

**SPACE TECHNOLOGY & APPLICATIONS  
INTERNATIONAL FORUM (STAIF-2008)**  
February 10 - 14, 2008

**“Enabling Space Exploration”**

**PROGRAM BOOK**

**12<sup>th</sup> CONFERENCE ON THERMOPHYSICS APPLICATIONS IN  
MICROGRAVITY**

**1<sup>st</sup> SYMPOSIUM ON SPACE RESOURCE UTILIZATION**

**25<sup>th</sup> SYMPOSIUM ON SPACE NUCLEAR POWER AND PROPULSION**

**6<sup>th</sup> CONFERENCE ON HUMAN/ROBOTIC TECHNOLOGY AND THE  
VISION FOR SPACE EXPLORATION**

**6<sup>th</sup> SYMPOSIUM ON SPACE COLONIZATION**

**5<sup>th</sup> SYMPOSIUM ON NEW FRONTIERS AND FUTURE CONCEPTS**

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Paragon Space Development Corp.  
Pennsylvania State University  
Physical Sciences, Inc.  
Plasma Processes, Inc.  
Plus Ultra Technologies, Inc.  
Pratt & Whitney Rocketdyne  
QASAR Technologies  
Quanics.com  
RCIG, Inc.  
RenMar Enterprises, Inc.  
Rensselaer Polytechnic Institute  
Sandia National Laboratories  
SCITOR Corporation  
Seattle Museum of Flight  
Seculine Consulting  
Sholtis Engineering and Safety Consulting  
Snyder Technical Services/ Jacobs  
Space Settlement Design Competitions  
State University of New York at Stony Brook  
St-Petersburg State University  
of Information Technologies  
Sunpower, Inc.  
Swales Aerospace  
Teledyne Energy Systems, Inc.  
Texas A&M University  
The Aerospace Corporation  
The Boeing Company  
The Jamestown Group/ High Frontier  
Thermacore International, Inc.  
Tietronix Software  
TRAC Labs, Inc.  
United Launch Alliance  
University of Arkansas  
University of Colorado  
University of Dayton  
University of Florida  
University of Illinois, Urbana-Champaign  
University of Kentucky  
University of Louisiana  
University of Michigan  
University of Missouri  
University of Missouri-Rolla  
University of New Mexico  
University of South Carolina  
University of Southern California  
University of Toronto  
University of Trento  
University of Washington  
University of Wisconsin  
US Air Force Research Laboratory  
US Department of Defense  
US Department of Energy  
Waseda University  
West Virginia University

## EXHIBITS

*Hotel Albuquerque, Exhibit Area, North/East Atrium and Alvarado E*

Sunday, February 10, 2008

Exhibitor Move-In, Noon - 6:00 p.m.

STAIF-2008 Preliminary Program

Monday, February 11, 2008 Exhibit Hours, 8:30 a.m. - 12:00 p.m., 2:00 p.m. - 7:00 p.m.  
Tuesday, February 12, 2008 Exhibit Hours, 8:30 a.m. - 12:00 p.m., 2:00 p.m. - 5:00 p.m.,  
6:00 p.m. - 7:00 p.m.  
Wednesday, February 13, 2008 Exhibit Hours, 8:30 a.m. - 12:00 p.m., 2:00 p.m. - 4:30 p.m.  
Exhibitor Move-Out, 4:30 p.m. - 8:30 p.m.

## **EXHIBITORS**

**Advanced Cooling Technologies, Inc.**

**ATK**

**Center for Space Nuclear Research**

**Hamilton Sundstrand**

**Idaho National Laboratory**

**L3 Electronics Technologies**

**NASA Marshall**

**University of New Mexico-ISNPS**

**Lockheed Martin Space Systems  
Company**

**NASA Glenn Research Center**

**NASA Marshall Space Flight Center**

**Thermacore International, Inc.**

**Sandia National Laboratories**

**Sunpower, Inc.**

## AWARDS AND OUTREACH

### SCHREIBER-SPENCE ACHIEVEMENT AWARD

The Schreiber-Spence Space Achievement Award was established by The University of New Mexico's Institute for Space and Nuclear Power Studies to recognize contributions that have advanced capabilities in space technologies and applications through excellence in pioneering applications, technical contributions, public service, or leadership. The award consists of a memento and a monetary award of \$2,500 (shared equally if there are multiple awardees who have contributed jointly). Presented by the Institute, the award is given when a worthy person (or persons contributing jointly) is identified by the Awards Committee. The award is not given more frequently than, nor necessarily, annually. The Award(s) will be presented at the STAIF-2008 Banquet. The awardee(s) is expected to attend the STAIF Conference, at which the award is given, and to address the attendees on a relevant topic. The award honors Raemer E. Schreiber and Roderick W. Spence for their pioneering and technical contributions to concepts and designs for nuclear propulsion in space during their tenure at Los Alamos National Laboratory.

**NOMINATION:** Nominations for the award can be submitted at any time to The University of New Mexico's Institute for Space and Nuclear Power Studies, c/o Schreiber-Spence Space Achievement Award, on the special nomination form. The final selection for the award will be made based on the criteria described in the award bylaws. A copy of the award bylaws and the nomination form can be obtained by writing to the Institute or by calling (505) 277-0446. Nominations will be retained for consideration for a three-year period.

**SELECTION CRITERIA:** Strict selection criteria have not been adopted, nor judged to be appropriate, except as they are implicit in the purposes for which the Award has been established and as noted in the first paragraph of these "Guidelines." Additionally, contributions are, or have been, substantial and specific, and contributions acknowledged to be worthy of unusual recognition for excellence by those actively engaged in the field of space technologies and applications.

**NOMINATION FORM:** To be considered by the Award Committee, all sections of the Nomination Form must be completed in compliance with the requirements. The Award Committee will place particular emphasis in its review of the nominations on evidence substantiating the excellence of the contributions noted in the citation and as contained in the basis for the nomination. Nominations can be submitted at any time on the Nomination Form to ISNPS.

#### **2008 AWARD COMMITTEE:**

**Lawrence DeFillipo** (Chair), Science Applications International; **Robert L. Wiley** (co-chair), U.S. Department of Energy; **Kenneth R. Johnson**, Jet Propulsion Laboratory; **Stanley K. Borowski**, NASA Glenn Research Center; **Stanley Gunn**, Rocketdyne (Retired); **Eric Rice**, Orbital Technologies Corporation (ORBITEC); **Harrison Schmitt**, Consultant; and **Ted Swanson**, NASA Goddard Space Flight Center.

#### **Recipients of the Schreiber-Spence Space Achievement Award:**

1988 Raemer E. Schreiber  
1988 Roderick W. Spence  
1990 Jerome Mullein  
1990 William E. Wright  
1991 Stanley V. Gunn  
1992 Harold B. Finger  
1993 Robert T. Carpenter  
1993 James J. Lombardo  
1994 George Gryaznov, Russia  
1994 Victor Ya. Poupko, Russia

1995 Martin Marietta Astro Space RTG Team  
1996 SNAP-10A Team  
1996 Gary L. Bennett  
1997 Wesley T. Huntress  
1998 The Cassini Mission Power Source Team  
1999 NSTAR Team and SCARLET Team  
2002 Robert L. Wiley  
2003 Robert L. Forward  
2003 Teledyne Transit/ Nimbis/ Pioneer/Viking/  
RTG Team

## STAIF-2008 Preliminary Program

2004 Robert W. Bussard  
2005 Ronald J. Sovie,  
Franklin P. Durham, and Keith Boyer Team  
2006 Milton Klein

2007 Chauncey Starr  
**2008 TBD**

### About the Schreiber-Spence Achievement Award Memento

Each Schreiber-Spence Achievement memento is handcrafted following the original design for the award by Mark D. Hoover, a former STAIF publications co-chair, and one of the co-founders of the Symposium Series. Because the scientific contributions each Schreiber-Spence awardee

has made to the field are unique, Hoover believes “the mementos should be unique in the world,” as well. Hoover creates the bases himself of solid walnut, while the logo-etched glass component is made by a local Albuquerque artisan.

## MANUEL LUJAN, JR. STUDENT PAPER AWARD

The Manuel Lujan, Jr. Student Paper Award was established in 1987 by The University of New Mexico’s Institute for Space and Nuclear Power Studies to recognize outstanding contributions by students in the field addressed at all conferences and symposia of the Space Technology & Applications International Forum. Up to two awards could be granted at the forum, with each consisting of a certificate and \$500.00, shared equally if more than one awardee. The award is given by the Institute when worthy contributions are identified by the award committee.

**NOMINATION CRITERIA:** Nominations for the award will be based on the quality of the paper published in the STAIF proceedings, as well as on the technical quality and originality of the oral presentation at the annual meeting. For

a paper to be considered for the award, it must have the student as the lead author and he or she must have done the majority of the research.

### 2008 AWARD COMMITTEE:

**Robert S. Reid**, (Chair) Los Alamos National Laboratory; **Jonathan Stabb**, Jet Propulsion Laboratory; **Jack Chan**, Lockheed Martin Space Systems Company; **Stephen Gaddis**, NASA Marshall Space Flight Center; **Travis Knight**, University of South Carolina; **Mike Pauken**, Jet Propulsion Laboratory; **Thomas Reinarts**, NASA Kennedy Space Center; **Emanuel Tward**, Northrop Grumman; and **Jim Woodward**, California State University

### Recipients of the Manuel Lujan, Jr. Student Paper Award:

1988-Vladimir Valentakovich, University of California at LA  
1989-John McGhee, ISNPS, University of New Mexico  
1990-John Metzger, ISNPS, University of New Mexico  
1991-Theodore Tessner, Oregon Graduate Institute of Science  
1992-Christopher S. Murray, ISNPS, University of New Mexico  
1992-Ronald A. Pawlowski, Oregon State University  
1992-Bernard R. Wernsman, ISNPS, University of New Mexico  
1993-Jonathan Witter, Massachusetts Institute of Technology  
1994-David I. Poston, University of Michigan  
1995-Jun Liu, Auburn University  
1996-James R. Luke, ISNPS, University of New Mexico

1996-Jean-Michel Tournier, ISNPS, University of New Mexico  
1998-Jeffrey S. Allen, University of Dayton  
1999-Gerrit Wölk, University of Bremen, Germany  
1999-Thomas L. Mahood, California State University  
2000-Jeffrey C. King, ISNPS, University of New Mexico  
2001-Eric Choiniere, University of Michigan  
2002-David P. Morris, University of Michigan  
2004-Shannon Bragg-Sitton, University of Michigan  
2005-Jeffrey C. King, ISNPS, University of New Mexico  
2006-Steven A. Hatton, ISNPS, University of New Mexico  
2006-Benjamin Amiri, University of Florida  
**2007-Thomas Liu**, University of Michigan

## OUTSTANDING PAPER AWARDS

The Space Nuclear Power and Propulsion Outstanding Paper Award was established in 1992 by The University of New Mexico's Institute for Space and Nuclear Power Studies (ISNPS) to recognize outstanding technical contributions to the fields of all hosted conferences and symposia of the Space Technology and Applications International Forum (STAIF). The recognition of an outstanding contribution is based upon the written paper published in the STAIF Proceedings and the content of the presentation at the meeting. The award is presented by ISNPS upon the recommendation of the STAIF Award Committees.

### NOMINATION AND EVALUATION

PROCEDURE: Contributions from STAIF conferences could be nominated by the session chair and co-chair, or any member of that conference or symposia Outstanding Paper Award Subcommittee. Nomination forms will be given to the session chairs and co-chairs at the speakers' breakfast. Individuals who wish to have their contribution or a colleague's contribution considered may request that a member of the Outstanding Paper Award Committee attend the session in which the presentation will be made. The request must be made in writing to the ISNPS office or to the STAIF Outstanding Paper Award Committee Chair. For consideration, nominations must be received by the ISNPS office or Outstanding Paper Award Committee Chair by the 2nd Friday in February following the STAIF Conference.

### NOMINATION AND EVALUATION

CRITERIA: The paper and the content of the presentation represents a technical contribution that (1) has an influential impact on the field of the topic of the conference or symposia in which it was presented, (2) has lasting technical value, and (3) is likely to be built upon and referenced by their peers. The primary emphasis in the selection of the award will be based on the written paper. In the case of a close decision, input from subcommittee members who heard the oral presentation and the session chair and co-chair may be used to render a final decision. The paper must be well written, well organized, and have appropriate references and acknowledgments. The paper must also present a complete and scientifically sound analysis. The STAIF Outstanding Paper Award is presented for technical contributions. While

overview and historical papers are important for the historical archives, they will not be considered for the award. The author(s) must be a major technical contributor to the work. The paper should also acknowledge all major technical contributors to the work who are not co-authors.

### 2008 AWARD COMMITTEES:

*Conference on Thermophysics Applications in Microgravity:* **Tung L. Lam**, (Chair) The Aerospace Corporation; **R. Panneer Selvam**, University of Arkansas; **Eric Silk**, NASA Goddard Space Flight Center; **Kirk Yerkes**, U.S. Air Force Research Laboratory.

*Symposium on Space Nuclear Power and Propulsion:* **Michael Houts**, (Chair) NASA Marshall Space Flight Center; **Robert Abelson**, Jet Propulsion Laboratory; **Patrick Frye**, Pratt & Whitney Rocketdyne; **Melissa Van Dyke**, NASA Marshall Space Flight Center; **James Werner**, Idaho National Laboratory; **Ron Lipinski**, Sandia National Laboratories; **Lee Mason**, NASA Glenn Research Center; **Abraham Weitzberg**; Consultant, **Bernard Wernsman**, Bechtel Bettis, Inc.

*Symposium on Space Colonization:* **Edward McCullough**, (Chair) The Boeing Company; **Mark Benton**, The Boeing Company; **Klaus Heiss**, The Jamestown Group/High Frontier.

*Symposium on New Frontiers and Future Concepts:* **Glen A. Robertson**, (Chair) Gravi Atomic Research; **Michael LaPointe**, NASA Marshall Space Flight Center; **Raymond A. Lewis**, NASA Marshall Space Flight Center; **Clive Woods**, Louisiana State University; **Eric Davis**, Institute for Advanced Studies at Austin.

### RECIPIENTS OF 2007 AWARDS

**12<sup>th</sup> Conference on Thermophysics in Microgravity:** James R. Gaier and **Donald A.**

## STAIF-2008 Preliminary Program

**Jaworske**, NASA Glenn Research Center, Cleveland, OH, USA, for their paper, "Lunar Dust on Heat Rejection System Surfaces: Problems and Prospects."

**25<sup>th</sup> Symposium on Space Nuclear Power and Propulsion:** **David I. Poston, David D. Dixon, Thomas Marcille, and Benjamin W. Amiri**, Los Alamos National Laboratory, Nuclear Systems Design Group, NM, USA, for their paper, "FRINK – A Code to Evaluate Space Reactor Transients."

**5<sup>th</sup> Symposium on New Frontiers and Future Concepts:** **Martin Tajmar, Florin Plesescu,**

**Bernhard Seifert, and Klaus Marhold**, Space Propulsion, ARC Seibersdorf Research GmbH, Seibersdorf, Austria, for their paper, "Measurement of Gravitomagnetic and Acceleration Fields around Rotating Superconductors."

**6<sup>th</sup> Conference on Space Colonization:** **Eric H. Cardiff, Brian R. Pomeroy, Ian S. Banks**, NASA Goddard Space Flight Center, Greenbelt, MD, USA; and **Alexis Benz**, University of Michigan, Ann Arbor, MI, USA, for their paper, "Vacuum Pyrolysis and Related ISRU Techniques."

## GENERAL ERNEST C. HARDIN SCHOLARSHIP AWARD

This scholarship fund was established in 1986 by The University of New Mexico's Institute for Space and Nuclear Power Studies to recognize outstanding undergraduate and graduate students in engineering and science disciplines with emphasis on space science and technology and related fields. Several awards are offered annually to deserving students. This year's awards consist of a certificate of recognition and a \$1000 monetary sum.

This year's recipients are **Bruno Gallo, Tai Pham, and Timothy Schriener, Ph.D.**, candidates in the University of New Mexico's Department of Chemical and Nuclear Engineering and Research Assistants in the Institute for Space and Nuclear Power Studies.

## 20<sup>TH</sup> SECONDARY SCHOOL SPECIAL SESSION AND SPACE DESIGN COMPETITION

The 20<sup>th</sup> Secondary School Special Session and the 20<sup>th</sup> Annual Space Design Competition are events sponsored by the University of New Mexico's Institute for Space and Nuclear Power Studies, and are organized by **Susan Ostlie**, Madison Middle School, **Jack Parker, Tim Schriener, Bruno Gallo, and Tai Pham**, UNM-ISNPS. New Mexico secondary school students and teachers participating in the Space Design Competition are invited to attend the Secondary School Special Session where space related topics will be presented by members of the science and engineering committees. This year's design objective for the Space Design Competition is entitled, "Orbital Colony" Judging of the event will take place during the Secondary School Special Session, and the results of the competition will be presented during Plenary Session – II, Monday, February 11, 2008.

## PUBLICATIONS

Available from the American Institute of Physics, c/o Springer New York, Customer Service, 1-800-777-4643, or e-mailorders-ny@springer.com, or mail to Springer New York, P. O. Box 2485, Secaucus, NJ 07094-2485, USA (For North America, add \$5.00 for shipping and handling for the first volume, plus \$1.00 for each additional volume. For orders outside of North America, add \$10.00 for first volume and \$5.00 for each additional volume.)

Proc. Space Technology and Applications International Forum (**STAIF-2008**):  
AIP Conf. Proceedings 969, (1-vol.hardcover book), ISBN 978-0-7354-0486-1..... \$299.00  
CD-ROM Version, ISBN 978-0-7354-0487-8..... \$145.00

STAIF-2008 Preliminary Program

<b>Proc. Space Technology and Applications International Forum (STAIF-2007):</b>	
AIP Conf. Proceedings 880, (1-vol. hardcover book), ISBN 978-0-7354-0386-4.....	\$286.00
CD-ROM Version, ISBN 978-0-7354-0387-1 .....	\$145.00
<b>Proc. Space Technology and Applications International Forum (STAIF-2006):</b>	
AIP Conf. Proceedings 813, (1-vol. hardcover book), ISBN 0-7354-0305-8 .....	\$320.00
CD-ROM Version, ISBN 0-7354-0306-6.....	\$145.00
<b>Proc. Space Technology and Applications International Forum (STAIF-2005):</b>	
AIP Conf. Proceedings 746, (1-vol. hardcover book), ISBN 0-7354-0231-0.....	\$320.00
CD-ROM Version, ISBN 0-7354-0230-0.....	\$145.00
<b>Proc. Space Technology and Applications International Forum (STAIF-2004):</b>	
AIP Conf. Proceedings 699, (1-vol. hardcover book), ISBN 0-7354-0171-3.....	\$290.00
CD-ROM Version, ISBN 0-7354-0172-0.....	\$145.00
<b>Proc. Space Technology and Applications International Forum (STAIF-2003):</b>	
AIP Conf. Proceedings 654, (1-vol. hardcover book), ISBN 0-7354-0114-4.....	\$280.00
CD-ROM Version, ISBN 0-7354-0115-2.....	\$140.00
<b>Proc. Space Technology and Applications International Forum (STAIF-2002):</b>	
AIP Conf. Proceedings 608, (1-vol. hardcover book), ISBN 0-7354-0052-0.....	\$295.00
CD-ROM Version, ISBN 0-7354-0053-9.....	\$150.00
<b>Proc. Space Technology and Applications International Forum (STAIF-2001):</b>	
AIP Conf. Proceedings 552, (1-vol. hardcover book), ISBN 1-56396-980-7.....	\$280.00
CD-ROM Version, ISBN 1-56396-981-5.....	\$150.00
<b>Proc. Space Technology and Applications International Forum (STAIF-2000):</b>	
AIP Conf. Proceedings 504, (2-vol. hardcover set), ISBN 1-56396-919-X.....	\$300.00
CD-ROM Version, ISBN 1-56396-920-3.....	\$200.00
<b>Proc. Space Technology and Applications International Forum (STAIF-99):</b>	
AIP Conf. Proceedings 458, (2-vol. hardcover set), ISBN 1-56396-846-0 .....	\$300.00
CD-ROM Version, ISBN 1-56396-879-7.....	\$200.00
<b>Proc. Space Technology and Applications International Forum (STAIF-98):</b>	
AIP Conf. Proceedings 420 (3-vol. hardcover set), ISBN 1-56396-747-2.....	\$320.00
<b>Proc. 12<sup>th</sup> Symposium on Space Nuclear Power &amp; Propulsion, Conf. on Alternative Power from Space, and Conf. on Accelerator-Driven Transmutation Technologies and Applications (1995), AIP Conf. Proceedings 324 (2-vol. hardcover set), ISBN 1-56396-427-9.....</b>	
	\$225.00
<b>Proc. 1<sup>st</sup> Conf. on NASA Centers for Commercial Development of Space (1-vol. hardcover book), ISBN 1-56396-431-7, AIP Conf. Proceedings 325.....</b>	
	\$125.00
<b>A Critical Review of Space Nuclear Power &amp; Propulsion (1984-1993) (Anniversary Issue), AIP Press, ISBN 1-56396-317-5.....</b>	
	\$ 75.00
<b>Proceedings of the 10<sup>th</sup> Symposium (1993) (3-vol. hardcover set), ISBN 1-56396-137-7, AIP Conf. Proceedings 271.....</b>	
	\$275.00
<b>Proceedings of the 9<sup>th</sup> Symposium (1992) (3-vol. hardcover set), ISBN 1-56396-027-3, AIP Conf. Proceedings 246.....</b>	
	\$225.00
<b>Proceedings of the 8<sup>th</sup> Symposium (1991) (3-vol. hardcover set), ISBN 0-88318-838-4, AIP Conf. Proceedings 217.....</b>	
	\$175.00

## HOTEL ACCOMMODATIONS

Hotel Albuquerque, 800 Rio Grande Blvd. NW, Albuquerque, NM 87104  
 (505) 843-6300, Fax (505) 842-8426, Toll Free Reservations: 1-866-505-7829

Guest rooms have been reserved at the Hotel Albuquerque, located in Albuquerque's Old Town District, for those who identify themselves as participants of STAIF-2008. The rates are:

### ROOM RATES

Single Occupancy	\$75.00	Triple Occupancy	\$75.00
Double Occupancy	\$75.00	Quadruple Occupancy	\$75.00

ALL ATTENDEES ARE RESPONSIBLE FOR MAKING THEIR OWN RESERVATIONS DIRECTLY WITH THE HOTEL.

All group-rate reservation requests must be received by the hotel no later than January 25, 2008. Attendees must identify themselves as participants of STAIF-2008, the hotel will not be able to ensure the quoted group rate or guest room availability. Rates will not be changed at check-in or check-out for attendees who fail to identify their affiliation with this meeting. All reservations must be guaranteed with a one night's deposit in the form of credit card, check, or money order. Check-in time is 3:00 pm and Check-out is 12:00 pm. Contact the hotel for more information on reservation requirements and cancellation policies.

## REGISTRATION AND FEES

### *Hotel Albuquerque, Fireplace Room*

Sunday, February 10	4:30 pm - 7:30 pm
Monday, February 11	7:30 am - 12:00 pm, 1:00 pm - 4:30 pm
Tuesday, February 12	7:30 am - 11:30 pm, 1:00 pm - 4:30 pm
Wednesday, February 13	7:30 am - 11:30 pm, 1:00 pm - 4:30 pm
Thursday, February 14	7:30 am - 10:30 am

### ALL ATTENDEES AND EXHIBITORS MUST REGISTER & PAY A REGISTRATION FEE

	<u>Early</u>	<u>Late</u> (after 12/12/2007)
FULL REGISTRATION (a)	\$595.00	\$665.00
ONE DAY REGISTRATION (b)	\$395.00	\$435.00
STUDENT (c)	\$195.00	\$235.00
ADDITIONAL BANQUET TICKET (d)	\$45.00	\$50.00

(a) Full Registration Fee: Includes Technical Sessions, Tuesday banquet, daily coffee breaks, and a set of Proceedings on CD-ROM.

(b) One-Day Registration: Includes Technical Sessions, coffee breaks and a set of Proceedings on CD ROM. (Banquet tickets are not included, but are available for purchase).

(c) Student Registration: **TO QUALIFY, INDIVIDUALS MUST SHOW PROOF OF FULL TIME ENROLLMENT** for the 2008 Spring Semester. Pre-registrants should enclose a copy of their 2008 spring schedules. Registration fee includes a set of Proceedings on CD ROM, banquet ticket, and coffee breaks.

(d) Additional luncheon tickets can be purchased on-site if available, although pre-purchasing luncheon tickets is encouraged to help provide accurate numbers to the caterer.

Cash, corporate or personal checks, Visa and MasterCard will be accepted. Payment by a personal or corporate check should be made payable to: INSTITUTE FOR SPACE & NUCLEAR POWER STUDIES, STAIF-2008 Conferences, MSC01-1120, FEC Room 239, 1 University of New Mexico, Albuquerque, NM 87131-0001, (505) 277-2813 or (505) 277-0446.

## CANCELLATIONS AND REFUNDS

Those unable to attend the conferences may receive a refund of their registration fee (less a 20% processing charge) by calling the Institute office at (505) 277-0446 or by email at: [isnps@unm.edu](mailto:isnps@unm.edu) no later than January 7, 2008. All refunds will be made promptly by mail. **NO REFUNDS WILL BE ISSUED after January 7, 2008.**

## AWARDS BANQUET

Tuesday, February 12, 6:45 pm – 9:00 pm, Alvarado Ballroom A, B, C, and D, Hotel Albuquerque.

One banquet ticket will be included with each full registration. Additional tickets must be purchased in advance. Please be certain that you and each of your guests have registered. *All guests must check in at registration to receive their name badge and banquet tickets.* Guest banquet tickets will **not** be included in the host's registration packet.

**Master of Ceremonies: Brewster Shaw, The Boeing Company, Houston, TX**

**Guest Speaker: TBD**

## CHAIRS' AND SPEAKERS' BREAKFAST

All STAIF-2008 speakers and session chairs are requested to attend the hosted Speakers' Breakfast from 7:00 am to 7:45 am in the Franciscan Room on the day of their session or presentation to discuss the session arrangements and guidelines.

## AUDIO / VISUAL EQUIPMENT

One (1) LCD Data Projector, and one (1) screen will be provided at all sessions. A slide or overhead projector will also be provided on request without charge. Additional A/V equipment must be ordered through Institute personnel, in advance, and paid for by the author. Please call (505) 277-0446 with special requests. Attendees must provide their own laptop computers.

## COMMITTEE MEETINGS

### Schreiber-Spence Award Committee

Monday, February 11, 12:30 pm - 1:45 pm, **Weavers Room**

### Technical Program Committees

Tuesday 12:15 pm – 1:30 pm

(All Session Chairs and Co-Chairs are committee members. Lunch is available for purchase)

12<sup>th</sup> Conference on Thermophysics Applications in Microgravity,

**Alvarado A**

1<sup>st</sup> Symposium on Space Resource Utilization, **Turquoise**

25<sup>th</sup> Symposium on Space Nuclear Power and Propulsion, **Alvarado B/C**

6<sup>th</sup> Conference on Human/Robotic Tech. and the Vision for Space Exploration,

**Alvarado D**

6<sup>th</sup> Symposium on Space Colonization, **Alvarado G/H**

5<sup>th</sup> Symposium on New Frontiers and Future Concepts, **Alvarado F**

## PROGRAM ACTIVITIES

### SUNDAY, February 10, 2008

4:30 pm - 7:30 pm **Registration**, Fireplace Room

### MONDAY, February 11, 2008

7:00 am - 7:45 am **Speakers' Breakfast**, Franciscan Room  
 7:30 am - 12:00 pm **Registration**, Fireplace Room  
 8:00 am - 12:30 pm **Space Design Competition**, North/East Atrium  
 8:00 am - 8:15 am **Opening Remarks and Keynote Speech**, Alvarado Ballroom A/B/C/D  
 8:15 am - 10:15 am **Plenary Session I**, Alvarado Ballroom A/B/C/D  
 10:00 am - 10:30 am **Coffee Break**, East/North Atrium, and Alvarado E  
 10:30 am - 12:00 pm **Plenary Session II**, Alvarado Ballroom A/B/C/D  
 10:00 am - 12:00 pm **Secondary School Special Session**, Alvarado G/H  
 12:00 pm - 12:20 pm **Space Design Competition Awards Ceremony**, Alvarado Ballroom A/B/C/D  
 12:30 pm - 1:45 pm **Lunch Break**  
 12:30 pm - 1:45 pm **Schreiber-Spence Award Committee Meeting**, Weavers Room  
 1:00 pm - 4:30 pm **Registration**, Fireplace Room  
 1:45 pm - 3:45 pm **Technical Sessions** (see table of contents or centerfold for time and room)  
 3:45 pm - 4:00 pm **Coffee Break**, East/North Atrium and Alvarado E  
 4:00 pm - 6:00 pm **Technical Sessions** (see table of contents or centerfold for time and room)  
 6:00 pm - 7:00 pm **STAIF-08 Reception**, North/East Atrium and Alvarado E  
 7:00 pm - 8:30 pm **Special Plenary-25<sup>th</sup> Anniversary of Symposium on Space Nuclear Power and Propulsion**, Franciscan Room

### TUESDAY, February 12, 2008

7:00 am - 7:45 am **Speakers' Breakfast**, Franciscan Room  
 7:30 am - 11:30 am **Registration**, Fireplace Room  
 8:00 am - 10:00 am **Technical Sessions** (see table of contents or centerfold for time and room)  
 10:00 am - 10:15 am **Coffee Break**, East/North Atrium and Alvarado E  
 10:15 am - 12:15 pm **Technical Sessions** (see table of contents or centerfold for time and room)  
 12:15 pm - 1:30 pm **Lunch Break**  
 12:15 pm - 1:30 pm **STAIF Technical Program Committee Meetings**  
     12<sup>th</sup> Conference on Thermophysics Applications in Microgravity, Alvarado A  
     1<sup>st</sup> Symposium on Space Resource Utilization, Turquoise Room  
     25<sup>th</sup> Symposium on Space Nuclear Power and Propulsion, Alvarado G/H  
     6<sup>th</sup> Conference on Human/Robotic Technology and the Vision for Space Exploration, Alvarado F  
     6<sup>th</sup> Symposium on Space Colonization, Potters Room  
     5<sup>th</sup> Symposium on New Frontiers and Future Concepts, Weavers Room  
 1:00 pm - 4:30 pm **Registration**, Fireplace Room  
 1:30 pm - 3:30 pm **Technical Sessions** (see table of contents or centerfold for time and room)  
 3:30 pm - 3:45 pm **Coffee Break**, East/North Atrium and Alvarado E  
 3:45 pm - 5:45 pm **Technical Sessions** (see table of contents or centerfold for time and room)  
 6:15 pm - 6:45 pm **No-Host Cocktail Reception**, North/East Atrium and Alvarado E  
 6:45 pm - 9:00 pm **STAIF-2008 Awards Banquet**, Alvarado A/B/C/D

### WEDNESDAY, February 13, 2008

7:00 am - 7:45 am **Speakers' Breakfast**, Franciscan Room  
 7:30 am - 11:30 am **Registration**, Fireplace Room  
 8:00 am - 10:00 am **Technical Sessions** (see table of contents or centerfold for time and room)  
 10:00 am - 10:15 am **Coffee Break**, East/North Atrium and Alvarado E  
 10:15 am - 12:15 pm **Technical Sessions** (see table of contents or centerfold for time and room)  
 12:15 pm - 1:30 pm **Lunch Break**  
 1:00 pm - 4:30 pm **Registration**, Fireplace Room  
 1:30 pm - 3:30 pm **Technical Sessions** (see table of contents or centerfold for time and room)  
 3:30 pm - 3:45 pm **Coffee Break**, East/North Atrium and Alvarado E  
 3:45 pm - 5:45 pm **Technical Sessions** (see table of contents or centerfold for time and room)

### THURSDAY, February 14, 2008

7:00 am - 7:45 am **Speakers' Breakfast**, Franciscan Room  
 7:30 am - 10:30 am **Registration**, Fireplace Room  
 8:00 am - 10:00 am **Technical Sessions** (see table of contents or centerfold for time and room)  
 10:00 am - 10:15 am **Coffee Break**, East/North Atrium  
 10:15 am - 12:15 pm **Technical Sessions** (see table of contents or centerfold for time and room)

## OPENING REMARKS AND KEYNOTE SPEAKER

*Monday, February 11, 8:00 am – 8:15 am, Alvarado Ballroom A,B,C,D*

**Brewster Shaw**, STAIF-2008 General Chair, The Boeing Company, TX.

**Harold McFarlane**, STAIF-2008 General Co-Chair, Idaho National Laboratory, ID.

## PLENARY SESSION I: WHY SPACE EXPLORATION?

*Monday, February 11, 8:15 am – 10:15 am, Alvarado Ballroom A, B, C, D*

**Brewster Shaw**, Chair  
VP & General Manager, Space Exploration  
The Boeing Company  
Houston, TX

**Harold McFarlane**, Co-Chair  
Associate Director  
Idaho National Laboratory

**Representative Heather Wilson (R-NM)**, 1<sup>st</sup> District of New Mexico, **(Invited)**  
**Tom Cremins**, Deputy Associate Administrator for Management and Policy, Exploration  
Systems Mission Directorate, NASA Headquarters, Washington, D. C.  
**Pete Worden**, **Director**, NASA Ames Research Center, Moffett Field, CA  
**Barbara Morgan**, Astronaut, NASA Johnson Space Center, Houston, TX **(Invited)**  
**Michael Anastasio**, Director, Los Alamos National Laboratory, Los Alamos, NM  
**(Invited)**

## PLENARY SESSION II: MAKING EXPLORATION AFFORDABLE

*Monday, February 11, 10:30 am - 12:00 pm, Alvarado Ballroom A, B, C, D*

**Wade Carroll**, Chair  
Deputy Director, Office of Nuclear Energy  
Germantown, MD

**John Stevens**, Co-Chair  
Director, Space Nuclear Systems  
& Technology Division  
Idaho National Laboratory, Idaho Falls, ID

**Owen Lowe**, **Director**, U.S. Department of Energy, Germantown, MD  
**Benjamin Newman**, Deputy Director, Advanced Capabilities Division, NASA  
Headquarters, Washington, DC  
**David R. Criswell**, Director, Institute for Space Systems Operations, University of  
Houston, Houston, TX

### 12:00 pm - Space Design Competition Awards Ceremony

**Astronaut- Barbara Morgan**, NASA Johnson Space Center  
**Brewster Shaw**, The Boeing Company, STAIF-08, General Chair  
**Harold McFarlane**, Idaho National Laboratory, STAIF-08, General Co-Chair  
**Mohamed El-Genk**, University of New Mexico, STAIF-08, Technical Publications  
Chair

STAIF-2008 Preliminary Program

## **SECONDARY SCHOOL SPECIAL SESSION**

*Monday, February 11, 10:00 am - 12:00 pm – Alvarado G/H*

**Tai T. Pham**, Chair  
UNM-ISNPS

**Tim Schriener**, Co-Chair  
UNM-ISNPS

## **20<sup>TH</sup> SPACE DESIGN COMPETITION: ORBITAL COLONY**

*Monday, February 11, 8:00 am – 12:30 pm – North/East Atrium*

**Tim Schriener**, Chair  
UNM-ISNPS

**Bruno Gallo**, Co-Chair  
UNM-ISNPS

## **STAIF-08 RECEPTION CELEBRATING THE 50<sup>TH</sup> ANNIVERSARY OF NASA AND THE 25<sup>TH</sup> ANNIVERSARY OF STAIF**

*Monday, February 11, 6:00 pm - 7:00 pm – North/East Atrium and Alvarado E*

## **SPECIAL EVENING PLENARY: 25<sup>TH</sup> ANNIVERSARY OF SYMPOSIUM ON SPACE NUCLEAR POWER AND PROPULSION**

*Monday, February 11, 7:00 pm - 8:30 pm – Franciscan Room*

**Mike Houts**, Chair  
NASA Marshall Space Flight Center  
Huntsville, AL

**Mohamed El-Genk**, Co-Chair  
University of New Mexico  
Albuquerque, NM

# TECHNICAL SESSIONS

MONDAY, FEBRUARY 11, 2008

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## [A01] Opening Session: Round Table Discussion on Current Issues in Thermal Technology

*Monday, February 11, 2008, 1:45 pm - 3:45 pm - Potters Room*

**Chairs:** Ted Swanson, NASA Goddard Space Flight Center, Greenbelt, MD, USA  
Tung T. Lam, The Aerospace Corporation, Los Angeles, CA, USA

M. S. El-Genk, Institute for Space and Nuclear Power Studies, University of New Mexico, Albuquerque, NM, USA

C. D. Butler, NASA Goddard Space Flight Center, Greenbelt, MD, USA (Invited)

## [B01] Lunar Resource Utilization - I

*Monday, February 11, 2008, 1:45 pm - 3:45 pm - Turquoise Room*

**Chairs:** Edgardo Santiago, NASA Kennedy Space Center, Uninc Brevard County, FL, USA  
Takashi Nakamura, Physical Sciences, Inc., San Ramon, CA, USA

### *1:45 pm - Carbothermal Processing of Lunar Regolith Using Methane*

R. Balasubramaniam, U. Hegde, National Center for Space Exploration Research (NCSEER), NASA Glenn Research Center, Cleveland, Ohio, USA; and S. Gokoglu, NASA Glenn Research Center, Cleveland, Ohio, USA

### *2:15 pm - Oxygen Production on the Moon: Hydrogen Reduction for the PILOT Program*

D. L. Clark, T. Muff, Lockheed Martin Space Systems Company, Denver, CO, USA; and T. Simon, NASA Johnson Space Center, Houston, TX, USA

### *2:45 pm - Oxygen Production via Carbothermal Reduction of Lunar Regolith*

R. Gustafson and B.C. White, Orbital Technologies Corporation (ORBITECTM), Madison, WI, USA

### *3:15 pm - Selection, Development and Results for The RESOLVE Regolith Volatiles Characterization Analytical System*

D. E. Lueck, J. E. Captain, Sciences Division, Applied Technology Directorate, John F. Kennedy Space Center, National Aeronautics and Space Administration, Kennedy Space Center, FL, USA; T. L. Gibson, B. V. Peterson, and C. M. Berger, Applied Sciences & Technology, Artic Slope Research Corporation Aerospace, Kennedy Space Center, FL, USA

## [CT01] Space Nuclear Symposium Opening Session - I

*Monday, February 11, 2008, 1:45 pm - 3:45 pm - Franciscan Room*

**Chairs:** Michael G. Houts, NASA Marshall Space Flight Center, Huntsville, AL  
Garry Burdick, Jet Propulsion Laboratory, Pasadena, CA

### *1:45 pm - AFSPS Study Results*

J. Nainiger, NASA Glenn Research Center, Cleveland, OH, USA

### *2:15 pm - Fission Surface Power*

J. Warren, NASA Headquarters, Washington, DC, USA

### *2:45 pm - Radioisotope Power for Solar System Exploration*

B. A. Harmon, NASA Headquarters, Washington, DC, USA

### *3:15 pm - Panel Discussion (all)*

## **[D01] Exploration Technology Opening Session**

*Monday, February 11, 2008, 1:45 pm - 3:45 pm - Alvarado F*

- Chairs:** John Mankins, Artemis Innovation Management Solutions, Ashburn, VA, USA  
Robert Wegeng, Pacific Northwest National Laboratory, Richland, WA, USA  
Christopher Moore, NASA Headquarters, Washington, D.C., USA
- 1:45 pm - Constellation Program's Technology Development Needs**  
L. Ham, NASA Johnson Space Center, Houston, TX, USA
- 2:15 pm - Lunar Robotic Precursor Missions in support of Lunar Science and Human Lunar Exploration**  
D. N. Jacobson, NASA Marshall Space Flight Center, Huntsville, AL, USA
- 2:45 pm - Major Scientific Goals in Space and the Architecture to Return Humans to the Moon**  
H. Thronson, NASA Goddard Space Flight Center, Greenbelt, MD, USA
- 3:15 pm - Panel Discussion (all)**

## **[E01] Space Colonization - Opening Session I**

*Monday, February 11, 2008, 1:45 pm - 3:45 pm - Weavers Room*

- Chairs:** Klaus Heiss, The Jamestown Group/High Frontier, Alexandria, VA, USA  
Narayanan Ramachandran, Jacobs Technology, Huntsville, AL, USA
- 1:45 pm - Evolving Enterprise from Exploration**  
G. Woodcock, Gray Research Inc., Huntsville, AL, USA
- 2:15 pm - Introduction and Overview of Space Colonization**  
K. Heiss, The Jamestown Group/High Frontier, Alexandria, VA, USA
- 2:45 pm - Lunar Solar Power Industries to Seed Human Habitation of the Solar System**  
D. R. Criswell, Institute For Space Systems Operations, University of Houston, Houston, TX, USA
- 3:15 pm - Panel Discussion (all)**

## **[F01] Opening Session**

*Monday, February 11, 2008, 1:45 - 3:45 pm - Alvarado G/H*

- Chairs:** Paul A. Murad, New Frontiers and Future Concepts, Vienna, VA, USA  
Glen A. Robertson, Gravi Atomic Research. LLC, Madison, AL, USA
- 1:45pm - Opening Session Introduction**  
P. A. Murad, New Frontiers and Future Concepts, Vienna, VA, USA
- 2:15 pm - Guerilla Financing for Paper Napkin Plans, Garage Shop Technologies, and Ongoing Relationships**  
D. Mathes, Space Lines LLC, Rocklin, CA, USA
- 2:45 pm - The Economics of van der Waals Force Engineering**  
F. Pinto, InterStellar Technologies Corporation, Monrovia, CA, USA
- 3:15 pm - Panel Discussion (all)**

## **[A02] Thermal Control Technologies - I**

*Monday, February 11, 2008, 4:00 pm - 6:00 pm - Potters Room*

- Chairs:** Michael Pauken, Jet Propulsion Laboratory, Pasadena, CA, USA  
Scott Garner, Advanced Cooling Technologies, Inc., Lancaster, PA, USA
- 4:00 pm - Demonstration of a Plug-And-Play Approach to Spacecraft Thermal Control System Design**  
E. B. Maxwell, G. S. Cole, R. P. Scaringe, Mainstream Engineering Corporation, Rockledge, FL, USA; and J. Didion, NASA Goddard Spaceflight Center, Greenbelt, MD, USA
- 4:30 pm - Experimental Studies on CHF of Pool Boiling on Horizontal Conductive Micro Porous Coated Surfaces**

## STAIF-2008 Preliminary Program

C. Li and G. P. Peterson, Department of Mechanical Engineering, University of Colorado, Boulder, CO, USA

**5:00 pm - *Loop Heat Pipe Development Overview***

R. R. Riehl, N. dos Santos, National Institute for Space Research - INPE - Space Mechanics and Control Division-DMC, São José dos Campos, SP, Brazil

**5:30 pm - *Pressure Controlled Heat Pipe for Precise Temperature Control***

D. B. Sarraf, S. Tamanna, and P. M. Dussinger, Advanced Cooling Technologies, Inc. Lancaster, PA, USA

## **[B02] Lunar Resource Utilization - II**

*Monday, February 11, 2008, 4:00 pm - 6:00 pm - Turquoise Room*

**Chairs:** Laurent Sibille, ASRC Aerospace Corporation, NASA Kennedy Space Flight Center, FL, USA

Kevin Payne, Lockheed Martin Space Systems Company, Denver, CO, USA

**4:00 pm - *Advances in Molten Oxide Electrolysis for the Production of Oxygen and Metals from Lunar Regolith***

D. R. Sadoway, Massachusetts Institute of Technology, Cambridge, MA, USA

**4:30 pm - *Molten Materials Transfer and Handling on the Lunar Surface***

D. M. Stefanescu, Dept. of Materials Science and Engineering, Ohio State University, Columbus OH, USA; P. A. Curreri, and S. Sen, NASA Marshall Space Flight Center, Huntsville, AL, USA

**5:00 pm - *Plasma Processing of Lunar Regolith Simulant for Diverse Applications***

E. C. Schofield, J. S. O'Dell, Plasma Processes, Huntsville, AL, USA; and S. Sen, BAE Systems, Inc., NASA Marshall Space Flight Center, Huntsville, AL, USA

**5:30 pm - *Production of Methane from Plastic Waste from Human Lunar Presence***

J. Captain, NASA Kennedy Space Center, Orlando, FL, USA

## **[CT02] Space Nuclear Symposium Opening Session - II**

*Monday, February 11, 2008, 4:00 pm - 6:00 pm - Franciscan Room*

**Chairs:** Michael G. Houts, NASA Marshall Space Flight Center, MSFC, AL, USA

Garry Burdick, Jet Propulsion Laboratory, Pasadena, CA, USA

**4:00 pm - *AFSPS Reference Power System Concept - I***

L. S. Mason, NASA Glenn Research Center, Cleveland, OH, USA

**4:30 pm - *AFSPS Safety Approach***

S. A. Wright, Sandia National Laboratories, Albuquerque, NM, USA

**5:00 pm - *AFSPS Technology Program***

D. Palac, NASA Glenn Research Center, Cleveland, OH, USA

**5:30 pm - *Reference Reactor Module for the Affordable Fission Surface Power System***

D.I. Poston, R.J. Kapernick, D.D. Dixon, B. W. Amiri, and T. Marcille, Nuclear Systems Design Group, Los Alamos National Laboratory, Los Alamos, New Mexico, USA

## **[D02] Lunar and Mars Exploration Architecture Studies**

*Monday, February 11, 2008, 4:00 pm - 6:00 pm - Alvarado F*

**Chairs:** Richard T. Howard, NASA Marshall Space Flight Center, Huntsville, AL, USA

Jennifer D. Mitchell, NASA Johnson Space Center, Houston, TX, USA

**4:00 pm - *Canada as a Key Partner in Space Exploration***

J. Piedboeuf and G. Leclerc, Canadian Space Agency, St-Hubert, QC, Canada

**4:30 pm - *Lunar Surface Systems and Operations for an Early Human Outpost***

D. B. Smith, NASA Systems, The Boeing Company, Arlington, VA; and G. Woodcock, Gray Research, Huntsville, AL, USA

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- 5:00 pm - *NASA In-Situ Resource Utilization (ISRU) Technology and Development Project Overview*  
G. B. Sanders, NASA Johnson Space Center, Houston, TX, USA
- 5:30 pm - *Panel Discussion (all)*

**[E02] Space Colonization - Opening Session II**

*Monday, February 11, 2008, 4:00 pm - 6:00 pm - Weavers Room*

- Chairs:** Klaus Heiss, The Jamestown Group/High Frontier, Alexandria, VA, USA  
Narayanan Ramachandran, Jacobs Technology, Huntsville, AL, USA
- 4:00 pm - *Lunar Dust Mitigation Technology Development*  
M. J. Hyatt, NASA Glenn Research Center, Cleveland, OH, USA
- 4:30 pm - *NESC Overview and Mechanical Systems Lunar Dust Assessment*  
M. J. Dube, NASA Goddard Space Flight Center, Greenbelt, MD, USA
- 5:00 pm - *Toxicology Problems Related to Space Exploration*  
J. T. James, NASA Johnson Space Center, Houston, TX, USA
- 5:30 pm - *Discussion*  
N. Ramachandran, Jacobs Technology, Huntsville, AL, USA

**[F05] Other Concepts and Theories - III**

*Monday, February 11, 2008, 4:00 pm - 6:00 pm - Alvarado G/H*

- Chairs:** Raymond Lewis, Pennsylvania State University, Boalsburg, PA, USA  
Eric W. Davis, Institute for Advanced Studies, Austin, TX, USA
- 4:00 pm - *An Exploration Perspective of Beamed Energy Propulsion*  
J. W. Cole, NASA Marshall Space Flight Center, Huntsville, AL, USA
- 4:30 pm - *Barium and Barium Oxide Transport in Hollow Cathodes*  
J. Polk, Jet Propulsion Laboratory, Pasadena, CA, USA; A. M. Capece, I. G. Mikellides,  
I. Katz and J. Shepherd, California Institute of Technology, CA, USA
- 5:00 pm - *Experiments with the Casimir Force and Concepts for New Propulsion Systems  
with Zero Point Energy (ZPE)*  
T. Ludwig, New Energy Technologies, Berlin, Germany
- 5:30 pm - *Panel Discussion (all)*

**[CT] Special Plenary – 25<sup>th</sup> Anniversary on Space Nuclear Power  
and Propulsion**

*Monday, February 11, 2008, 7:00 pm - 8:30 pm –Franciscan Room*

- Chairs:** Michael G. Houts, NASA Marshall Space Flight Center, Huntsville, AL, USA  
Mohamed El-Genk, University of New Mexico, Albuquerque, NM, USA

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**TUESDAY, FEBRUARY 12, 2008**

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**[A03] Thermal Control Technologies - II**

*Tuesday, February 12, 2008, 8:00 am - 10:00 am - Turquoise Room*

- Chairs:** Jeffrey Didion, NASA Goddard Space Flight Center, Greenbelt, MD, USA  
Glenn Tsuyuki, Jet Propulsion Laboratory, CA, Pasadena, USA
- 8:00 am - *Design and Development of a Two-Phase Flow Splitter*  
C. Kurwitz, A. Larson and F. R. Best, Texas A&M University, College Station, TX,  
USA; B. R. Oinuma, Center for Space Power, Texas A&M University, College Station,  
TX, USA
- 8:30 am - *Mars Science Laboratory Launch Pad Thermal Control*  
P. Bhandari, Jet Propulsion Laboratory, Pasadena, CA, USA

- 9:00 am - Titanium Loop Heat Pipes for Space Nuclear Power Systems**  
J. R. Hartenstine, W. G. Anderson, and R. Bonner, III, Advanced Cooling Technologies, Inc., Lancaster, PA, USA
- 9:30 am - Vapor Compression Hybrid Two-Phase Loop Technology for Lunar Surface Applications**  
C. Park, Advanced Cooling Technologies, Inc. Lancaster, PA, USA; and E. Sunada, Jet Propulsion Laboratory, Pasadena, CA, USA

### [CT03] Space Nuclear Symposium Opening Session - III

*Tuesday, February 12, 2008, 8:00 am - 10:00 am - Alvarado G/H*

- Chairs:** Michael G. Houts, NASA Marshall Space Flight Center, MSFC, AL, USA  
Garry Burdick, Jet Propulsion Laboratory, Pasadena, CA, USA
- 8:00 am - AFSPS Development and ATLO Approach**  
J. E. Werner, Idaho National Laboratory, Idaho Falls, ID, USA
- 8:30 am - AFSPS Reactor Instrumentation and Control Approach**  
A. L. Qualls, Oak Ridge National Laboratory, Oak Ridge, TN, USA
- 9:00 am - Russian Space Nuclear Experience and Expertise - I**  
E. D'yakov, High Technology and Design Division FSUE SRI SIA "LUCH", Russian Federation
- 9:30 am - Russian Space Nuclear Experience and Expertise - II**  
V. Blank, Troitsk Institute for Artificial Diamonds (TISNCM), Troitsk, Russian Federation

### [D03] Technologies for Orion and Ares

*Tuesday, February 12, 2008, 8:00 am - 10:00 am - Alvarado F*

- Chairs:** Christopher Moore, NASA Headquarters, Washington D.C., USA  
John Mankins, Artemis Innovation Management Solutions, Ashburn, VA, USA
- 8:00 am - Integrated Docking Simulation and Testing with the Johnson Space Center Six-Degree-of-Freedom Dynamic Test System**  
J. D. Mitchell, S. P. Cryan, K. Baker, T. Martin, NASA Johnson Space Center, Houston, TX, USA; R. Goode, K. W. Key, T. Manning, L3 Communications - Titan Group, Houston, Texas, USA; and C. Chien, GeoControl Systems Inc., Houston, TX, USA
- 8:30 am - Multi-Sensor Testing for Automated Rendezvous and Docking**  
R. T. Howard and C. K. Carrington, NASA Marshall Space Flight Center, Huntsville, AL, USA
- 9:00 am - Technology Infusion of Intelligent Software Engineering Tools for Orion**  
M. Lowry, NASA Ames Research Center, Palo Alto, CA, USA
- 9:30 am - The Advanced Video Guidance Sensor: Orbital Express and the Next Generation**  
R.T. Howard, A. F. Heaton, R. M. Pinson, C. K. Carrington, J. E. Lee, T. C. Bryan, B. A. Robertson, S. H. Spencer, and J. E. Johnson, NASA Marshall Space Flight Center, Huntsville, AL, USA

### [E03] Space Exploration: Strategies

*Tuesday, February 12, 2008, 8:00 am - 10:00 am - Potters Room*

- Chairs:** Mark Benton, The Boeing Company, Los Angeles, CA, USA  
Peter A. Curren, NASA Marshall Space Flight Center, Huntsville, AL, USA
- 8:00 am - Designing 8 Degrees of Freedom Humanoid Robotic Arm for Space Exploration**  
L.B. Duc, M. Syaifuddin, T.T. Toai, N.H. Tan and M.N. Saad, Universiti Teknologi PETRONAS, Tronoh, Perak, Malaysia.
- 8:30 am - How the Sputnik 50<sup>th</sup> Anniversary Tells Us to Bridge the Proposed American Human Space Flight Gap**  
J. Brandenburg, Orbital Technologies Inc., Madison, WI, USA
- 9:00 am - In-Situ Propellant Supplied Lunar Lander Concept**  
B. Donahue and C. Maulsby, Boeing Advanced Systems, Huntsville, AL, USA
- 9:30 am - Lunar Surface Architecture Utilization and Logistics Support Assessment**

## STAIF-2008 Preliminary Program

D. Bienhoff, The Boeing Company, Arlington, VA, USA; W. Findiesen, M. Bayer, A. Born, and D. McCormick, The Boeing Company, Huntington Beach, CA, USA

### [F02] Taming the Solar System

*Tuesday, February 12, 2008, 8:00 am - 10:00 am - Weavers Room*

- Chairs:** Charles Suchomel, Air Force Research Laboratory, Wright-Patterson AFB, OH, USA  
Franklin B. Mead, Air Force Research Laboratory, Edwards AFB, CA, USA
- 8:00 am - *Conceptual Launch Vehicles Using Metallic Hydrogen Propellant***  
J. W. Cole, NASA Marshall Space Flight Center, AL, USA; I. F. Silvera, Harvard University, Cambridge, MA, USA; and J. P. Foote, Jacobs ESTS, Huntsville, AL, USA
- 8:30 am - *Progress in Analysis of Two-Phase Flow***  
J. K. Keska, University of Louisiana, Youngsville, LA, USA
- 9:00 am - *Recent Progress in the Development of a Multi-Layer Green's Function Code for Ion Beam Transport***  
J. Tweed, S. A. Walker, Department of Mathematics & Statistics, Old Dominion University, Norfolk, VA, USA; J. W. Wilson, and R. K. Tripathi, NASA Langley Research Center, Hampton, VA, USA
- 9:30 am - *Techniques for Microfabricating Coils for Microelectromechanical Systems Applications***  
R.C. Woods, Louisiana State University, Department of Electrical and Computer Engineering, Baton Rouge, LA, USA; and A.L. Powell, University of Sheffield, Sheffield, UK

### [B03] Thermal Challenges in ISRU Reactors

*Tuesday, February 12, 2008, 10:15 am - 12:15 pm - Turquoise Room*

- Chairs:** Adam P. Bruckner, University of Washington, Seattle, WA  
Uday Hegde, NCSER (National Center for Space Exploration Research), Cleveland, OH
- 10:15 am - *Analysis of Thermal and Reaction Times for Hydrogen Reduction of Lunar Regolith***  
U. Hegde, R. Balasubramanian, National Center for Space Exploration Research, Cleveland, OH, USA; and S. Gokoglu, NASA Glenn Research Center, Cleveland, OH, USA
- 10:45 am - *Resonant Heat Transfer in a Vibrofluidized Reactor with Lunar Regolith Simulant***  
V. Nayagam and K. R. Sacksteder NASA Glenn Research Center, Cleveland, OH, USA
- 11:15 am - *Sintering of Lunar and Simulant Glass***  
B. L. Cooper, Oceaneering Space Systems, Houston, TX, USA
- 11:45 am - *Solar Thermal Power System for Oxygen Production from Lunar Regolith***  
T. Nakamura, A. D. Van Pelt, Physical Sciences Inc., San Ramon, CA, USA; R. Gustafson, Orbital Technologies Corporation, Madison, WI, USA; and L. Clark, Lockheed Martin Space Systems Company, Denver, CO, USA

### [CT106] Non-Nuclear Testing - I

*Tuesday, February 12, 2008, 10:15 am - 12:15 pm - Weavers Room*

- Chairs:** James J. Martin, NASA Marshall Space Flight Center, Huntsville, AL, USA  
David Hervol, Analex Corporation, Cleveland, OH, USA
- 10:15 am - *Advanced Thermal Simulator Testing: Thermal Analysis and Test Results***  
S. M. Bragg-Sitton, R. Dickens, D. Dixon, R. S. Reid, M. Adams, and J. Davis, NASA Marshall Space Flight Center, MSFC, AL, USA
- 10:45 am - *Demonstration of a Martian Surface Power System Sodium Boiler Heat Exchanger***  
M. Schuller, F. Best, Center for Space Power, Texas A&M University, College Station, TX, USA; C. Kurwitz, Department of Nuclear Engineering, Texas A&M University, College Station, TX, USA; and R. Williams, JET Learning Laboratory, Houston, TX, USA
- 11:15 am - *Flow Components in a NaK Test Loop Designed to Simulate Conditions in a Nuclear Surface Power Reactor***  
K. A. Polzin and T. Godfroy, NASA Marshall Space Flight Center, AL, USA
- 11:45 am - *Operational Results of a 30 kWe Dual Brayton Power Conversion System***  
D. Hervol, Analex Corporation, Cleveland, OH, USA

## **[CT406] Thermal Energy Transport and Heat Rejection**

*Tuesday, February 12, 2008, 10:15 am – 12:15 pm - Alvarado G/H*

**Chairs:** Donald A. Jaworske, NASA Glenn Research Center, Cleveland, OH, USA  
Robert S. Reid, Los Alamos National Laboratory, Los Alamos, NM, USA

**10:15 am - High Performance Lightweight Compact Radiator Thermal Analysis and Performance Evaluation**

C.-F. Tsai, J. Tran, and J. Prabhu, The Boeing Company, Huntington Beach, CA, USA;  
and F. Shen, The Boeing Company, Seal Beach, CA, USA

**10:45 am - Oxygen Behavior in Liquid Sodium-Potassium Systems**

J. Zhang, Los Alamos National Laboratory, Los Alamos, NM, USA

**11:15 am - Reactivity Studies of Inconel 625 with Sodium, and Lunar Regolith Simulant**

P. Salvail, Snyder Technical Services, Huntsville AL, USA

**11:45 am - Variable Conductance Heat Pipes for Radioisotope Stirling Systems**

W. G. Anderson and C. Tarau, Advanced Cooling Technologies, Inc., Lancaster, PA, USA

## **[D09] International Partnerships for Exploration Technology Development**

*Tuesday, February 12, 2008, 10:15 am – 12:15 pm - Alvarado F*

**Chairs:** Robert Wegeng, Pacific Northwest National Laboratory, Richland, WA, USA  
Christopher Moore, NASA Headquarters, Washington D.C., USA

**10:15 am - Lunar Surface Power Architecture**

J. Nainiger, NASA Glenn Research Center, Cleveland, OH, USA

**10:45 am - Technology Maturation of Integrated System Health Management**

M. S. Feather, K.A. Hicks, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, USA; and S. Uckun, NASA Ames Research Center, Moffett Field, CA, USA

**11:15 am - Video Guidance Sensor for Surface Mobility Operation**

K. Fernandez, NASA Marshall Space Flight Center, Huntsville, AL, USA

**11:45 am - Panel Discussion (all)**

## **[E08] Lunar Dust: Fundamentals and Simulations**

*Tuesday, February 12, 2008, 10:15 am – 12:15 pm - Potters Room*

**Chairs:** Carlos I. Calle, NASA Kennedy Space Center, Orlando, FL, USA  
Robert C. Richmond, NASA Marshall Space Flight Center, Huntsville, AL, USA

**10:15 am - Development of the Lunar Environments Test System**

J. Vaughn and T. A. Schneider, NASA Marshall Space Flight Center, AL, USA

**10:45 am - Electrostatic Characterization of Apollo 14 Lunar Dust Samples**

C. I. Calle, NASA Kennedy Space Center, Orlando, FL

**11:15 am - Some Expected Mechanical Characteristics of Lunar Dust: A Geological View**

D. Rickman, National Space Science and Technology Center, NASA Marshall Space Flight Center, Huntsville, AL, USA; and K.W. Street, Tribology and Surface Science, NASA Glenn Research Center, Cleveland, OH, USA

**11:45 am - Measurements of Charging of Apollo 17 Lunar Dust Grains by Electron Impact**

M. M. Abbas, J. F. Spann, J.A. Gaskin, NASA Marshall Space Flight Center, Huntsville, AL, USA; D. Tankosic, University of Alabama, Huntsville, AL, USA; and M. J. Dube, NASA Goddard Space Flight Center, Greenbelt, MD, USA

## **[A04] High Capacity Heat Rejection Systems**

*Tuesday, February 12, 2008, 1:30 pm – 3:30 pm – Turquoise Room*

**Chairs:** Michael N. Nikitkin, Swales Aerospace, Beltsville, MD, USA  
Eric A. Silk, NASA Goddard Space Flight Center, Greenbelt, MD, USA

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- 1:30 pm -** *A Low Specific Mass Inflatable Radiator for a 100kW Solar Powered GEO Satellite*  
J. Thayer and W. Cho, Thermacore International, Lancaster, PA, USA; D. Cavanaugh, and S. Palm, Surface Optics Corporation, San Diego, CA, USA
- 2:00 pm -** *Test Results for a High Power Thermal Management System*  
K. R. Wrenn and D. A. Wolf, ATK Space Division, Beltsville, MD, USA
- 2:30 pm -** *Thermal Vacuum Testing of Crescent Structural Integral Radiators for Spacecraft Heat Rejection*  
C. S. Iacomini, Paragon Space Development Corporation, Tucson, AZ, USA
- 3:00 pm -** *Assessment of the Multi-Fluid Evaporator Technology*  
G. Quinn and E. O'Connor, Hamilton Sundstrand, Windsor Locks, CT, USA

**[CT103] Fission Surface Power System Components - II**

*Tuesday, February 12, 2008, 1:30 pm - 3:30 pm - Potters Room*

- Chairs:** Samit Bhattacharyya, RenMar Enterprises Inc., Naperville, IL, USA  
Shannon Bragg-Sitton, NASA Marshall Space Flight Center, Huntsville, AL, USA
- 1:30 pm -** *Comparison of Reactivity Control Systems for the Submersion Subcritical Safe Space (S<sup>4</sup>) Reactor*  
T. M. Schriener and M. S. El-Genk, Institute for Space and Nuclear Power Studies, University of New Mexico, Albuquerque, NM, USA
- 2:00 pm -** *Radiolysis Concerns for Water Shielding in Fission Surface Power Applications*  
M.P. Schoenfeld, NASA Marshall Space Flight Center, Huntsville, AL, USA; and S. Anghaie, Innovative Space Power and Propulsion Institute, University of Florida, Gainesville, FL, USA
- 2:30 pm -** *Reactivity Control Schemes for Fast Spectrum Space Nuclear Reactors*  
A. E. Craft and J. C. King, Mining and Nuclear Engineering Department, Missouri University of Science and Technology, Rolla, MO, USA
- 3:00 pm -** *Wide Range Neutron Flux Measuring Channel for Aerospace Application*  
R. M. Cibils, A. Busto, J.L. Gonella, R. Martinez, A.J. Chielens, J.M. Otero, M. Nuñez, INVAP, Rio Negro, Argentina; and S. E. Tropea, INTI, Buenos Aires, Argentina

**[CT110] Space Radiation and Environmental Effects**

*Tuesday, February 12, 2008, 1:30 pm - 3:30 pm - Alvarado G/H*

- Chairs:** Abdulnasser F. Barghouty, NASA Marshall Space Flight Center, Huntsville, AL, USA  
Ronald Lipinski, Sandia National Laboratories, Albuquerque, NM, USA
- 1:30 pm -** *Modeling the Uncertainty in the Radiation Quality Factor as an Ito Process*  
A. F. Barghouty, NASA Marshall Space Flight Center, Huntsville, AL, USA
- 2:00 pm -** *Polyethylene/Boron Composites for Radiation Shielding Applications*  
C. Harrison, E. Grulke, Department of Chemical & Materials Engineering, University of Kentucky, Lexington, KY, USA; E. Burgett, and N. Hertel, Neely Nuclear Research Center, Georgia Institute of Technology, Atlanta, GA, USA
- 2:30 pm -** *Regolith Biological Shielding for a Lunar Outpost from High Energy Solar Protons*  
T. Pham and M. S. El-Genk, Institute for Space and Nuclear Power Studies, University of New Mexico, Albuquerque, NM, USA
- 3:00 pm -** *Mechanical Characterization of Proton Radiation Induced Damage on Magnetically Annealed Epoxy*  
M. S. Al-Haik, S. Trinkle, University of New Mexico, Albuquerque, NM, O. Momotyuk, B. T. Roeder, K. Kemper, and M. Y. Hussaini, Florida State University, Tallahassee, FL, and M. S. El-Genk, University of New Mexico, Albuquerque NM

**[D04] Technologies for the Lunar Lander**

*Tuesday, February 12, 2008, 1:30 pm - 3:30 pm - Alvarado F*

- Chairs:** Andrew Keys, NASA Marshall Space Flight Center, Huntsville, AL, USA  
Robert Wegeng, Pacific Northwest National Laboratory, Huntsville, WA, USA

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- 1:30 pm - *Active Costorage of Cryogenic Propellants for Exploration***  
E. R. Canavan, R. F. Boyle, and S. Mustafa, Cryogenics and Fluids Branch, NASA Goddard Space Flight Center, Greenbelt, MD
- 2:00 pm - *Autonomous Landing and Hazard Avoidance Technology (ALHAT) Cryogenic Fluid Technologies for Long Duration In-Space Operations***  
S. Motil, NASA Glenn Research Center , Cleveland, OH, USA
- 2:30 pm - *Propulsion for the Lunar Lander***  
M. Klem, NASA Glenn Research Center , Cleveland, OH, USA
- 3:00 pm - *Panel Discussion (all)***

## [F06] High-Frequency Gravitational Wave

*Tuesday, February 12, 2008, 1:30 pm - 3:30 pm – Weavers Room*

- Chairs:** Robert M.L. Baker, Gravwave, LLC, Playa Del Rey, CA, USA  
Giorgio Fontana, University of Trento, POVO (TN), Italy
- 1:30 pm - *Analyses of the Frequency and Intensity of Laboratory Generated HFGWs***  
R. M. L. Baker, Jr., GRAVWAVE® LLC and Transportation Sciences Corp., Playa del Rey, CA, USA; G. V. Stephenson, Seculine Consulting, Redondo Beach, CA, USA; and F. Li Department of Physics, Chongqing University, Chongqing, China
- 2:00 pm - *Gravitational Waves in the Hyperspace***  
G. Fontana, University of Trento, POVO (TN), Italy
- 2:30 pm - *Proposed Ultra-High Sensitivity High-Frequency Gravitational Wave Detector***  
R. M. L. Baker, Jr., GRAVWAVE® LLC and Transportation Sciences Corp., Playa del Rey, CA, USA; G. V. Stephenson, Seculine Consulting, Redondo Beach, CA, USA; and F. Li, Department of Physics, Chongqing University, Chongqing, China
- 3:00 pm - *Very-High-Frequency Gravitational Waves and Superconductors***  
R.C. Woods, Louisiana State University, Baton Rouge, LA, USA

## [B04] Lunar Soils and Simulants

*Tuesday, February 12, 2008, 3:45 pm – 5:45 pm - Turquoise Room*

- Chairs:** Allen Wilkinson, NASA Glenn Research Center, Cleveland, OH, USA  
Masami Nakagawa, Colorado School of Mines, Golden, CO, USA
- 3:45 pm - *A Comparison of Discrete Element Modeling, Finite Element Analysis, and Physical Experiment of Granular Material Systems in a Direct Shear Cell***  
R. Bharadwaj, P. Weitzman, DEM Solutions (USA) Inc, Lebanon, NH, USA; J. Khambekar, T. A. Royal, Jenike & Johanson Inc, Tyngsboro, MA, USA; A. Orlando, Z. Gao, H. Shen, and B. Helenbrook, Clarkson University, Potsdam, NY, USA
- 4:15 pm - *Development of a High Fidelity Lunar Soil Simulant***  
R. Gustafson, B. C. White, Orbital Technologies Corporation (ORBITECTM), Madison, WI, USA; and M. A. Gustafson, PLANET, Madison, WI, USA
- 4:45 pm - *Electrostatic Transport and Manipulation of Lunar Soil and Dust***  
H. Kawamoto, Waseda University, Tokyo, Japan
- 5:15 pm - *Numerical Investigation of Mechanical Behavior of Agglutinates***  
M. Nakagawa, Colorado School of Mines , Golden, CO, USA

## [CT104] Integration and Utilization of Surface Fission Energy Sources

*Tuesday, February 12, 2008, 3:45 pm – 5:45 pm - Alvarado G/H*

- Chairs:** J. Boise Pearson, NASA Marshall Space Flight Center, Huntsville, AL, USA  
Robert L. Cataldo, NASA Glenn Research Center, Cleveland, OH, USA
- 3:45 pm - *Enabling Space Mission Concepts with Small Radioisotope Power Systems***  
B. Heshmatpour and J. Hart, and J. D. Weinberg Teledyne Energy Systems, Inc., Hunt Valley, MD, USA

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- 4:15 pm -** *Radar Men on the Moon: A Brief Survey of Fission Surface Power Studies*  
G. L. Bennett, Metaspac Enterprises, Emmett , ID, USA
- 5:00 pm -** *The Development a Control System for a 5 Kilowatt Free Piston Stirling Space Converter*  
R.L. Kirby, Space Research Institute, Auburn University, AL, USA; and N. Vitale, Foster-Miller, Inc., Albany, NY, USA
- 5:15 pm -** *Panel Discussion (all)*

**[CT203] Non-nuclear Testing - II**

*Tuesday, February 12, 2008, 3:45 pm – 5:45 pm - Alvarado F*

- Chairs:** William J. Emrich, Jr., NASA Marshall Space Flight Center, Huntsville, AL, USA  
Steven B. Dron, Sandia National Laboratories, Albuquerque, NM, USA
- 3:45 pm -** *Feasibility Test Loop I Design and Test*  
T. Godfroy, NASA Marshall Space Flight Center, Huntsville, AL, USA
- 4:15 pm -** *Large-Scale Testing and High-Fidelity Simulation Capabilities at Sandia National Laboratories to Support Space Power and Propulsion*  
D. Dobranich and T. K. Blanchat, Sandia National Laboratories, Albuquerque, NM, USA
- 5:00 pm -** *Nuclear Thermal Rocket Element Environmental Simulator (NTREES)*  
W. J. Emrich, Jr., NASA Marshall Space Flight Center, Huntsville, AL, USA
- 5:15 pm -** *Recent Updates to the Fission Surface Power Primary Test Circuit (FSP-PTC)*  
A. Garber, NASA Marshall Space Flight Center, Huntsville, AL, USA

**[D10] Novel Concepts**

*Tuesday, February 12, 2008, 3:45 pm – 5:45 pm - Potters Room*

- Chairs:** Robert Wegeng, Pacific Northwest National Laboratory, Richland, WA, USA  
John Mankins, Artemis Innovation Management Solutions, Ashburn, VA, USA
- 3:45 pm -** *Astrotech Research & Conventional Technology Utilization Spacecraft (ARCTUS)*  
M. D. Johnson, R. Fitts, B. Howe, B. Hall, SPACEHAB/Astrotech, Inc., Webster, TX, USA; and B. Kutler, United Launch Alliance, Denver, CO, USA
- 4:15 pm -** *ATHLETE: A Cargo Handling and Manipulation Robot for the Moon*  
J. Matthews, Jet Propulsion Laboratory, Pasadena, CA, USA
- 5:00 pm -** *Rolling and Climbing by the Multifunctional SuperBot Reconfigurable Robotic System*  
W. Shen, H. C.H. Chiu, M. Rubenstein, and B. Salemi , Polymorphic Robotics Lab, Information Sciences Institute, University of Southern California, Marina del Rey, CA, USA
- 5:15 pm -** *Panel Discussion (all)*

**[F07] Experimental Results and New Concepts**

*Tuesday, February 12, 2008, 3:45 pm – 5:45 pm - Weavers Room*

- Chairs:** R. Clive Woods, Louisiana State University, Baton Rouge, LA, USA  
James F. Woodward, California State University, Fullerton, CA, USA
- 3:45 pm -** *Application of the Chameleon Model to EM Field Momentum*  
G. A. Robertson, Gravi Atomic Research, LLC, Madison, AL, USA
- 4:30 pm -** *G04IT: Gravitational Defying Methods of Propulsion From Asymmetrical Capacitors*  
D. Mathes, Space Lines LLC, Rocklin, CA, USA
- 4:15 pm -** *Investigation of Frame-Dragging-Like Signals from Spinning Superconductors using Laser Gyroscopes*  
M. Tajmar, F. Plesescu, B. Seifert, R. Schnitzer, and I. Vasiljevich, Space Propulsion & Advanced Concepts, Austrian Research Centers GmbH - ARC, Seibersdorf, Austria
- 5:15 pm -** *Mach Effects and Rapid Spacetime Transport*  
J. F. Woodward, California State University, Fullerton, CA, USA

## WEDNESDAY, FEBRUARY 13, 2008

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### [A05] Advances in Spray Cooling

*Wednesday, February 13, 2008, 8:00 am - 10:00 am - Turquoise Room*

- Chairs:** Eric Silk, NASA Goddard Space Flight Center, Greenbelt, MD, USA  
Kirk L. Yerkes, USAF / Air Force Research Laboratory, OH, USA
- 8:00 am -** *Investigation of Pore Size Effect On Spray Cooling Heat Transfer With Porous Tunnels*  
E. A. Silk, NASA Goddard Space Flight Center, MD, USA
- 8:30 am -** *Spray Cooling Modeling: Droplet Sub-Cooling Effect on Heat Transfer*  
J. E. Johnston, Power Electronics Leveling Solutions LLC Fayetteville, AR, USA; R. P. Selvam, University of Arkansas, Fayetteville, AR, USA; and E. A. Silk, NASA Goddard Space Flight Center, Greenbelt, MD, USA
- 9:00 am -** *Visualization of Electrohydrodynamic Effects and Time Scale Analysis for Impinging Spray Droplets of HFE-7000*  
P. J. Kreitzer and J. M. Kuhlman, Department of Mechanical and Aerospace Engineering, West Virginia University, Morgantown, WV, USA
- 9:30 am -** *Effect of Non-Uniform Inlet Temperature on Flow Stagnation in a Pumped Fluid Tube Radiator*  
G. Reavis, Paragon Space Development Corporation, Tucson, AZ, USA

### [CT102] Fission Surface Power System Components - I

*Wednesday, February 13, 2008, 8:00 am - 10:00 am - Alvarado D*

- Chairs:** A.L. Qualls, Oak Ridge National Laboratory, Oak Ridge, TN, USA  
Dan Wachs, Idaho National Laboratory, Idaho Falls, ID, USA
- 8:00 am -** *An Affordable Test Approach for Lunar Fission Surface Power Systems*  
J. E. Werner, Idaho National Laboratory, Idaho Falls, ID, USA; and L. S. Mason, NASA Glenn Research Center, Cleveland, OH, USA
- 8:30 am -** *Gravity Scaling of a Power Reactor Water Shield*  
R. S. Reid and J. B. Pearson, NASA Marshall Space Flight Center, Huntsville, AL, USA
- 9:00 am -** *Life-Cycle Radiation Dose Issues for a Fission Surface Power System*  
D. I. Poston, N. Devine, and S. Mullet, Nuclear Systems Design Group, Los Alamos National Laboratory, NM, USA
- 9:30 am -** *Validation of MCNP 5 Thermal and Epithermal Scattering Predictions for Sand and Seawater*  
J. C. King, University of Missouri, Rolla, MO, USA

### [CT105] Near-Term Radioisotope Power Systems

*Wednesday, February 13, 2008, 8:00 am - 10:00 am - Alvarado B/C*

- Chairs:** Bruce Alan Harmon, NASA/HQ, Washington, D.C., USA  
Robert Abelson, Jet Propulsion Laboratory, Pasadena, CA, USA
- 8:00 am -** *Mission Concepts for Studying Enceladus*  
A. I. Razzaghi, D. A. Di Pietro, D. A. Quinn, A. A. Simon-Miller, and S. D. Tompkins, Goddard Space Flight Center, Greenbelt, MD, USA
- 8:30 am -** *NASA Radioisotope Power Systems Program Update*  
B. A. Harmon, U. S. Department of Energy, Washington, D. C., USA and D. B. Lavery, Science Mission Directorate, NASA Headquarters, Washington, D. C., USA
- 9:00 am -** *Results of the Europa Explorer NASA Flagship Study*  
R. Abelson, Jet Propulsion Laboratory, Pasadena, CA, USA
- 9:30 am -** *Titan Explorer: A NASA Flagship Mission Concept*  
R. D. Lorenz, J. C. Leary, and M. K. Lockwood, Space Department, Johns Hopkins University Applied Physics Laboratory, Laurel, MD, USA, and J. H. Waite, Southwest Research Institute, San Antonio, TX, USA

## **[D05] Technologies for the Lunar Outpost**

*Wednesday, February 13, 2008, 8:00 am - 10:00 am - Alvarado F*

- Chairs:** Robert Wegeng, Pacific Northwest National Laboratory, Richland, WA, USA  
Christopher Moore, NASA Headquarters, Washington, D. C., USA
- 8:00 am -** *A Testbed for Evaluating Lunar Habitat Autonomy Architectures*  
D. Kortenkamp, D. Schreckenghost and R. P. Bonasso, TRAC Labs Inc., Houston, TX, USA; M. Izyon, Tietronix Inc., Houston TX, USA; D. Lawler and L. Wang, NASA Johnson Space Center/ER2 Houston, TX, USA; and K. Kennedy, NASA Johnson Space Center/EA3 Houston, TX, USA
- 8:30 am -** *ATHLETE: A Lunar Mobility and Manipulation System*  
B. Wilcox, Jet Propulsion Laboratory, Pasadena, CA, USA
- 9:00 am -** *High-Performance, Radiation-Hardened Electronics for Space and Lunar Environments*  
A. Keys, J. H. Adams, R. C. Darty, and M. C. Patrick NASA Marshall Space Flight Center, Huntsville, AL, USA; J. D. Cressler, School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA, USA; and M. A. Johnson, NASA Langley Research Center, Hampton, VA, USA
- 9:30 am -** *Life Support System Technology Development for Exploration Missions*  
D. J. Barta and M. K. Ewert, Crew and Thermal Systems Division, NASA Johnson Space Center, Houston, TX, USA

## **[E05] Space Bases on Mars: How and Why?**

*Wednesday, February 13, 2008, 8:00 am - 10:00 am - Potters Room*

- Chairs:** Andrew Gonzales, NASA Ames Research Center, Moffett Field, CA, USA  
Subhayu Sen, BAE Systems, NASA MSFC, Huntsville, AL, USA
- 8:00 am -** *A Greenhouse for Mars and Beyond*  
C. P. Rahaim, HyperTech Concepts LLC, Huntsville, Alabama, USA, and P. A. Czysz, HyperTech Concepts LLC, St. Louis, MO, USA
- 8:30 am -** *Spaceship Discovery's Crew and Cargo Lander Module Designs for Human Exploration of Mars*  
M. G. Benton, Sr., Boeing Space and Intelligence Systems, Los Angeles, CA, USA
- 9:00 am -** *Simulation and Analysis of Architectures for a Lunar Surface Outpost*  
W. Findiesen, M. Bayer, A. Born, D. McCormick, The Boeing Company, Huntington Beach, CA, USA; and D. Bienhoff, The Boeing Company, Arlington, VA, USA
- 9:30 am -** *Space Colony from a Commercial Asteroid Mining Company Town*  
T. C. Taylor, GLOBAL OUTPOST, Inc., Las Cruces, NM, USA; W. Grandl, Architect, Dr. Billroth, Tulln, Austria; M. Pinni, Space Habitation Architect, University IUAV of Venice, Tolentini, S. Croce; Italy; and H. Benaroya, Department of Mechanical & Aerospace Engineering, Rutgers University, Director, Center for Structures in Extreme Environments, Rutgers University, Piscataway, New Jersey, USA

## **[F04] Other Concepts and Theories - II**

*Wednesday, February 13, 2008, 8:00 am - 10:00 am - Alvarado F*

- Chairs:** Andrew W. Beckwith, APS/Fermi National Laboratory, Menlo Park, CA, USA  
Paul A. Murad, New Frontiers and Future Concepts, Vienna, VA, USA
- 8:00 am -** *An Ansatz Regarding Relativistic Space Travel Part II- Propulsion Realities*  
P. A. Murad, New Frontiers and Future Concepts, Vienna, VA, USA
- 8:30 am -** *G Quantum Computing Models for Graviton Communication/Information Processing in Cosmological Evolution*  
A. W. Beckwith, APS / Contractor, Fermi National Laboratory, Menlo Park, CA, USA
- 9:00 am -** *Revisiting Human-Generated Experimental Gravitational Data for Consideration Towards Expanding Physical Models*  
D. Graham, NW Frontier Research Institute, Yelm, WA, USA

**9:30 am - *Symmetries in Evolving Space-Time and their Connection to High-Frequency Gravity Wave Production***

A.W. Beckwith, APS / Contractor, Fermi National Laboratory, Menlo Park, CA, USA

**[B05] Excavation**

*Wednesday, February 13, 2008, 10:15am – 12:15 pm – Turquoise Room*

**Chairs:** Dale S. Boucher, Northern Centre for Advanced Technology, Sudbury, Ontario, Canada  
John Caruso, NASA Glenn Research Center, Cleveland, OH, USA

**10:15 am - *Cutterhead Development for the Low-Energy Planetary Excavator***

R. Gustafson, Orbital Technologies Corporation, Madison, WI, USA; and L. Gertsch, University of Missouri-Rolla, Rock Mechanics & Explosives Research Center, and Geological Sciences & Engineering Dept., Rolla, MO, USA

**10:45 am - *Multirobot Lunar Excavation and ISRU Using Artificial-Neural-Tissue Controllers***

J. Thangavelautham, A. Smith, N. A. El Samid, A. Ho, and G. M. T. D'Eleuterio Institute for Aerospace Studies, University of Toronto, Toronto, ON, Canada; D. Boucher, Northern Centre for Advanced Technology, Sudbury, ON, Canada; and J. Richard, Electric Vehicle Controllers Ltd, Val Caron, ON, Canada

**11:15 am - *Pneumatic Excavator for Extraterrestrial Applications***

K. Zacny and M. Hedlund, Honeybee Robotics, New York, NY, USA; G. Mungas, C. Mungas, and D. Fisher, Firestar Engineering, Broomfield, CO, USA

**11:45 am - *Trade Study of Excavation Tools and Equipment for Lunar Outpost Development and ISRU***

R. P. Mueller, Advanced Systems Division, NASA, Kennedy Space Center, Florida, USA; and R. H. King, Engineering Division, Colorado School of Mines, Golden, CO, USA

**[CT202] Nuclear Thermal Rockets: Past, Present, and Future**

*Wednesday, February 13, 2008, 10:15 am – 12:15 pm – Alvarado B/C*

**Chairs:** Stanley K. Borowski, NASA Glenn Research Center, Cleveland, OH, USA  
Stanley V. Gunn, Rocketdyne (Retired), Chatsworth, CA, USA

**10:15 am - *Economic Public Private Partnerships for Development***

T. C. Taylor, Lunar Transportation Systems, Las Cruces, NM, USA; W. P. Kistler, and B. Citron, Lunar Transportation Systems, Inc. Bellevue, WA, USA

**10:45 am - *Future NTP Development Synergy Leveraged from Current J-2X Engine Development***

R. O. Ballard, Liquid Engine and Main Propulsion Systems Branch, NASA Marshall Space Flight Center, AL, USA

**11:15 am - *The Center for Space Nuclear Research: a Paradigm for Advancing Space Nuclear Education***

J. Bess, Center for Space Nuclear Research, Idaho Falls, ID, USA

**11:45 am - *Panel Discussion (all)***

**[CT403] Dynamic Power: Multi-Kilowatt - II**

*Wednesday, February 13, 2008, 10:15 am – 12:15 pm – Alvarado D*

**Chairs:** Steven Howe, Center for Space Nuclear Research, Idaho Falls, ID, USA  
George Schmidt, NASA Glenn Research Center, Cleveland, OH, USA

**10:15 am - *A Preliminary and Simplified Closed Brayton Cycle Modeling for a Space Reactor Application***

L.N.F. Guimarães and G.P. Camillo, Institute for Advanced Studies, Rodovia dos Tamoios, SP, Brazil

**10:45 am - *Overview of Multi-Kilowatt Free-Piston Stirling Power Conversion Research at GRC***

S.M. Geng, L. S. Mason, and R. W. Dyson, Thermal Energy Conversion Branch, NASA

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Glenn Research Center, Cleveland, OH, USA; L. B. Penswick, SEST Inc., Middleburg Hts, OH, USA

**11:15 am - Performance Analyses of 38 kWe Turbo-Machine Unit for Space Reactor Power Systems**

B. M. Gallo and M. S. El-Genk, Institute for Space and Nuclear Power Studies and Chemical and Nuclear Engineering Department, The University of New Mexico, Albuquerque, NM, USA

**11:45 am - Transport Properties of He-N<sub>2</sub> Binary Gas Mixtures for CBC Space Applications**

J-M. Tournier and M.S. El-Genk, Institute for Space and Nuclear Power Studies and Chemical and Nuclear Engineering Department, The University of New Mexico, Albuquerque, NM, USA

**[CT404] Thermoelectric Power Conversion - I**

*Wednesday, February 13, 2008, 10:15 am – 12:15 pm – Alvarado F*

**Chairs:** Bill J. Nesmith, Jet Propulsion Laboratory, Pasadena, CA, USA  
Jean-Michel Tournier, University of New Mexico, Albuquerque, NM, USA

**10:15 am - Development Status and Plans of the Advanced Thermoelectric Converter (ATEC) Project**

R. C. Ewell, Jet Propulsion Laboratory / California Institute of Technology, Pasadena, CA, USA

**10:45 am - Mechanical Properties of Thermoelectric Skutterudites**

V. Ravi, California State Polytechnic University, Pomona, CA, USA and Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, USA; S. Firdosy, and T. Caillat, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, USA; B. Lerch, A. Calamino, R. Pawlik, and M. Nathal, NASA Glenn Research Center, Cleveland, OH, USA; A. Sechrist, J. Buchhalter, and S. Nutt, University of Southern California, University Park Campus, Los Angeles, CA, USA

**11:15 am - MilliWatt Generator Design**

J. C. Bass, V. Jovanovic, N. B. Elsner, and N. Hiller, Hi-Z Technology, Inc, San Diego, CA, USA

**11:45 am - Silicon-Germanium (SiGe) Technology for Cryo Temperature Environments for Europa and Enceladus Missions**

L. Peltz, The Boeing Company, Huntington Beach, CA, USA

**[D08] Technology Demonstrations and Analogs**

*Wednesday, February 13, 2008, 10:15 am – 12:15 pm – Potters Room*

**Chairs:** Joseph Nainiger, NASA Glenn Research Center, Cleveland, OH, USA  
Neville Marzwell, Jet Propulsion Laboratory, Pasadena, CA, USA

**10:15 am - A Procedure Integrated Development Environment for future Spacecraft and Habitat**

M. Izygon, Tietronix Software, Houston, TX, USA

**10:45 am - Centennial Challenges Status**

K. Davidian, NASA Headquarters, Washington, D.C., USA

**11:15 am - Desert Research and Technology Studies (RATS) 2007 Field Campaign Objectives & Results**

J. J. Kosmo, NASA Johnson Space Center, Houston, TX, USA

**11:45 am - Panel Discussion (all)**

**[F09] Future Propulsion Models and Concepts**

*Wednesday, February 13, 2008, 10:15 am – 12:15 pm – Alvarado A*

**Chairs:** Greg V. Meholic, The Aerospace Corporation, El Segundo, CA, USA  
Richard Obousy, Baylor University, Waco, TX, USA

**10:15 am - Hyperspace and Other Phenomena as Defined by the Tri-Space Model of the Universe**

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G. V. Meholic, The Aerospace Corporation, El Segundo, CA, USA

**10:45 am - Propulsion in the Chameleon Model**

G. A. Robertson, Gravi Atomic Research, Madison, AL, USA

**11:15 am - Unlabored Ship Transitions Between Subluminal and Superluminal Speeds in a Higher Dimensional Tri-Space**

H. D. Froning, Jr. and G. V. Meholic, The Aerospace Corporation, El Segundo, CA, USA

**11:45 am – Panel Discussion (all)**

**[A06] Advanced Heat Pipe Technologies**

*Wednesday, February 13, 2008, 1:30 pm – 3:30 pm – Turquoise Room*

**Chairs:** Robert S. Reid, Los Alamos National Laboratory, Los Alamos, NM, USA  
Angirasa Devarakonda, NASA Ames Research Center, Moffett Field, CA, USA

**1:30 pm - Design Optimization of Loop Heat Pipes with Cylindrical Evaporator and Integral Reservoir for Space Application**

V. V. Vlassov, F. L. de Sousa, and R. R. Riehl, Division of Space Mechanics and Control, National Institute for Space Research, SP, Brazil

**2:00 pm - Life Test Results for Water Heat Pipes Operating at 200 °C to 300 °C**

J. H. Rosenfeld and N. J. Gernert, Thermacore, Inc., Lancaster, PA, USA

**2:30 pm - Titanium Heat Pipe Thermal Plane**

S. Y. Semenov, Aerospace Engineering, Thermacore International Inc., Lancaster, PA, USA; and K. A. Burke, Electrochemistry Branch, Power and Propulsion Technology Division, NASA Glenn Research Center, Cleveland, OH, USA

**3:00 pm - Visual Observation of Oscillating Heat Pipes Using Neutron Radiography**

H. Ma, Department of Mechanical & Aerospace Engineering, University of Missouri, Columbia, MO, USA

**[CT107] Space Nuclear Power Systems: Simulation and Modeling**

*Wednesday, February 13, 2008, 1:30 pm – 3:30 pm – Alvarado B/C*

**Chairs:** Thomas Marcille, Los Alamos National Laboratory, Los Alamos, NM, USA  
Jeffrey C. King, University of Missouri – Rolla, MO, USA

**1:30 pm - Comparison of Methods for Evaluating Nuclear Thermal Propulsion Tie-Tube Designs**

R. J. Kapernick, Nuclear Systems Design Group, Los Alamos National Laboratory, Los Alamos, NM, USA; and D. D. Dixon, Department of Nuclear Engineering, University of Tennessee, Knoxville, TN, USA

**2:00 pm - MCNP Cross Section Validation Technique**

T. Marcille, Los Alamos National Laboratory, Los Alamos, NM, USA

**2:30 pm - Monte Carlo Fission Source Convergence Assessment**

T. Marcille, Los Alamos National Laboratory, Los Alamos, NM, USA

**3:00 pm - TXSAMC: A New Tool for Generating Shielded Multigroup Cross-Sections**

M. Hiatt, Texas A&M University, Pearland, TX, USA

**[CT401] Dynamic Power: 100 W Class**

*Wednesday, February 13, 2008, 1:30 pm – 3:30 pm – Alvarado D*

**Chairs:** Richard K. Shaltens, NASA Glenn Research Center, Cleveland, OH, USA  
Anne Garber, NASA Marshall Space Flight Center, Huntsville, AL, USA

**1:30 pm - Advanced Stirling Converter (ASC) - From Technology Development to Future Flight Product**

W. A. Wong, Power and On-Board Propulsion Technology Division, NASA Glenn Research Center, Cleveland, OH, USA

**2:00 pm - Delivery of the Advanced Stirling Converter (ASC-E) for Integration into the ASRG EU**

K. Wilson, Sunpower, Inc., Athens, OH, USA

- 2:30 pm - GRC Supporting Technology for NASA's Advanced Stirling Radioisotope Generator (ASRG)**  
J. G. Schreiber and L. G. Thieme, NASA Glenn Research Center at Lewis Field, Cleveland, OH, USA
- 3:00 pm - Validation of Organics for Advanced Stirling Converter (ASC)**  
E.E. Shin, and L. Inghram, Ohio Aerospace Institute, Cleveland, OH, USA; D. Quade, NASA Glenn Research Center, Cleveland, OH, USA; D. Scheiman, and C. Burke ASRC, Cleveland, OH, USA; and M. Cybulski, University of Dayton, Cleveland, OH

## **[D06] Technologies for Lunar Surface Operations**

*Wednesday, February 13, 2008, 1:30 pm – 3:30 pm – Alvarado F*

- Chairs:** Christopher Moore, NASA Headquarters, Washington, D.C., USA  
David Kortenkamp, TRACLabs Inc., Houston, TX, USA
- 1:30 pm - A Versatile Lifting Device for Lunar Surface Payload Handling, Inspection & Regolith Transport Operations**  
W. Doggett, J. Dorsey, T. Collins, NASA Langley Research Center, Hampton, VA, USA; B. King, Lockheed Martin, USA; and M. Mikulas, National Institute of Aeronautics, USA
- 2:00 pm - Human Supervision of Robotic Site Surveys**  
D. Schreckenghost, TRACLabs, Houston, TX, USA; T. Fong, NASA Ames Research Center, Moffett Field, CA, USA; and T. Milam, S&K Aerospace, Houston, TX, USA
- 2:30 pm - Mobility Characterization of Planetary Rover in Reduced Gravity Environment**  
T. Kobayashi, and H. Ochiai, Department of Civil Engineering, Kyushu University, Fukuoka, Japan; , J. Yamakawa, Department of Mechanical Engineering, National Defense Academy, Yokosuka, Japan; S. Aoki, Space and Robot System Group, Institute of Technology, Shimizu Corporation, Tokyo, Japan; K. Matsui, and A. Miyahara, SELENE Ground Systems and Exploration Research Group, Tsukuba Space Center, and Japan Aerospace Exploration Agency, Ibaraki, Japan
- 3:00 pm - Remote Task-level Commanding of Centaur Over Time Delay**  
D. Schreckenghost, and R. Burrige, TRACLabs, Houston, TX, USA; T. Ngo and L. Wang, NASA Johnson Space Center, Houston, TX, USA; and M. Izygon, Tietronix, Houston, TX, USA

## **[E07] Observatories and Domed Ecosystems**

*Wednesday, February 13, 2008, 1:30 pm - 3:30 pm – Potters Room*

- Chairs:** Eric Rice, Orbital Technologies Corporation (ORBITEC), Madison, WI, USA  
John Mankins, Artemis Innovation Management Solutions, Ashburn, VA, USA
- 1:30 pm - Design and Fabrication of Martian Domed Ecosystems**  
J. Brandenburg, Orbital Technologies Inc., Madison, WI, USA
- 2:00 pm - Development of a Lunar Water Astroparticle Observatory**  
A. Ignatiev, Texas Center for Advanced Materials, Houston, TX, USA
- 2:30 pm - Establishing a Biosphere Beyond the Earth: Concepts and Challenges Involved in Developing a Large-Scale Habitat on the Moon & Mars**  
J. Mankins, Artemis Innovation Management Solutions, Ashburn, VA, USA
- 3:00 pm - The Space Homestead and Creation of Real Estate and Industry beyond Earth**  
M. K. Detweiler, Lewiston, ME, USA; and P. A. Curreri, NASA, Marshall Space Flight Center, AL, USA

## **[F03] Other Concepts and Theories - I**

*Wednesday, February 13, 2008, 1:30 pm – 3:30 pm – Alvarado A*

- Chairs:** John W. Cole, NASA Marshall Space Flight Center, Huntsville, AL, USA  
Gary Stephenson, Seculine Consulting, Los Angeles, CA, USA

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- 1:30 pm - *An Ansatz Regarding Relativistic Space Travel Part I- The Environment***  
P. A. Murad, New Frontiers and Future Concepts, Vienna, VA, USA
- 2:00 pm - *Engineering Dynamics of the Universe***  
G. A. Robertson, Atomic Research, Madison, AL, USA
- 2:30 pm - *FTL (Faster Than Light) Drive from the GEM Theory***  
J. Brandenburg, Orbital Technologies Inc., Madison, WI, USA
- 3:00 pm - *Panel Discussion (all)***

**[B06] In Situ Resource Utilization Precursors, Outpost, and Beyond**

*Wednesday, February 13, 2008, 3:45 pm – 5:45 pm – Turquoise Room*

- Chairs:** Kurt Sacksteder, NASA Glenn Research Center, Cleveland, OH, USA  
Diane Linne, NASA Glenn Research Center, Cleveland, OH, USA
- 3:45 pm - *Commonality of Electrolysis Sub-Systems for ISRU, Power, and Life Support for a Lunar Outpost***  
D. Linne, J.E. Freeh, NASA Glenn Research Center, Cleveland, OH, USA; and  
A.F. Abercromby, Wyle, Houston, TX, USA
- 4:15 pm - *In-Situ Resource Utilization (ISRU) to Support the Lunar Outpost and the Rationale for Precursor Missions***  
T. Simon, NASA Johnson Space Center, Houston, TX, USA
- 4:45 pm - *SELENE Mission Status Associated with ISRU***  
K. Matsui, A. Miyahara, Y. Takizawa, SELENE project, Tsukuba Space Center, Japan  
Aerospace Exploration Agency, Tsukuba, Ibaraki, Japan; and S. Aoki, Space and Robot  
System Group, Institute of Technology, Shimizu Corporation, Tokyo, Japan
- 5:15 pm - *Transportation and Power Requirements for He<sup>3</sup> Mining of the Jovian Planets***  
T. Kammash, Department of Nuclear Engineering and Radiological Sciences, University  
of Michigan, Ann Arbor, MI, USA; and R. Tang, Department of Aerospace Engineering,  
University of Michigan, Ann Arbor, MI, USA

**[CT108] Safety and Reliability**

*Wednesday, February 13, 2008, 3:45 pm – 5:45 pm – Alvarado B/C*

- Chairs:** Steven A. Wright, Sandia National Laboratories, Albuquerque, NM, USA  
Martin B. Sattison, Idaho National Laboratory, Idaho Falls, ID, USA
- 3:45 pm - *Advanced Stirling Radioisotope Generator: Design Processes, Reliability Analyses Impacts, and Extended Operation Tests***  
C. T. Ha, Lockheed Martin Space Systems, Sunnyvale, CA, USA; R. Fernandez, NASA  
Glenn Research Center, Cleveland, OH, USA; S. L. Cornford, and M. S. Feather, NASA  
Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, USA
- 4:15 pm - *Criticality Calculations for Step-2 GPHS Modules***  
R. Lipinski, and D. L. Hensen, Advanced Nuclear Concepts Department, Sandia  
National Laboratories, Albuquerque, NM, USA
- 4:45 pm - *Investigation of Stress Rupture Tested Neutron Irradiated Tantalum Alloys***  
C. D. Barklay and D. P. Kramer, University of Dayton Research Institute, Dayton OH,  
USA; J. Y. Howe, Oak Ridge National Laboratory, Oak Ridge, TN, USA
- 5:15 pm - *Space Reactor Launch Safety - An Acceptably Low Risk***  
A. Weitzberg, Independent Consultant, Woodland Hills, CA, USA; and S. A. Wright,  
Sandia National Laboratories, Albuquerque, NM, USA

**[CT402] Dynamic Power: Multi-Kilowatt - I**

*Wednesday, February 13, 2008, 3:45 pm – 5:45 pm – Alvarado D*

- Chairs:** Lee S. Mason, NASA Glenn Research Center, Cleveland, OH, USA  
Dennis Pelaccio, The Aerospace Corporation, Los Angeles, CA, USA
- 3:45 pm - *Irradiation Damage Effects Review of Permanent Magnetic Materials for Space***

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**Power Applications**

C. Bowman, NASA Glenn Research Center, Cleveland, OH, USA

**4:15 pm - Progress in Developing a New 5 Kilowatt Free-Piston Stirling Space Converter**

H. W. Brandhorst, and Jr., R. L. Kirby, Space Research Institute, Auburn University, AL, USA; and P. A. Chapman, Foster-Miller, Inc., Albany, NY, USA

**4:45 pm - Test Results from a Simulated High Voltage Lunar Power Transmission Line**

A. Birchenough, Power Systems Development Branch, Power and Avionics Division, NASA Glenn Research Center, Cleveland, OH, USA; and D. Hervol, Mechanical Systems Branch, Glenn Engineering and Scientific Support Organization, Analex Corporation, NASA Glenn Research Center, Cleveland, OH, USA

**5:15 pm - Panel Discussion (all)**

**[CT405] Thermoelectric Power Conversion - II**

*Wednesday, February 13, 2008, 3:45 pm – 5:45 pm – Alvarado F*

**Chairs:** G. Jeffrey Snyder, Jet Propulsion Laboratory, Pasadena, Pasadena, CA, USA

Bahman Heshmatpour, Teledyne Energy Systems, Inc., Hunt Valley, Hunt Valley, MD

**3:45 pm - Complex Zintl Phases for Thermoelectric Applications**

G. J. Snyder, Jet Propulsion Laboratory, Pasadena, CA, USA

**4:15 pm - Lanthanum Telluride: Mechanochemical Synthesis of a Refractory Thermoelectric Material**

A. May, J. Snyder, California Institute of Technology, Pasadena CA, USA; and J. Fleurial, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA

**4:45 pm - Nanostructured Bulk Composite and Alloyed Semiconductors as Efficient High Temperature Thermoelectric Materials**

J. Fleurial, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA

**5:15 pm - The General-Purpose Heat Source Radioisotope Thermoelectric Generator: A Truly General-Purpose Space RTG**

G. L. Bennett, Formerly of the U.S. Department of Energy and NASA, Emmett, ID, USA; J. J. Lombardo, Formerly of the U.S. Department of Energy and NASA, Damascus, MD, USA; R. J. Hemler, Formerly of Lockheed-Martin Space Systems Company, Audubon, PA, USA; G. Silverman, Formerly of Lockheed-Martin Space Systems Company, Lansdale, PA, USA; C. W. Whitmore, Formerly of General Electric Company, Broomall, PA, USA; W. R. Amos, Formerly of Mound Laboratory, Vandalia, OH, USA; E. W. Johnson, Formerly of Mound Laboratory, Centerville, OH, USA; R. W. Zoicher, Formerly of Los Alamos National Laboratory, Kingston, WA, USA; J. C. Hagan, Formerly of Johns Hopkins University Applied Physics Laboratory, Ellicott City, MD, USA; and R. W. Englehart, Formerly of NUS Corporation now with the U.S. Department of Energy, Gaithersburg, MD, USA

**[E04] Space Bases on the Moon: Concepts and Challenges**

*Wednesday, February 13, 2008, 3:45 pm – 5:45 pm – Alvarado A*

**Chairs:** Paul van Susante, Colorado School of Mines, Lakewood, CO, USA

Robert P. Mueller, NASA Kennedy Space Center, Orlando, FL, USA

**3:45 pm - Astrosociology and Space Exploration: Taking Advantage of the Other Branch of Science**

J. Pass, Astrosociology.com, Huntington Beach, CA, USA

**4:15 pm - Lunar Deployment of a James Webb Space Telescope Backup as Insurance against ‘Single Event’ Risks in JWST Space Deployment, Operations and early Termination**

A. Ignatiev, Texas Center for Advanced Materials, Houston, TX, USA

**4:45 pm - Risk-Assessment for Equipment Operating on the Lunar Surface**

R.C. Richmond, and N. Ramachandran, NASA Marshall Space Flight Center, Huntsville, AL, USA; and A. Kusiak, University of Iowa, Department of Mechanical and Industrial Engineering, Iowa City, IA, USA

**5:15 pm - *Conducting a Risk Management Software Tool Enterprise-Wide Rollout at Ball Aerospace***

S. Cass, Ball Aerospace & Technologies Corporation, Boulder, CO, USA

**[E09] Lunar Dust: Testing and Mitigation**

*Wednesday, February 13, 2008, 3:45 pm – 5:45 pm – Potters Room*

**Chairs:** Michael J. Dube, NASA Goddard Space Flight Center, Greenbelt, MD, USA  
Mark J. Hyatt, NASA Glenn Research Center, Cleveland, OH, USA

**3:45 pm - *Dust Mitigation Efforts at NASA Goddard Space Flight Center***

S. Straka, NASA/Goddard Space Flight Center, Greenbelt, MD, USA

**4:15 pm - *Mitigation of Lunar Dust in Mechanical Systems***

C. I. Calle, Electrostatics and Surface Physics Laboratory, NASA Kennedy Space Center, FL, USA

**4:45 pm - *Testing Lunar Dust Simulant on Mechanical Components – Paradigm and Practicality***

R. C. Richmond, NASA Marshall Space Flight Center, Huntsville, AL, USA

**5:15 pm - *Commercial Space Tourism and Human Survival***

D. C. Gibson, C. Fletcher, and A. Garcia, University of New Mexico, Albuquerque, NM, USA; C. Candelario, Development Division, Ultra Mira, Albuquerque, NM, USA;  
R. Burnet, Cordova Public Relations, Albuquerque, NM, USA

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**THURSDAY, FEBRUARY 14, 2008**

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**[A07] Smart Materials**

*Thursday, February 14, 2008, 8:00 am - 10:00 am – Turquoise Room*

**Chairs:** Kenneth Shannon, Eclipse Energy Systems, Inc., St. Petersburg, FL, USA  
Angirasa Devarakonda, NASA Ames Research Center, Moffett Field, CA, USA

**8:00 am - *Composite Material Initiative at GSFC - Thermal Aspects***

J. Didion, Senior Thermal Engineer, NASA Goddard Space Flight Center, Greenbelt, MD, USA

**8:30 am - *Emissivity Modulating Electrochromic Device***

H. Demiryont, Eclipse Energy Systems, Inc., St. Petersburg, FL, USA

**9:00 am - *The Evolution of Electrochromic Technology as a Thermal Control Management System for Spacecraft***

R. Storm, Eclipse Energy Systems, Inc., St. Petersburg, FL, USA

**9:30 am - *Heat Flux-Based Emissivity Sensor: Transient Behavior of Active Thermal Control Devices***

J. Lawler, ATEC, Inc., College Park, MD, USA

**[CT109] Power Requirements for Lunar and Mars Missions**

*Thursday, February 14, 2008, 8:00 am - 10:00 am – Alvarado B/C*

**Chairs:** Joseph Nainiger, NASA Glenn Research Center, Cleveland, OH, USA  
John H. Scott, NASA Johnson Space Center, Houston, TX, USA

**8:00 am - *A Fission Surface Power System for a Human Lunar Outpost***

J. Nainiger, NASA Glenn Research Center, Cleveland, OH, USA

**8:30 am - *A Photovoltaic and Regenerative Fuel Cell System Design for a Human Lunar Outpost***

J. E. Freeh, NASA Glenn Research Center, Cleveland, OH, USA

**9:00 am - *Expected Power Requirements for a Human Mars Mission***

R. L. Cataldo, NASA Glenn Research Center, Cleveland, OH, USA

**9:30 am - *Lunar Surface-to-Surface Power Transfer***

T. W. Kerslake, Mission and Systems Analysis Division, NASA Glenn Research Center, Cleveland, OH, USA

### [CT301] Fuel and Materials

*Thursday, February 14, 2008, 8:00 am - 10:00 am – Alvarado D*

- Chairs:** A.L. Qualls, Oak Ridge National Laboratory, Oak Ridge, TN, USA  
Cheryl Bowman, NASA Glenn Research Center, Cleveland, OH, USA
- 8:00 am -** *Honeycomb Betavoltaic Battery for Space Applications*  
G.H. Miley, J.R. Lee, and B. Ulmen, Department of Nuclear, Plasma and Radiological Engineering, University of Illinois at Urbana-Champaign, Urbana, IL, USA
- 8:30 am -** *Radiation Sensitivity, Dose and Temperature Limitations of Polymeric Materials for Application in a Fission Surface Power Convertor*  
K. J. Leonard, Oak Ridge National Laboratory, Oak Ridge, TN, USA
- 9:00 am -** *Structural Material Choices for Space Fission Reactor Systems*  
J. Busby, Oak Ridge National Laboratory, Oak Ridge, TN, USA
- 9:30 am -** *The Importance of Pu-238 in Long-Term Scientific Missions to the Outer Solar System and Beyond*  
J. B. Perkins, Center for Space Nuclear Research, Idaho National Laboratory, Idaho Falls, ID, USA

### [CT407] Radioisotope Power Systems Technology

*Thursday, February 14, 2008, 8:00 am - 10:00 am – Alvarado F*

- Chairs:** Patrick E. Frye, Pratt & Whitney Rocketdyne, Canoga Park, CA, USA  
Joseph Nainiger, NASA Glenn Research Center, Cleveland, OH, USA
- 8:00 am -** *Development Status of Advanced High-Temperature Thermoelectric Materials for Integration into Advanced Radioisotope Thermoelectric Generators*  
T. Caillat, Jet Propulsion Laboratory, Pasadena, CA, USA
- 8:30 am -** *Special Application Thermoelectric Micro Isotope Power Sources*  
B. Heshmatpour, A. Lieberman, M. Khayat, A. Leanna, and T. Dobry, Teledyne Energy Systems, Incorporated, Hunt Valley, MD, USA
- 9:00 am -** *TBD work on alternative isotope RTGs*  
R. O'Brien, Space Instrumentation & Instrumentation for Extreme Environments, Leicester, United Kingdom
- 9:30 am -** *Panel Discussion (all)*

### [F08] Theoretical Considerations

*Thursday, February 14, 2008, 8:00 am - 10:00 am – Alvarado A*

- Chairs:** Eric W. Davis, Institute for Advanced Studies at Austin, Austin, TX, USA  
Raymond Lewis, Pennsylvania State University, Boalsburg, PA, USA
- 8:00 am -** *Magic Angle Precession*  
B. Binder, Quanics.com, Germany
- 8:30 am -** *Membrane Nano-Actuation by Light-Driven Manipulation of van der Waals Forces: A Progress Report*  
F. Pinto, InterStellar Technologies Corporation, Monrovia, CA, USA
- 9:00 am -** *Progress on The GEMS (Gravity Electro-Magnetism-Strong) Theory of Field Unification and Its Application to Space Problems*  
J. Brandenburg, Orbital Technologies Incorporated, Madison, WI, USA
- 9:30 am -** *Panel Discussion (all)*

### [B07] Analog Test Site Experience

*Thursday, February 14, 2008, 10:15 am – 12:15 pm – Turquoise Room*

- Chairs:** Mark Henley, The Boeing Company, Topanga, CA, USA  
Alain Berinstain, Canadian Space Agency, St-Hubert, Quebec, Canada
- 10:15 am -** *Exploration System Mission Directorate and Constellation Program Support for*

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*Analogue Missions*

S. Hoffman, SAIC, Houston, TX, USA

**10:45 am - Lunar Commercial Mining Logistics**

W. P. Kistler, B. Citron, Lunar Transportation Systems, Inc., Bellevue, WA, USA and  
T. C. Taylor, Lunar Transportation Systems, Inc., Las Cruces, NM, USA

**11:15 am - Planetary Analogs: An Evaluation Standard**

P. Lee, NASA Ames Research Center, Moffett Field, CA, USA

**11:45 am - Preparing and Handling Large Quantities of JSC-1A Lunar Regolith Simulant for the 2007 Regolith Excavation Challenge**

M. R. Everingham, N. Pelster, California Space Authority, Santa Maria, CA, USA  
and California Space Education and Workforce Institute, Pasadena, CA, USA;  
R. P. Mueller, National Aeronautics and Space Administration, Kennedy Space  
Center, FL, USA; and K. Davidian, National Aeronautics and Space  
Administration, Headquarters, DC, USA

## [CT101] Space Nuclear Fission Power Systems and Concepts

*Thursday, February 14, 2008, 10:15 am – 12:15 pm – Alvarado B/C*

**Chairs:** David I. Poston, Los Alamos National Laboratory, Los Alamos, NM, USA  
John D. Metzger, State University of New York at Stony Brook, Stony Brook, NY, USA

**10:15 am - Comparison of KENO-VI and MCNP5 Criticality Analyses for a Lunar Regolith Clustered-Reactor System**

J. D. Bess, Center for Space Nuclear Research, Idaho Falls, ID, USA

**10:45 am - Lunar Nuclear Power Plant with Solid Core Reactor, Heatpipes and Thermoelectric Conversion**

E. D. Sayre, Engineering Consultant, Los Gatos, CA, USA; P. J. Ring, Advanced Methods  
& Materials, Sunnyvale, CA, USA; N. Brown, Engineering Consultant, San Jose, CA,  
USA; N. B. Elsner, and J. C. Bass, Hi-Z Technology, Inc., San Diego, CA, USA

**11:15 am - Near Infrared Beam Reactor**

J. E. Werner, Idaho National Laboratory, Idaho Falls, ID, USA

**11:45 am - System Concepts for Affordable Fission Surface Power**

L. S. Mason, NASA Glenn Research Center, Cleveland, OH, USA

## [CT201] Advanced Concepts and Technologies

*Thursday, February 14, 2008, 10:15 am – 12:15 pm – Alvarado F*

**Chairs:** James R. Powell, Plus Ultra Technologies, Inc., Stony Brook, NY, USA  
Terry Kammash, University of Michigan, Ann Arbor, MI, USA

**10:15 am - Breakthrough Technologies for Ultra Large Telescopes**

J.D.G. Rather, RCIG, Inc., Oak Ridge, TN, USA; G.W. Zeiders, The Sirius Group,  
Huntsville, AL, USA; and J.R. Powell, Plus Ultra Technologies, Shorham, NY, USA

**10:45 am - Converting the ISS to an Earth-Moon Transport System Using Nuclear Thermal Propulsion**

J. Paniagua, G. Maise, and J. Powell, Plus Ultra Technologies, Inc., Stony Brook, NY, USA

**11:15 am - Engineering Challenges in Antiproton Triggered Fusion Propulsion**

B. Cassenti, Department of Engineering & Science, Rensselaer Polytechnic Institute,  
Hattford, CT, USA and T. Kammash, Nuclear Engineering Department, University of  
Michigan, Ann Arbor, MI, USA

**11:45 am - MOA - The Magnetic Field Amplified Thruster, a Novel Concept for a Pulsed Plasma Accelerator**

N. Frischauf, M. Hettmer, A. Grassauer, and T. Bartusch QASAR Technologie(s), Vienna,  
Austria; O. Koudelka Institute of Communication Networks and Satellite  
Communication, Graz University of Technology, Inffeldgasse, Austria

## **[D07] Technologies for Lunar Surface Power Systems**

*Thursday, February 14, 2008, 10:15 am – 12:15 pm – Alvarado D*

**Chairs:** Robert Wegeng, Pacific Northwest National Laboratory, Richland, WA, USA  
Randy Black, Honeywell, Glendale, AZ, USA

**10:15 am - *Cryogenic Storage and Processing for Regenerative Fuel Cells***  
R. F. Boyle, NASA Goddard Space Flight Center, Greenbelt, MD, USA

**10:45 am - *Fission Surface Power Technology Development***  
D. Palac, NASA Glenn Research Center, Cleveland, OH, USA

**11:15 am - *Fuel Cell and Battery Development for Lunar Surface Power Systems***  
M. A. Manzo, NASA Glenn Research Center, Cleveland, OH, USA

**11:45 am - *Technologies for Lunar Surface Power Systems Power Beaming and Transfer***  
N. Marzwell, and R. J Pogorzelski, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, USA; K. Chang, and F. Little, Texas A&M University, College Station, TX, USA

## **[F10] An International Outlook on Far Term Propulsion and Power**

*Thursday, February 14, 2008, 10:15 am – 12:15 pm – Alvarado A*

**Chairs:** Bernd Binder, Quanics.com, Germany  
Martin Tajmar, Austrian Research Centers GmbH – ARC, Austria

**10:15 am - *Friedmann Propulsion in a Flat Holographic Universe***  
B. Binder, Quanics.com, Germany

**10:45 am - *Inertia, Electromagnetism and Fluid Dynamics***  
A. A. Martins, Center for Plasma Physics, Instituto Superior Técnico, Lisboa, Portugal  
and M. J. Pinheiro, Department of Physics and Center for Plasma Physics, Instituto Superior Técnico, Lisboa, Portugal

**11:15 am - *Measurements of the Influence of Acceleration and Temperature of Bodies on Their Weight***  
A. L. Dmitriev, St-Petersburg State University of Information Technologies, Mechanics and Optics, St-Petersburg, Russia

**11:45 am - *Long Distance Teleportation of Macroscopic Objects by Vacuum Holes***  
C. Leshan, Kiev University, Department of Nuclear Physics, Ukraine

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