## The International Planetary Probe Workshop

**The First Ten Years**

<table>
<thead>
<tr>
<th>Jean-Pierre Lebreton</th>
<th>David H. Atkinson</th>
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<tr>
<td>ESA/ESTEC, LPC2E &amp; LESIA</td>
<td>Univ. Idaho</td>
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<tr>
<th>Bernie Bienstock</th>
<th>Ethiraj Venkatapathy</th>
<th>Tibor Balint</th>
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<td>JPL, Caltech</td>
<td>NASA Ames</td>
<td>NASA HQ</td>
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### IPPW-1: Afzul Suleman
- IPPW-2: Ethiraj Venkatapathy
- IPPW-3: George Vekinis
- IPPW-4: Jim Cutts
- IPPW-5: Jean-Marc Bouilly
- IPPW-6: Bobby Braun
- IPPW-7: Ed Chester
- IPPW-8: Michelle Munk
- IPPW-9: David Mimoun
- IPPW-10: Periklis Papadopoulos
Beginnings

- Conceived by Dr. J.-P. Lebreton and Dr. D.H. Atkinson in 1998
- Motivated by studies of Huygens entry / descent trajectory reconstruction by Huygens Descent Trajectory Working Group
- Originally intended to be a one-time meeting dedicated to entry probe entry / descent trajectory analysis and reconstruction
“An international workshop on the topic of *Planetary Probe Atmospheric Entry and Descent Trajectory Analysis and Science* will take place on 6-9 October 2003 in Lisbon, Portugal. The purpose of the workshop is to bring together the community of planetary scientists, spacecraft engineers, and mission designers and planners whose expertise, experience, and interests are in the area of entry probe trajectory and attitude determination, and aerodynamics and measurement of aerodynamical and aerothermodynamical properties of planetary entry vehicles.”
IPPW Goals

• To Review state-of-the-art in science, mission design, and technologies for in situ robotic exploration of Solar System

• To Share ideas, mission opportunities, and emerging technologies

• To Serve as forum for discussions of innovative methodologies and techniques

• To Attract early career scientists and engineers

• To Foster international collaboration
Organizing Committees

- International Organizing/Steering Committee (IOC)
- Local Organizing Committee (LOC)
- Program Organizing Committee (POC)
- Student Organizing Committee (SOC)
- Al Seiff Committee
- Short Course Committee
- Long Term Planning Committee
International Organizing Committee Chairs

IPPW-1:  J.-P. Lebreton, D. Atkinson
IPPW-2:  E. Venkatapathy, D. Atkinson, J.-P. Lebreton
IPPW-3:  J.-P. Lebreton, D. Atkinson, E. Venkatapathy
IPPW-4:  D. Atkinson
IPPW-5:  J.-P. Lebreton, D. Atkinson
IPPW-6:  B. Bienstock, A. Ball
IPPW-7:  B. Bienstock, E. Chester, A. Ball
IPPW-8:  B. Bienstock, E. Chester
IPPW-9:  B. Bienstock, J.-P. Lebreton
IPPW-10: B. Bienstock, O. Karatekin
Program Organizing Committee Chairs

IPPW-1: D. Atkinson, A. Suleman
IPPW-2: E. Venkatapathy, D. Atkinson, J.-P. Lebreton
IPPW-3: J.-P. Lebreton, D. Atkinson, T. Spilker
IPPW-4: E. Kolawa, R. Lorenz, M. Roos-Serote
IPPW-5: A. Coustenis, B. Braun
IPPW-6: M. Wright, B. Kaziminejad
IPPW-7: D. Hash, O. Witasse, A. Coustenis, R. Lorenz, R. Trautner
IPPW-8: K. Edquist, R. Haya Ramos
IPPW-10: A. Sengupta, D. Atkinson
Student Organizing Committee Chairs

IPPW-4: B. Braun, M. Roos-Serote

IPPW-5: A. Ball, P. Papadopoulos

IPPW-6: P. Papadopoulos, Ed Chester

IPPW-7: Georg Herdrich, P. Papadopoulos

IPPW-8: S. Ruffin, A. Sole

IPPW-9: O. Witasse, S. Ruffin

IPPW-10: S. Ruffin, J.-P. Lebreton
Short Course Organizing Committee Chairs

IPPW-2: E. Venkatapathy
IPPW-3: S. Lingard
IPPW-4: J. Cutts
IPPW-5: F. Coron, B. Braun, A. Ball
IPPW-6: E. Kolawa
IPPW-7: T. Balint, D. Atkinson
IPPW-8: T. Balint
IPPW-9: T. Balint
IPPW-10: A. Morris
International Participation and Venues

- International participation has always been and continues to be the most important hallmark of the IPPW

- Beginning with IPPW-2, we decided that all future IPPWs would be hosted on alternating sides of the Atlantic
A tradition first introduced at IPPW-2 by E. Venkatapathy

- IPPW-2: Thermal Protection Systems
- IPPW-3: Parachutes
- IPPW-4: Instruments for Planetary Probes & Aerial Platforms
- IPPW-5: Controlled Entry & Descent into Planetary Atmospheres
- IPPW-6: Extreme Environment Technologies
- IPPW-7: Planetary Protection
- IPPW-8: Atmospheric Flight Technologies
- IPPW-9: Probe Science Instrument Technologies
- IPPW-10: EDL Systems
Al Seiff Award

- 1948 – 1986 Research Engineer/Scientist, Ames
- 1986 – 2000 San Jose State Univ. Foundation
- Background in Chemical Engineering, Gas Dynamics, and Aerodynamics

**Al Seiff Award** introduced in 2007 at IPPW-5 in recognition of Al Seiff’s lifetime contributions to fields of planetary exploration and planetary entry probe technologies, and mentorship of next generation of planetary scientists and technologists.

Award created to recognize and honor a scientist, engineer, technologist, or mission planner for outstanding career achievements and contributions to the understanding of planetary (including Titan) atmospheres utilizing high speed entry probes.
Al Seiff Video
AI Seiff Award Recipients

                NASA Goddard

IPPW-6 (2008): Jacques Blamont
                CNES

IPPW-7 (2010): Marty Tomasko
                Univ. Arizona
                Mike Tauber
                Eloret Corp.

IPPW-8 (2011): Jean-Pierre Lebreton
                ESA/ESTEC

IPPW-9 (2012): Bobby Braun
                Georgia Tech

IPPW-10 (2013): Mikhail Marov
                Keldysh Institute for
                Applied Mathematics
                Jim Arnold
                NASA Ames
Students

- Student participation is a primary focus of all International Planetary Probe Workshops

- In IPPW-4 a formal Committee was created to generate increased student participation, and to solicit funding for and provide scholarship support to many participating students

- Beginning with IPPW-2, nearly 300 students have attended the International Planetary Probe Workshops
Special Thanks to Tibor Balint

- Created posters for IPPWs

- Short Course Committee Chair for IPPW-7 (Barcelona), IPPW-8 (Portsmouth), and IPPW-9 (Toulouse)

- IPPW Logo
Relevance

- Planetary probes, via their in situ capability, generate the most accurate atmospheric and surface science from planets and moons in our solar system.

- Many atmospheric properties and constituents are inaccessible from remote sensing, and can only be measured by directly sampling.
Sponsors

Agencies
NASA: HQ, ARC, JPL, LaRC
ESA, CNES, Demokritos

Universities, Institutes, and Research Centers
Georgia Tech, Instituto Superior Tecnico, ISAE, San Jose State University, University of Idaho

Industry
Aerospace Valley  EADS
Alcatel Space  ELORET
Aquitaine  Lockheed Martin
Areva  Sncma Propulsion Solide
Astrium  Thales Alenia Space
Boeing  Vorticity

Other
ARA, BAIE, CTAE, Europlanet, National Institute of Aerospace, SSTEP
Impact

- After discussions during several IPPWs that the Huygens heat shield was not instrumented, ESA decided to properly instrument the Exomars 2016 DEM entry heatshield

- Discussions at an IPPW led to the abandonment of the very technically challenging Jupiter Deep Probe mission, with replacement by a Saturn probe mission

Future

- Continued solar system exploration by planetary entry probes is indeed promising

- Exploration of increasingly diverse planetary bodies with challenging entry system requirements requires new materials, advanced instrumentation, creative techniques, and international partnerships