between the airport and the hotel—shuttle van service is just \$7 per person each way. Reserve by phone or online at least 24 hours in advance. More information and reservation instructions are available online on the **Hotel Page** of the meeting website.

If you prefer to take a taxi, the cost is approximately \$15.00 one way. The hotel is located eight miles from the Salt Lake City International Airport. If driving to the hotel, take advantage of a 25% discount on self-parking rates for JANNAF attendees, a savings of up to \$5.00 per day. More information will be available at the JANNAF On-Site Registration / Check-in Desk.

Registration

Registration for JANNAF meetings is a **two-part process**; to complete this process:

1. Register for the meeting via the JANNAF Secure Portal.
2. Pay the registration fee (Portal account not required).

Important links for completing your meeting registration can be found at <https://www.jannaf.org/mtgs/Dec2015/pages/registration.html>.

Security/Attendance Requirements

The overall security classification of this meeting is Unclassified.

Attendance is restricted to **U.S. citizens qualified to receive unclassified, limited-distribution information**. To qualify, the attendee must be employed by a DoD, DoE, or NASA facility, or with a DoD, DoE, or NASA contractor facility eligible for receipt of militarily-critical technical data. No foreign nationals will be permitted to attend. **To register, you must have a JANNAF Secure Portal account. Please visit the [Registration Page](#) of the meeting website for additional information and important links.**

JANNAF Meeting Invitation - December 2015

Questions concerning attendance eligibility should be directed to the CADRE Facility Security Officer, Mary Gannaway, at (410) 992-7304, ext. 211 or mtg@jhu.edu.

Registration Fee

For details of what the registration fee includes, please go to the [Registration Page](#) of the meeting website. Please reference the registration fee chart below to determine the amount applicable to your registration. **The dates noted below are based on payment being received.**

Payment Received	Regular Attendee	Student*
<i>on or before 11/23/15</i>	\$ 900.00	\$200.00
<i>11/24/15 or later</i>	\$1,050.00	\$200.00
<i>PSHS Workshop only</i>	\$250.00	\$250.00
<i>Blast & Fragmentation Course</i>	\$300.00	\$300.00

* *A discounted registration fee is offered for full time students, interns, and cooperative education students. Students must meet the security/attendance requirements noted above and present current student identification upon registration on-site.*

Registration payment will be accepted via check payable to JHU-CADRE, purchase order (government only), or by credit card (VISA, MasterCard, American Express) using the online remittance site available online. Go to the [Registration Page](#) of the meeting website, and click on “Pay Registration Fee.”

Attendees are encouraged to complete the registration process via the JANNAF Secure Portal, and submit payment, on or before 23 November 2015 to ensure prompt registration upon arrival at the meeting. Credit card payments made electronically via the Web will be charged immediately; a receipt will be sent to you via email.

Cancellation Policy

Please note our cancellation policy—written (email) cancellations on or before 23 November 2015 will receive a full refund minus an administrative fee of \$50.00. Cancellations made after 23 November 2015 **will not be refunded**. Substitutes are welcome as long as attendance certifications are appropriately met. Please contact Shelley Cohen via email to scohen@cadre.jhu.edu to transfer or cancel your payment.

On-Site Registration / Check-in

The JANNAF Registration desk will be located on the first

floor of the Salt Lake Marriott Downtown at City Creek. Photo identification is required upon registration or check-in. The desk will be open Monday, 7 December from 10:00 a.m. - 5:00 p.m., and Tuesday, 8 December through Thursday, 10 December from 7:00 a.m. - 5:00 p.m.

Attention DoD

An approval package to certify the December 2015 JANNAF Meeting as a “government approved” conference has been submitted by Mr. Stuart Blashill, Chair of the JANNAF Executive Committee from the Naval Air Warfare Center Weapons Division in China Lake, CA.

DoD approval of conferences takes several months and judging from past meetings, may not be received until just prior to the start of the December meeting. **Interested DoD attendees are strongly encouraged to obtain a JANNAF Secure Portal account now and register for the meeting.** This step does not require travel or training office approval since it does not include a financial commitment. Payment of the registration fee may be completed as soon as permitted.

Attire

There is no official dress code for JANNAF conferences. However, most attendees wear business or business casual attire. When packing, keep in mind that it can be difficult to regulate the temperature in meeting rooms to everyone’s liking, and any changes may not be noticeable quickly, so it is best to bring a sweater or jacket and dress in layers.

Dining

Approximately one and one-half hours for lunch has been built into the program each day. Hotel restaurants include Elevations and Starbucks. Additionally, the hotel is located adjacent to the City Creek Center, which houses more than 20 quick and casual dining options.

Networking Room

Salon F of the Grand Ballroom will serve as the JANNAF networking area at the hotel; a light continental breakfast and mid-morning coffee break along with mid-afternoon

JANNAF Meeting Invitation - December 2015

refreshments will be served at the times stated in the program. This area will be open Monday from 10:00 a.m. - 5:00 p.m., and Tuesday - Thursday from 7:00 a.m. - 5:00 p.m. Please note that scheduled breaks are included in session agendas where time permits.

Networking Night

Come enjoy an evening with fellow JANNAF attendees on Wednesday, 9 December 2015, from 6:30-8:00 p.m., in Grand Ballroom Salons D & E (specific location subject to change) at the Salt Lake Marriott Downtown at City Creek. A complimentary meal is included. There is no charge for meeting attendees; however, guest tickets may be purchased on the Registration Payment site for \$40 (admission is free for children five and under). Be sure to wear your JANNAF badge to attend the event.

Reading Room

All papers presented in the technical sessions and received in time will be available to read via JANNAF touch-screen tablets. The reading room will be open Monday from 1:30 p.m. - 4:30 p.m., and Tuesday through Thursday from 8:00 a.m. - 4:30 p.m. Reproduction of reading room papers is not permitted.

Side Meetings

There are rooms of varying sizes located on the 1st and 2nd floors of the hotel that are available for JANNAF-related side meetings. Audiovisual equipment will not be provided. Please contact Shelley Cohen at scohen@cpiaac.jhu.edu to reserve a room as soon as possible. Rooms will be assigned first-come, first-served..

Program Changes

Meeting programs will be distributed to attendees upon registration/check-in on-site. Note that **Final Programs are Distribution Statement C and should be secured when not in your possession.** Changes to the Final Program will be posted on touch screen monitors located in the ballroom pre-function space. Attendees should periodically check for program updates and administrative announcements and note these updates in their copy of the Final Program.

Meeting Proceedings

Proceedings from this meeting will be published by the JHU Center for Aerospace-Defense Research and Engineering. Papers, and in limited cases, presentations will be provided

complimentary to attendees of this meeting who have paid the full registration fee (early or regular). These attendees will have access to these materials approximately 12 weeks following the meeting via the JANNAF Digital Online Collection (JDOC) Database accessible through your account on the JANNAF Secure Portal. This benefit of registration is not available for student attendees.

Questions

Questions concerning this program and/or payment of the registration fee should be directed to Shelley Cohen at (410) 992-7302, ext. 215 or email: scohen@cadre.jhu.edu.

Questions pertaining to registering via the JANNAF Secure Portal should be directed to Mary Gannaway at (410) 992-7304, ext. 211 or email: mtg@jhu.edu.

Upcoming JANNAF Meetings

43rd Structures and Mechanical Behavior;
39th Propellant and Explosives Development and Characterization;
30th Rocket Nozzle Technology;
28th Safety and Environmental Protection Programmatic and Industrial Base
Joint Subcommittee Meeting
December 7-11, 2015
Salt Lake City, Utah

63rd JANNAF Propulsion Meeting;
Programmatic and Industrial Base;
47th Combustion;
35th Airbreathing Propulsion;
35th Exhaust Plume and Signatures;
29th Propulsion Systems Hazards
Joint Subcommittee Meeting
May 16-20, 2016
Newport News, Virginia

JANNAF Meeting Invitation - December 2015

Program Committee Members

PROGRAM CHAIR

Mr. Paul F. Jones
Air Force Research Laboratory
Edwards AFB, CA

PROGRAMMATIC AND INDUSTRIAL BASE

PIB Executive Committee Co-Chair

Dr. Christine M. Michienzi
OSD-AT&L/MIBP / Alexandria, VA

PIB Executive Committee Co-Chair

Dr. Kendall K. Brown
NASA Marshall Space Flight Center / Huntsville, AL

JHU-CADRE Technical Representative

Kirk V. Sharp
JHU Center for Aerospace-Defense Research and Engineering
Columbia, MD

STRUCTURES AND MECHANICAL BEHAVIOR SUBCOMMITTEE

Technical Steering Group Chair

Dr. Timothy C. Miller
Air Force Research Laboratory / Edwards AFB, CA

Technical Steering Group Deputy Chair

Dr. Jeremy R. Rice
Army Aviation and Missile Research, Development and
Engineering Center / Redstone Arsenal, AL

JANNAF Executive Committee Liaison

Dr. Jay S. Lilly
Army Aviation and Missile Research, Development and
Engineering Center / Redstone Arsenal, AL

JHU-CADRE Technical Representative

Mr. David B. Owen
JHU Center for Aerospace-Defense Research and Engineering
Columbia, MD

Mission Area I: Service Life / Missile Sustainment

Dr. Kara D. Lormand
Aerojet Rocketdyne / Sacramento, CA

Mission Area II: Materials Properties and Characterization

Dr. Soe T. (Tom) Bhe
Aerojet Rocketdyne / Sacramento, CA

Mission Area III: Structural Analysis and Design

Dr. Brian C. Liechty
Orbital ATK / Brigham City, UT

Mission Area IV: Experimental Structural and Mechanical Analysis and Test Methods

Mr. Gary L. Biggs
Naval Surface Warfare Center / Indian Head, MD

Mission Area V: Nondestructive Evaluation

Mr. Scott H. McClain
Army Armament Research, Development and Engineering Center
Picatinny Arsenal, NJ

Mission Area VI: Damage Tolerance / Fracture for Non-Metallic Materials [Joint Mission Area with RNTS]

Dr. David E. Richardson
Orbital ATK / Brigham City, UT

PROPELLANT AND EXPLOSIVES DEVELOPMENT AND CHARACTERIZATION SUBCOMMITTEE

Technical Steering Group Chair

Mr. Paul F. Jones
Air Force Research Laboratory / Edwards AFB, CA

Technical Steering Group Deputy Chair

Dr. Mark H. Mason, Jr.
Naval Air Warfare Center Weapons Division / China Lake, CA

JANNAF Executive Committee Liaison

Mr. Frank C. Tse
Naval Surface Warfare Center / Indian Head, MD

JHU-CADRE Technical Representative

Mr. Andrew J. Taylor
JHU Center for Aerospace-Defense Research and Engineering
Columbia, MD

Mission Area I: Liquid Propellants

Dr. Benjamin Greene
Jacobs Technology, Incorporated / Las Cruces, NM

JANNAF Meeting Invitation - December 2015

Mission Area II: Explosive Formulation

Dr. Mark H. Mason, Jr.
Naval Air Warfare Center Weapons Division / China Lake, CA

Mission Area III: Propellant and Explosives Process Engineering

Dr. Jamie B. Neidert
Army Aviation and Missile Research, Development and Engineering Center / Redstone Arsenal, AL

Mr. Richard S. Muscato
Naval Surface Warfare Center / Indian Head, MD

Mission Area IV: Solid Propellant Chemistry Test Methods

Dr. James G. Carver
Army Aviation and Missile Research, Development and Engineering Center / Redstone Arsenal, AL

Mission Area V: Solid Propellant Ingredients and Formulations

Mr. Paul F. Jones
Air Force Research Laboratory / Edwards AFB, CA

Mission Area VI: Propellant and Explosive Surveillance and Aging

Dr. Kerry A. Clark
Naval Sea Systems Command / Indian Head, MD

Dr. Heather F. Hayden
Naval Ordnance Safety and Security Activity / Indian Head, MD

Mission Area VII: Gun Propulsion Component Formulation and Development

Dr. Pamela J. Kaste
Army Research Laboratory / Aberdeen Proving Ground, MD

Ms. Christine D. Knott
Naval Surface Warfare Center / Indian Head, MD

Mission Area VIII: Green Energetic Materials (GEM) Joint PEDCS - SEPS Mission Area

Mr. Noah Lieb
Jensen Hughes / Baltimore, MD

Dr. Jesse J. Sabatini
Army Research Laboratory / Aberdeen Proving Ground, MD

ROCKET NOZZLE TECHNOLOGY SUBCOMMITTEE

Technical Steering Group Chair

Mr. J. Robert Esslinger
Army RDECOM-Aviation and Missile Research, Development and Engineering Center / Redstone Arsenal, AL

JANNAF Executive Committee Liaison

Dr. Jay S. Lilly
Army Aviation and Missile Research, Development and Engineering Center / Redstone Arsenal, AL

JHU-CADRE Technical Representative

Mr. David B. Owen
JHU Center for Aerospace-Defense Research and Engineering
Columbia, MD

Mission Area I: Nozzle Thermal, Structural, Fluids Analysis and Modeling

Mr. J. Louie Clayton
NASA Marshall Space Flight Center / Huntsville, AL

Mission Area II: Nozzle Design, Test and Evaluation

Mr. Clyde E. Carr, Jr.
Orbital ATK / Elkton, MD

Mission Area III: Thrust Control

Ms. Susan L. Burroughs
Army Aviation and Missile Research, Development and Engineering Center / Redstone Arsenal, AL

Mission Area IV: Innovative Nozzle Materials

Mr. Matthew L. Shewmaker
Naval Air Warfare Center Weapons Division / China Lake, CA

Mission Area V: Damage Tolerance / Fracture for Non-Metallic Materials [Joint Mission Area with SMBS]

Dr. David E. Richardson
Orbital ATK / Brigham City, UT

JANNAF Meeting Invitation - December 2015

SAFETY AND ENVIRONMENTAL PROTECTION SUBCOMMITTEE

Technical Steering Group Chair

Dr. Mark S. Johnson
Army Public Health Center (Provisional) / Aberdeen Proving
Ground, MD

JANNAF Executive Committee Liaison

Dr. Brad E. Forch
Army Research Laboratory / Aberdeen Proving Ground, MD

JHU-CADRE Technical Representative

Mr. William A. Bagley
JHU Center for Aerospace-Defense Research and Engineering
Columbia, MD

Mission Area I: Toxicology

Dr. David R. Mattie
711 Human Performance Wing/RHDJ / Wright Patterson AFB, OH

Dr. Mark S. Johnson
Army Public Health Center (Provisional) / Aberdeen Proving
Ground, MD

Mission Area II: Atmospheric Dispersion Modeling and Hazards Assessment

Mr. Daniel E. Strub
30th Space Wing / Vandenberg AFB, CA

Mission Area III: Instrumentation

Dr. Karen L. Mumy
Navy Medical Research Unit - Dayton / Wright Patterson AFB, OH

Mission Area IV: Environmental

Dr. William S. Eck
Army Public Health Center (Provisional) / Aberdeen Proving
Ground, MD

Mission Area V: Industrial Hygiene

Ms. Lindsey Kneten
Army Public Health Center (Provisional) / Aberdeen Proving
Ground, MD

CPT Kenneth Kirk
Air Force Research Laboratory, 711HPW / Wright Patterson AFB, OH

Mission Area VI: Range Safety and Explosives Safety

Mr. Daniel E. Strub
30th Space Wing / Vandenberg AFB, CA

Mission Area VII: Environmental, Safety and Occupational Health of Insensitive Munitions

Dr. Kimberly Y. Spangler
Army Armament Research, Development and Engineering Center
Picatinny Arsenal, NJ

Mission Area VIII: Green Energetic Materials (GEM) Joint PEDCS - SEPS Mission Area

Mr. Noah Lieb
Jensen Hughes / Baltimore, MD

Dr. Jesse J. Sabatini
Army Research Laboratory / Aberdeen Proving Ground, MD

Dr. Sara K. Pliskin
Naval Surface Warfare Center / Crane, IN

Mission Area IX: Demilitarization, Reclamation, and Reuse Technologies

Dr. Randall J. Cramer
Navy Ordnance Environmental Support Office / Indian Head, MD

Dr. Sara K. Pliskin
Naval Surface Warfare Center / Crane, IN

Mission Area X: Review of Accidents and Incidents

Mr. Daniel E. Strub
30th Space Wing / Vandenberg AFB, CA

JANNAF MEETING MANAGER

Shelley S. Cohen
JHU Center for Aerospace-Defense Research and Engineering
Columbia, MD

JANNAF MEETING PROCEEDINGS EDITOR

Ms. Kathleen Biglari
JHU Center for Aerospace-Defense Research and Engineering
Columbia, MD

SECURITY OFFICER

Ms. Mary T. Gannaway
JHU Center for Aerospace-Defense Research and Engineering
Columbia, MD

JANNAF Meeting Invitation - December 2015

Program Highlights

Keynote Address



Dr. Louis Cannizzo, Director of Research and Development (R&D) for the Propulsion Systems Division of Orbital ATK, will present the keynote at this year's conference.

The title of his address is **"Crucial Elements in the Development of Energetic Materials for Propellant and Explosive Formulations."**

His presentation will illustrate major factors routinely encountered when introducing

and scaling new ingredients and formulations from laboratory to production process environments.

In his current position at Orbital ATK, Cannizzo directs a staff of R&D scientists and engineers tasked with the development of strategic materials, formulations and technologies for the solid rocket industry. The Orbital ATK R&D group is also recognized worldwide for developing products and services in the motor health management, explosive, gun propellant, military flare and decoy, pyrotechnic, initiator and warhead industries. His organization is actively involved in troubleshooting material-based development and manufacturing issues within Orbital ATK and for many commercial and government customers.

Prior to his current position, Cannizzo has worked in a number of different roles at Orbital ATK and the heritage companies Morton Thiokol, Thiokol, and ATK during a 27-year career. Most recently he served as Chief Scientist for R&D before accepting his current position as Director in 2011.

Cannizzo started his career at Morton Thiokol in 1988 as a staff scientist synthesizing and characterizing new energetic materials including CL-20, GAP, energetic block copolymers, and a number of furazan-based materials. He also participated in the development of new demilitarization technologies and served as an in-house consultant for addressing major chemistry-related manufacturing issues. He progressed through a series of roles as team leader, technical marketer, and senior staff scientist. He also was the Technical Director for ATK at the Radford Army Ammunition Plant for twelve months on his one assignment outside of the Promontory, Utah location. He

has co-authored seventeen US patents, approximately two dozen papers in refereed journals, and published a number of papers at government/industry conferences.

Cannizzo earned his Bachelor of Science in chemistry from the University of New Mexico and obtained his Ph.D. in Organic Chemistry from Caltech under the direction of Professor Robert Grubbs, a Nobel laureate. He spent one additional year in post-doctoral studies at Colorado State University before starting his industrial career.

All attendees are invited to participate. The Keynote Address begins at 8:00 a.m. on Tuesday, 8 December, in Salons D and E of the Grand Ballroom (subject to change) at the hotel.

Awards Ceremony

Awards to acknowledge the contributions of the Structures and Mechanical Behavior, Propellant and Explosives Development and Characterization, Rocket Nozzle Technology, and Safety and Environmental Protection subcommittees are being solicited. Please contact David Owen (dowen@cadre.jhu.edu) for SMBS and RNTS nominations, Andrew Taylor (ataylor@cadre.jhu.edu) for PEDCS nominations, and William Bagley (wbagley@cadre.jhu.edu) for SEPS nominations. An Awards Ceremony will immediately follow the keynote address.

PSHS Workshop: Slow Cook-off Consortium

Over the past 30 years, a significant portion of time and money has gone into addressing and mitigating the slow cookoff hazard. Many advances that have taken place over the past five years have not been shared with the community.

The Propulsion Systems Hazards Subcommittee (PSHS) will hold a 1.5 day workshop during the December JANNAF meeting, beginning the afternoon of Monday, 7 December and continuing for the entire day on Tuesday, 8 December. The purpose is to bring the community together to share and improve the knowledge base for slow cookoff. An additional goal is to focus and help direct the ongoing research in an effort to understand and prevent slow cookoff from occurring.

Those planning to attend the December 2015 JANNAF meeting may also attend the PSHS workshop at no additional fee. For those wishing to attend just the 1.5 day PSHS workshop, a workshop-only fee of \$250 will be assessed. More information about the workshop can be found on pages 16, 21 and 25 of the Preliminary Program.

JANNAF Meeting Invitation - December 2015

Program Highlights - continued

White Sands Test Facility Blast and Fragmentation Course

A two-day training, developed by NASA at the White Sands Test Facility, will provide participants with a basic understanding of the methods and provide references to conduct simple blast analysis based on the principles of overpressure, impulse, fragmentation, structural response, and a brief introduction to the concept of Quantity-Distance. Students will gain a working understanding of the limits of structures and the human body to resist or survive blast

waves, an understanding of the current state-of-the-art techniques available, and the limitations of analysis of blast generating systems and associated fragmentation.

The training will be held Friday and Saturday, 11 & 12 December. Registration is limited to the first 20 who sign up on or before 23 November 2015, and requires a separate fee of \$300. A detailed outline for each day of the training can be found on page 41 of the Preliminary Program.

Technical Program

This year's technical program currently consists of 43 technical sessions with more than 200 presentations, plus 4 specialist sessions, 6 workshops, and 19 panel meetings. A detailed daily schedule (subject to change) of all sessions, workshops, meetings and networking activities is provided below and continues through page 13. Detailed agendas of the technical sessions, specialist sessions, and workshops are listed in the Program Section of the Preliminary Program beginning on page 14. You must log in to your JANNAF Secure Portal account to view the Preliminary Program.

SCHEDULE - Monday, 7 December					
10:00 a.m. - 5:00 p.m.	On-Site Check-In and Registration Desk Open				
10:00 a.m. - 11:00 a.m.	Networking Area Refreshments			Grand Ballroom F	Open
12:45 p.m. - 1:15 p.m.	Session Chair Meeting (Monday Sessions)			Grand Ballroom A	Closed
1:30 p.m. - 4:30 p.m.	Reading Room			Grand Ballroom A	Open
1:30 p.m. - 6:05 p.m.	Monday Technical Sessions, Workshops and Specialist Sessions				
1:30 p.m. - 4:35 p.m.	IQ	PEDCS	Chemistry Test Methods	Grand Ballroom G	Open
1:30 p.m. - 3:35 p.m.	IR	SMBS	Service Life and Sustainment - I	Grand Ballroom H	Open
1:30 p.m. - 5:05 p.m.	IS	RNTS	WORKSHOP: Advanced Thermal/ Structural Modeling of Carbon Cloth Phenolic	Grand Ballroom I	Open
1:30 p.m. - 5:05 p.m.	IT	PEDCS	Ingredients and Formulations - I: Synthesis	Grand Ballroom J	Open
1:30 p.m. - 5:05 p.m.	IU	PSHS	WORKSHOP: Slow Cookoff Consortium - Part I	Deer Valley	Open
3:35 p.m. - 4:05 p.m.	Networking Area Refreshments			Grand Ballroom F	Open

Schedule Color Key	
	Meeting Services
	Networking Opportunities
	Closed Meetings
	Concurrent Sessions or Panel Meetings
	Session Details
	Panel Meetings

JANNAF Meeting Invitation - December 2015

SCHEDULE - Tuesday, 8 December					
7:00 a.m. - 5:00 p.m.	On-Site Check-In and Registration Desk Open				
7:00 a.m. - 5:00 p.m.	I.T. Office Open (for Presenters and Session Chairs needing technical assistance)			Cottonwood	Open
7:15 a.m. - 7:45 a.m.	Session Chair Meeting (Tuesday Sessions)			Grand Ballroom A	Closed
7:15 a.m. - 8:00 a.m.	Networking Area Refreshments			Grand Ballroom F	Open
8:00 a.m. - 10:00 a.m.	KEYNOTE ADDRESS: "Crucial Elements in the Development of Energetic Materials for Propellant and Explosive Formulations" Dr. Louis Cannizzo Awards Ceremony			Grand Ballroom D-E	Open
8:00 a.m. - 4:30 p.m.	Reading Room			Grand Ballroom A	Open
9:30 a.m. - 10:00 a.m.	Networking Area Refreshments			Grand Ballroom F	Open
10:00 a.m. - 6:00 p.m.	JANNAF Technical Executive Committee Meeting			Park City	Closed
10:00 a.m. - 12:35 p.m.	Tuesday Morning Technical Sessions, Workshops, and Panel Meetings				
10:00 a.m. - 12:05 p.m.	2A	SMBS	Service Life and Sustainment - II	Grand Ballroom B	Open
10:00 a.m. - 11:05 a.m.	2B	SEPS	Industrial Hygiene	Grand Ballroom C	Open
11:05 a.m. - 12:05 p.m.	2B	SEPS	PANEL MEETING: Industrial Hygiene	Grand Ballroom C	Open
10:00 a.m. - 12:05 p.m.	2C	PEDCS	Ingredients and Formulations - II	Grand Ballroom D	Open
10:00 a.m. - 11:35 a.m.	2D	PEDCS	Explosive Characterization - I	Grand Ballroom E	Open
10:00 a.m. - 11:05 a.m.	2E	SMBS/ RNTS	Damage Tolerance/Fracture for Non-Metallic Materials	Grand Ballroom G	Open
10:00 a.m. - 11:35 a.m.	2F	SMBS	Experimental Structural and Mechanical Analysis Test Methods	Grand Ballroom H	Open
10:00 a.m. - 12:35 p.m.	2G	PEDCS	Additive Manufacturing - I	Grand Ballroom I	Open
10:00 a.m. - 12:20 p.m.	2H	SEPS/ PEDCS	WORKSHOP: Sustainable Energetics - Part I	Grand Ballroom J	Open
10:00 a.m. - 12:00 p.m.	2I	PSHS	WORKSHOP: Slow Cookoff Consortium - Part II	Deer Valley	Open
12:00 p.m. - 1:30 p.m.	Lunch Break - <i>On Your Own</i>				
1:30 p.m. - 6:05 p.m.	Tuesday Afternoon Technical Sessions, Specialist Sessions, Workshops, and Panel Meetings				
1:30 p.m. - 3:35 p.m.	2N		SPECIALIST SESSION: New Developments and Safety in HME Research	Grand Ballroom C	Open
1:30 p.m. - 5:35 p.m.	2O	PEDCS	Binders	Grand Ballroom D	Open
1:30 p.m. - 4:35 p.m.	2P	PEDCS	Explosive Characterization - II	Grand Ballroom E	Open
1:30 p.m. - 5:35 p.m.	2Q	RNTS	Nozzle Thermal, Structural, Fluids Analysis and Modeling	Grand Ballroom G	Open
1:30 p.m. - 5:05 p.m.	2R	SMBS	Service Life and Sustainment - III	Grand Ballroom H	Open
5:05 p.m. - 6:05 p.m.	2R	SMBS	PANEL MEETING: Service Life and Sustainment	Grand Ballroom H	Open
1:30 p.m. - 5:35 p.m.	2S	PEDCS	Additive Manufacturing - II	Grand Ballroom I	Open
1:30 p.m. - 4:50 p.m.	2T	SEPS/ PEDCS	WORKSHOP: Sustainable Energetics - Part II	Grand Ballroom J	Open
1:30 p.m. - 3:00 p.m.	2U	PSHS	WORKSHOP: Slow Cookoff Consortium - Part III	Deer Valley	Open
3:35 p.m. - 4:05 p.m.	Networking Area Refreshments			Grand Ballroom F	Open

JANNAF Meeting Invitation - December 2015

SCHEDULE - Wednesday, 9 December					
7:00 a.m. - 5:00 p.m.	On-Site Check-In and Registration Desk Open				
7:00 a.m. - 5:00 p.m.	I.T. Office Open (for Presenters and Session Chairs needing technical assistance)			Cottonwood	Open
7:15 a.m. - 7:45 a.m.	Session Chair Meeting (Wednesday Sessions)			Grand Ballroom A	Closed
7:15 a.m. - 8:00 a.m.	Networking Area Refreshments			Grand Ballroom F	Open
8:00 a.m. - 4:30 p.m.	Reading Room			Grand Ballroom A	Open
8:00 a.m. - 12:35 p.m.	Wednesday Morning Technical Sessions and Panel Meetings				
8:00 a.m. - 11:35 a.m.	3A	PEDCS	Modeling - I	Grand Ballroom B	Open
8:00 a.m. - 10:35 a.m.	3B	PEDCS	Liquid Propellants	Grand Ballroom C	Open
10:35 a.m. - 11:05 a.m.	3B	PEDCS	<i>PANEL MEETING:</i> Liquid Propellants	Grand Ballroom C	Open
8:00 a.m. - 12:05 p.m.	3C	PEDCS	Propellant and Explosive Processing	Grand Ballroom D	Open
8:00 a.m. - 11:35 a.m.	3D	SEPS/ PEDCS	Green Energetic Materials - I	Grand Ballroom E	Open
11:35 a.m. - 12:35 p.m.	3D	SEPS/ PEDCS	<i>PANEL MEETING:</i> Green Energetic Materials	Grand Ballroom E	Open
8:00 a.m. - 9:05 a.m.	3E	RNTS	Nozzle Design, Test and Evaluation	Grand Ballroom G	Open
9:05 a.m. - 10:05 a.m.	3E	RNTS	<i>PANEL MEETING:</i> Next Generation Nozzle Materials / Materials Obsolescence	Grand Ballroom G	Open
10:35 a.m. - 11:35 a.m.	3E	RNTS	<i>PANEL MEETING:</i> Enabling Technologies for Thrust Control	Grand Ballroom G	Open
8:00 a.m. - 11:35 a.m.	3F	SMBS	Materials Property and Characterization - I	Grand Ballroom H	Open
8:00 a.m. - 12:35 p.m.	3G	PEDCS	Ingredients and Formulations - III	Grand Ballroom I	Open
8:00 a.m. - 10:05 a.m.	3H	PEDCS	Insensitive Munitions - I	Grand Ballroom J	Open
10:35 a.m. - 11:35 a.m.	3H	SEPS	<i>PANEL MEETING:</i> ESOH Impacts of Insensitive Formulations	Grand Ballroom J	Open
9:35 a.m. - 10:35 a.m.	Networking Area Refreshments			Grand Ballroom F	Open
12:00 p.m. - 1:30 p.m.	Lunch Break - <i>On Your Own</i>				
12:00 p.m. - 1:30 p.m.	RNTS Technical Steering Group Meeting			Park City	Closed
1:30 p.m. - 6:05 p.m.	Wednesday Afternoon Technical Sessions, Specialist Sessions, and Panel Meetings				
1:30 p.m. - 2:35 p.m.	3M	PEDCS	Modeling - II	Grand Ballroom B	Open
1:30 p.m. - 3:35 p.m.	3N	RNTS	<i>SPECIALIST SESSION:</i> Lessons Learned from Historical Investigations	Grand Ballroom C	Open
1:30 p.m. - 4:35 p.m.	3O	PEDCS	Propellant and Explosive Processing: Resonant Acoustic Mixing	Grand Ballroom D	Open
4:35 p.m. - 5:05 p.m.	3O	PEDCS	<i>PANEL MEETING:</i> Propellant and Explosive Processing	Grand Ballroom D	Open
1:30 p.m. - 5:35 p.m.	3P	SEPS/ PEDCS	Green Energetic Materials - II: Lead-Free Energetics	Grand Ballroom E	Open
1:30 p.m. - 5:05 p.m.	3Q	SEPS	Demilitarization, Reclamation, and Reuse Technologies	Grand Ballroom G	Open
5:05 p.m. - 6:05 p.m.	3Q	SEPS	<i>PANEL MEETING:</i> Demilitarization, Reclamation, and Reuse Technologies	Grand Ballroom G	Open
1:30 p.m. - 2:35 p.m.	3R	SMBS	Materials Property and Characterization - II	Grand Ballroom H	Open
2:35 p.m. - 3:35 p.m.	3R	SMBS	<i>PANEL MEETING:</i> Materials Property and Characterization	Grand Ballroom H	Open
1:30 p.m. - 4:35 p.m.	3S	PEDCS	Ingredients and Formulations - IV	Grand Ballroom I	Open
4:35 p.m. - 5:35 p.m.	3S	PEDCS	<i>PANEL MEETING:</i> Solid Propellant Ingredients and Formulations	Grand Ballroom I	Open
1:30 p.m. - 5:05 p.m.	3T	PEDCS	Insensitive Munitions - II	Grand Ballroom J	Open
3:05 p.m. - 4:05 p.m.	Networking Area Refreshments			Grand Ballroom F	Open
6:00 p.m. - 8:00 p.m.	Networking Night - Dinner and Cash Bar - <i>JANNAF Badge or Ticket required</i>			Grand Ballroom D-E	Open

JANNAF Meeting Invitation - December 2015

SCHEDULE - Thursday, 10 December					
7:00 a.m. - 5:00 p.m.	On-Site Check-In and Registration Desk Open				
7:00 a.m. - 5:00 p.m.	I.T. Office Open (for Presenters and Session Chairs needing technical assistance)			Cottonwood	Open
7:15 a.m. - 7:45 a.m.	Session Chair Meeting (Thursday Sessions)			Grand Ballroom A	Closed
7:15 a.m. - 8:00 a.m.	Networking Area Refreshments			Grand Ballroom F	Open
8:00 a.m. - 4:30 p.m.	Reading Room			Grand Ballroom A	Open
8:00 a.m. - 12:05 p.m.	Thursday Morning Technical Sessions, Specialist Sessions, and Panel Meetings				
8:00 a.m. - 11:05 a.m.	4A	PEDCS	Gun Propulsion Component, Formulation and Development - I	Grand Ballroom B	Open
11:05 a.m. - 12:05 p.m.	4A	PEDCS	<i>PANEL MEETING:</i> Gun Propulsion Component, Formulation and Development	Grand Ballroom B	Open
8:00 a.m. - 10:05 a.m.	4B	SMBS	Nondestructive Evaluation - I	Grand Ballroom C	Open
10:35 a.m. - 11:35 a.m.	4B	SMBS	<i>PANEL MEETING:</i> Defect Evaluation	Grand Ballroom C	Open
8:00 a.m. - 11:35 a.m.	4C	PEDCS	Joint Insensitive Munitions Technology Program - I	Grand Ballroom D	Open
8:00 a.m. - 12:05 p.m.	4D	PIB	PIB Panel Discussion: Impediments to Meeting Goals for Future Weapons	Grand Ballroom E	Open
8:00 a.m. - 12:10 p.m.	4E	PEDCS	<i>SPECIALIST SESSION:</i> Characterization and Manufacture of HTPB	Grand Ballroom G	Open
8:00 a.m. - 10:05 a.m.	4F	SMBS	Structural Analysis and Design - I	Grand Ballroom H	Open
8:00 a.m. - 11:05 a.m.	4G	SEPS	Toxicology / Environmental	Grand Ballroom I	Open
11:05 a.m. - 11:35 a.m.	4G	SEPS	<i>PANEL MEETING:</i> Occupational Health and Toxicology	Grand Ballroom I	Open
11:35 a.m. - 12:05 p.m.	4G	SEPS	<i>PANEL MEETING:</i> Environmental Protection	Grand Ballroom I	Open
9:35 a.m. - 10:35 a.m.	Networking Area Refreshments			Grand Ballroom F	Open
12:00 p.m. - 1:30 p.m.	Lunch Break - <i>On Your Own</i>				
1:30 p.m. - 5:35 p.m.	Thursday Afternoon Technical Sessions, Specialist Sessions, and Panel Meetings				
1:30 p.m. - 3:35 p.m.	4M	PEDCS	Gun Propulsion Component, Formulation and Development - II	Grand Ballroom B	Open
1:30 p.m. - 2:35 p.m.	4N	RNTS	Single Stage to Orbit Nozzle Technology	Grand Ballroom C	Open
2:35 p.m. - 3:35 p.m.	4N	RNTS	<i>PANEL MEETING:</i> Nozzle Design, Analysis, and Testing	Grand Ballroom C	Open
1:30 p.m. - 5:35 p.m.	4O	PEDCS	Joint Insensitive Munitions Technology Program - II	Grand Ballroom D	Open
1:30 p.m. - 5:35 p.m.	4P	PIB	<i>SPECIALIST SESSION:</i> Rocket Motor Industrial Base Issues (What Keeps Program Offices Up at Night?)	Grand Ballroom E	Open
1:30 p.m. - 3:05 p.m.	4Q	PEDCS	Surveillance and Aging	Grand Ballroom G	Open
3:05 p.m. - 4:05 p.m.	4Q	PEDCS	<i>PANEL MEETING:</i> Propellants and Explosives Surveillance and Aging	Grand Ballroom G	Open
1:30 p.m. - 3:35 p.m.	4R	SMBS	Structural Analysis and Design - II	Grand Ballroom H	Open
3:35 p.m. - 4:35 p.m.	4R	SMBS	<i>PANEL MEETING:</i> Structural Analysis and Design	Grand Ballroom H	Open
1:30 p.m. - 3:35 p.m.	4S	SEPS	Range and Explosives Safety	Grand Ballroom I	Open
3:35 p.m. - 4:35 p.m.	4S	SEPS	<i>PANEL MEETING:</i> Range Safety and Atmospheric Modeling	Grand Ballroom I	Open
1:30 p.m. - 3:05 p.m.	4T	SMBS	Nondestructive Evaluation - II	Grand Ballroom J	Open
3:35 p.m. - 4:35 p.m.	4T	SMBS	<i>PANEL MEETING:</i> Nondestructive Evaluation	Grand Ballroom J	Open
3:05 p.m. - 4:05 p.m.	Networking Area Refreshments			Grand Ballroom F	Open
6:00 p.m. - 7:00 p.m.	SEPS Technical Steering Group Meeting			Brighton	Closed
6:00 p.m. - 9:00 p.m.	PEDCS Technical Steering Group Meeting			Alta	Closed
7:00 p.m. - 8:30 p.m.	SMBS Technical Steering Group Meeting			Snowbird	Closed

SCHEDULE - Friday & Saturday, 11 - 12 December				
8:00 a.m. - 5:00 p.m.	2-Day Blast & Fragmentation Course - <i>separate registration fee required</i>		Snowbird & Brighton	Open