

2012 Space Propulsion and Power Program Review

10-14 September 2012, Arlington VA

10 SEPTEMBER 2012, MONDAY

09:00-09:30 INTRODUCTION

09:30-10:00

(YIP 12)-[Propellant-free Spacecraft Relative Maneuvering](#)

Riccardo Bevilacqua, RENSSELAER POLYTECHNIC INST

Coupled Materials and Plasma Processes Far From Equilibrium Initiative with

Ali Sayir (Aerospace Materials for Extreme Environments)

John Luginsland (Plasma and Electro-Energetic Physics)

Secondary Electron Emission and Electrode interactions

10:00-11:00

[Micro-Engineered Material Surfaces for Electric Propulsion and Pulsed Power](#)

Nasr Ghoniem (Principal Investigator), Richard Wirz, Shahram Sharafat (UCLA)

Igor Kaganovich, Yevgeny Raitses (Princeton University)

Brian William (Ultramet)

11:00-11:30 DISCUSSIONS

11:30-13:00 LUNCH BREAK

13:00-14:00

[Comprehensive Study of Plasma-Wall Sheath Transport Phenomena](#)

Mitchelle Walker, Alex Kieckhafer, (Georgia Institute of Technology)

Jud Ready (Georgia Tech Research Institute)

Greg Thomson (University of Alabama)

Michael Keider (George Washington University)

14:00-14:30 DISCUSSIONS

14:30-15:15

[Plasma/Materials Interactions in Electric Propulsion](#)

Manuel-Martinez Sanchez (Principal Investigator), Dennis Whyte (MIT)

Mark Cappelli (Stanford University)

15:15-16:00 DISCUSSIONS / COFFEE BREAK

16:00-16:30

[Coherent Acoustic Phonon Source: A Novel Diagnostic Probe for Plasma Thruster Erosion](#)

Thomas Wilson (Principal Investigator) Marshall University

Iain Boyd (University of Michigan)

16:30-17:00

[Advanced Kinetic-Based Modeling Applied to Plasma and Neutral Flows](#)

[William Hargus, AFRL/RQRS](#)

17:00-17:30 DISCUSSIONS

11 SEPTEMBER 2012, TUESDAY

08:30-09:15

[Plasma/Electrode Interactions in Plasma Propulsion & High Current Density Environments](#)

Ed Choueiri (Princeton University)

James Polk (Jet Propulsion laboratory)

09:15-09:45

(YIP-11) HETERO-INTERFACES FOR EXTREME ELECTRONIC ENVIRONMENTS
Alp Sehirlioglu, Case Western Reserve University

09:45-10:30- DISCUSSIONS/ COFFEE BREAK

10:30-11:30

**FUNDAMENTAL STUDY OF INTERACTIONS BETWEEN PULSED HIGH-DENSITY
PLASMAS AND MATERIALS FOR SPACE PROPULSION**

**Laxminarayan Raja (Principal Investigator), Graeme Henkelman, Francesco
Stefani, Ian McNab, Roger Bengston (The University of Texas at Austin)**

Waltraud Kriven (University of Illinois at Urbana Champaign)

11:30-12:00 DISCUSSIONS

12:00-13:30 LUNCH BREAK

Field Reverse Configuration

13:30-14:15

Materials Analysis of Transient Plasma-Wall Interactions

**John Slough (Principal Investigator), Fumio Ohuchi and Richard Milroy
(University of Washington)**

14:15-14:45

**(YIP 10) - ENERGY CONVERSION AND LOSS PROCESSES IN HEAVY GAS, FIELD-
REVERSED CONFIGURATION ELECTRIC THRUSTER PLASMA**

Joshua Rovey, Missouri Univ of Science and Technology Rolla

14:45-15:15

Advanced Kinetic-Based Modeling Applied to Plasma and Neutral Flows

Sergey Gimelshein, Jean-Luc Cambier, Andrew Ketsdever , AFRL / RQRS

15:15-16:00 DISCUSSIONS / COFFEE BREAK

16:00-17:00

Spacecraft Environment:

Tightly Coupled Mechanistic Study of Materials in the Extreme Space Environment

Debbie Levin (Principal Investigator), Adri Van Duin
Krishna Rajan (Iowa State University)
Ray Sedwick, Mark Lewis (University of Maryland)

17:00-17:30 DISCUSSIONS

12 SEPTEMBER 2012, WEDNESDAY

Electrospray Propulsion

08:30-09:30

Electrosprayed Heavy Ion and Nanodrop Beams for Surface Engineering and Electrical Propulsion

Manuel-Gamero Costano (Principal Investigator), Jian-Guo Zheng, Daniel Mumm
(University of California, Irvine)
Juan Fernandez Mora, Alessandro Gomez (Yale University)
Paulo Cesar Lozano, Markus Buehler (Massachusetts Institute of Tech)

09:30-10:00 DISCUSSIONS / COFFEE BREAK

10:00-10:30

(STTR-PHASE II) VARIABLE THRUST/SPECIFIC IMPULSE ELECTROSPRAY PROPULSION

Mahadevan Krishnan (ALAMEDA APPLIED SCIENCES CORP)
Juan Fernandez Mora (Yale University)

10:30-11:00

(STTR-PHASE II) NOVEL PROPELLANTS FOR VARIABLE THRUST/ISP COLLOID THRUSTERS

James Nabity (TDA RESEARCH)
John Daily (UNIVERSITY OF COLORADO)

11:00-11:30

(STTR-PHASE II) VARIABLE-ISP IONIC LIQUID ELECTROSPRAY THRUSTER

Doug Spence (BUSEK CORP)
Paulo Lozano (MIT)

11:30-12:00 DISCUSSIONS

12:00-13:30 LUNCH BREAK

**AF11-BT10- Innovative Electric Propulsion Technology for
Responsive Space (STTR)**

13:30-13:50

Ultra-High Density Ion Propulsion From Ionic Liquids

Yu-Hui Chiu, Busek Co.

Paulo C. Lozano, Massachusetts Institute of Tech

13:50-14:10

Propulsion Optimization of Thrust through Auxiliary Entrainment of Neutrals (PROTEAN)

David Kirtley, MSNW LLC

John Slough, University of Washington

14:10-14:30

Hybrid Chemical-Electric Propulsion (HCEP)

Peter Peterson, ElectroDynamic Applications, Inc.
Michael M. Micci, The Pennsylvania State University

14:30-14:50

Innovative Electric Propulsion Technology for Responsive Space

Alexei Smirnov, RadiaBeam Technologies, LLC

Terry Kammash, University of Michigan

14:50-15:30 DISCUSSION ON STTR PHASE-I PROJECTS/ COFFEE BREAK

15:30-17:30

Michigan/AFRL Center of Excellence in Electric Propulsion

Alec Gallimore (Principal Investigator) , Iain Boyd (University of Michigan)

Lyon King (Michigan tech)

Debbie Levin (Pennsylvania State University)

Richard Wirz (UCLA)

Azer Yalin (Colorado State)

(YIP 11) Near-Surface Cusp Confinement of Micro-Scale Plasma

Richard Wirz, UCLA

17:30-18:30 DISCUSSIONS

13 SEPTEMBER 2012, THURSDAY

Novel Energetic Materials

09:00-11:00

NANOENERGETICS AND HIGH HYDROGEN CONTENT MATERIALS FOR SPACE PROPULSION

Smart Functional Nanoenergetic Materials (2012 MURI)

Richard Yetter (Principal Investigator), Stefan T. Thynell (PENNSYLVANIA STATE UNIVERSITY)

Michael Zachariah, Bryan Eichhorn (University of Maryland),

Ilhan A. Aksay, Annabella Selloni, Roberto Car (Princeton University)

Steve Son (Purdue University)

Vigor Yang (Georgia Institute of Technology)

11:00-11:30 DISCUSSIONS

11:30-13:00 LUNCH BREAK

**Nonlinear, multi-scale, multi-physics high pressure combustion
dynamics**

13:00-14:00

**THEORETICAL, NUMERICAL AND EXPERIMENTAL INVESTIGATIONS OF THE
FUNDAMENTAL PROCESSES**

Ben Zinn (Principal Investigator), Vigor Yang (Georgia Institute of Technology)

Chung K. Law (Princeton University)

14:00-14:45

**Fundamental Coupling Processes Driving Combustion Instabilities in Liquid
Rocket Engines**

Doug Talley, Ivett Leyva, AFRL / RQRC

14:45-15:30 DISCUSSIONS / COFFEE BREAK

15:30-16:45

**Reduced Basis and Stochastic Modeling of Liquid Propellant Rocket Engine as a
Complex System**

William A. Sirignano (Principal Investigator) and Athanasios Sideris (University of California, Irvine)

Suresh Menon (Georgia Institute of Technology)

Ramakanth Munipalli and Dale Ota (HyPerComp, Inc.)

David R. Kassoy (Kassoy Innovative Science Solutions)

16:45-17:30 DISCUSSIONS