

ADVANCE PROGRAM AND REGISTRATION

IMAPS Advanced Technology Workshop on
**RELIABILITY OF ADVANCED ELECTRONIC PACKAGES
AND DEVICES IN EXTREME COLD ENVIRONMENTS**

**HILTON PASADENA
PASADENA, CA 91101
FEBRUARY 21 - 23, 2005**



Courtesy of JPL/NASA

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TECHNICAL PROGRAM & REGISTRATION ON-LINE: WWW.IMAPS.ORG/EXTREMECOLD



Sponsored by:

The International Microelectronics And Packaging Society (IMAPS)
Everything in electronics between the chip and the system!

Early Registration and Hotel Deadline: January 21, 2005

Workshop Overview

The objective of this Advanced Technology Workshop (ATW) is to have a unique forum that brings together scientists, engineers, space agencies and academia who have been working in the area of advanced electronic package reliability and electronic device reliability in extreme cold temperature environments. Studies in extreme environments are extended beyond nominal operating temperature regimes. Validation of the electronic packages assembled with various electronic parts over a wide temperature range to infuse into the future space missions is of significant value for space applications. The other goal of this ATW is to expedite the infusion of cutting-edge technology into present and future NASA projects, missions, and science instruments. This ATW is partially providing the mechanism to create an international network of electronics developers and systems designers by bringing together representatives from academia and the space agencies. This workshop covers active and passive devices, circuits/systems, advanced packaging, and reliability under extreme cold temperature environments. This is the first time this workshop is being organized in the USA since there is a significant interest for NASA and other space agencies in the missions to Mars, Moon, Jupiter Icy Moons, and beyond.

Monday, February 21

Registration: Noon – 6 pm

Welcome Remarks: 1 pm – 1:30 pm
Workshop Chairs

SESSION 1: ACTIVE & PASSIVE DEVICES

Session Chairs: [Richard Patterson, NASA Glenn Research Center](#); [Richard Ulrich, University of Arkansas](#)

1:30 pm – 5:15 pm

SiGe Semiconductor Devices for Cryogenic Power Electronics - III
[R. R. Ward](#), [W. J. Dawson](#), [L. Zhu](#), [R. K. Kirschman](#), [G. Niu](#), [R. M. Nelms](#), [O. Mueller](#), [M. J. Hennessy](#), [E. K. Mueller](#), [R. L. Patterson](#), [J. E. Dickman](#), [A. Hammoud](#), [GPD Optoelectronics Corp.](#)

Reverse-Bias Degradation of SiGe Transistors at Normal and Cryogenic Temperatures
[Alexander Teverovsky](#), [Ashok Sharma](#), [Jeffrey Piepmeier](#), [QSS Group, Inc.](#)

Reliability, Performance and Standardization Issues in Embedded Passives in Extreme Temperature Conditions
[Richard K. Ulrich](#), [Leonard Schaper](#), [University of Arkansas](#)

Break: 3 pm – 3:30 pm

Issues and Experiences with Cold Temperature Testing of COTS PEM
[Michael A. Sandor](#), [Shri G. Agarwal](#), [Jet Propulsion Laboratory](#)

Performance of LTCC Resistors in Extreme Cold Environment
[Michail Moroz](#), [Ferro Electronic Material Systems](#)

Package Qual and Reliability for Extreme Environment
[Reza Ghaffarian](#), [Jet Propulsion Laboratory-NASA-CIT](#)

Lightweight Osprey CE Alloys for use in Cryogenic Packaging Applications
[Andrew J. W. Ogilvy](#), [Alan G. Leatham](#), [Sandvik Osprey](#); [Stu Weinhanker](#), [Advanced Packaging Associates](#)

Reception: 5:15 pm – 6 pm

Tuesday, February 22

Registration: 7 am – 6 pm

Continental Breakfast: 7 am – 8 am

KEYNOTE PRESENTATION: 8 AM – 8:45 AM

TITLE: RECONFIGURATION OF ANALOG ELECTRONICS FOR EXTREME ENVIRONMENTS: PROBLEM OR SOLUTION?

SPEAKER: ADRIAN STOICA, JET PROPULSION LABORATORY

SESSION 2: CIRCUITS/SYSTEMS

Session Chairs: [Patrick Plancke, European Space Agency \(ESA\)](#); [Richard Patterson, NASA Glenn Research Center](#)

8:45 am – 12:15 pm

Operation of a Boost Converter in an Extreme Cold Environment
[R. M. Nelms](#), [Dake He](#), [Calvin Cutshaw](#), [Auburn University](#)

Cryogenic Electronics for Space Applications
[Richard L. Patterson](#), [NASA Glenn Research Center](#); [Ahmad Hammoud](#), [QSS Group Inc.](#); [Malik Elbuluk](#), [University of Akron](#)

MCM ERC32SC Integrated SPARC Computer Core
[Isaac Parrondo](#), [Christian Boléat](#), [Jean-François Coldefy](#), [EADS Astrium](#)

Break: 10:15 am – 10:45 am

Asynchronous Logic for Cryogenic Applications
[Rajit Manohar](#), [Cornell University](#)

Analog & Digital Electronics for Deep Space Cryogenic Power Systems
[V. J. Kapoor](#), [A. J. Menezes](#), [University of Toledo](#); [R. L. Patterson](#), [J. E. Dickman](#), [A. Hammoud](#), [NASA Glenn Research Center](#)

Power Electronic Components and Circuits for Deep Space Missions
[Malik Elbuluk](#), [University of Akron](#); [Ahmad Hammoud](#), [Richard Patterson](#), [NASA Glenn Research Center](#)

Lunch: 12:15 pm – 1:30 pm

KEYNOTE PRESENTATION: 12:45 PM – 1:15 PM
TITLE: EXPLORING THE OUTER SOLAR SYSTEM
SPEAKER: DR. JAMES A. CUTTS, JET PROPULSION
LABORATORY

SESSION 3: ADVANCED PACKAGING
Session Chairs: F. Patrick McCluskey, University of Maryland; Phillip Zulueta, Jet Propulsion Laboratory/
NASA
1:30 pm – 5:15 pm

KEYNOTE PRESENTATION: 1:30 PM – 2:15 PM
TITLE: USING SiGe HBTs FOR ELECTRONICS
APPLICATIONS OPERATING AT CRYOGENIC
TEMPERATURES
SPEAKER: JOHN CRESSLER, GEORGIA INSTITUTE OF
TECHNOLOGY

High Density High Speed Flex Interconnect System for Cryogenic Multi-GHz Electronics
Thomas Tighe, G. Akerling, A. D. Smith, Northrop Grumman Corporation

Packaging Stress Characterization at Low Temperatures
Jeffrey C. Suhling, M. Kaysar Rahim, M. Saiful Islam, Richard C. Jaeger, Pradeep Lall, Auburn University

Break: 3:15 pm – 3:45 pm

Packaging Development for Cryogenic Power Electronics
Hua Ye, Pradeep Haldar, Harry Efstathiadis, Rashi Garg, Albany NanoTech, SUNY at Albany

Workmanship and Assembly Process Issues that Impact Reliability in Electronics for Extreme Cold Environments
Don Schatzel, Jet Propulsion Laboratory

Reliability of High Density Electronics Hybridized through Interconnect Bonding by Microwave Assembly Techniques
Nasser Budraa, Boon Ng, Daniel Wang, Syed Ahsan, Yu Zhang, John Mai, Microwave Bonding Instruments

Dinner: 5:30 pm – 6:30 pm

DINNER SPEAKER: 6:15 PM – 7 PM
TITLE: THE DESIGN OF MARS EXPLORATION ROVERS
DR. GARY R BURKE, JET PROPULSION LABORATORY

Wednesday, February 23

Registration: 7 am – Noon

Continental Breakfast: 7 am – 8 am

SESSION 4: RELIABILITY
Session Chairs: R. Wayne Johnson, Auburn University;
F. Patrick McCluskey, University of Maryland
8 am - 12:30 pm

Integration and Qualification of the Cold Readout Electronics Flight Assemblies for the Ge:Ga Detectors in the Herschel/PACS Instrument
Chris Van Hoof, Patrick Merken, Tim Souverijns, Jan Putzeys, Ybe Creten, IMEC

Extreme Environment Testing for Miniaturized Systems
Patrick Plancke, Jean-Luc Josset, Stephave Beauvivre, European Space Agency (ESA)

Reliability Assessment of COB Technology for Mars Mission
Sharon Ling, Johns Hopkins University – APL

Passive Components for Lunar and Martian Exploration
R. Wayne Johnson, Julia Gornito, Tye Green, William Symon, Auburn University

Break: 10 am – 10:30 am

Reliability Assessment of Advanced Flip-Chip Interconnect Electronic Package Assemblies under Extreme Cold Temperatures (-190°C and -120°C)
Rajeshuni Ramesham, Reza Ghaffarian, Andrew Shapiro, Jet Propulsion Laboratory; Phil A. Napala, Patrick A. Martin, NASA

Extreme Environment Tests on Micro-Cameras for the Rosetta Lander
Patrick Plancke, Jean-Luc Josset, Stephave Beauvivre, European Space Agency (ESA)

Power Module Reliability at Extreme Cold
F. Patrick McCluskey, K. Meyyappan, K. Ghosh, L. Everhart, University of Maryland

Thin Film Getter Usage in High Reliability Packages
Richard Kulberg, Heather Florence, Marco Moraja, Andrea Conte, SAES Getters/USA, Inc.

Closing Remarks: 12:30 pm
Workshop Chair



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REGISTRATION FORM

REGISTER ON-LINE AT WWW.IMAPS.ORG/EXTREMECOLD
EXTREME COLD ATW - FEBRUARY 21 - 23, 2005

Dr. Mr. Ms. Member ID# _____
First Name _____ M.I. _____ Last Name _____
Company/Affiliation _____ Job Position _____
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REGISTRATION FEES: EARLY REGISTRATION ENDS 1/21/05

WORKSHOP FEES

(On or before 1/21) (After 1/21)

Member (IMAPS) \$515 \$615
 Non-member* \$615 \$715

*Includes one-year individual membership in IMAPS

Speaker/Chair \$300 \$400

*Workshop Fee include an Abstract Book and a CD of Presentations.
CD of Presentations will be mailed 10 business days after the event.*

ADDITIONAL PURCHASES

Guest/Family Member (meals only) \$150 \$150
 CD of Presentations (Member Rate) \$150 \$150
 CD of Presentations (Non-Member Rate) \$275 \$275
 Add to Ship in the US \$7 \$7
 Add to Ship Overseas \$25 \$25

Housing (Hotel Cut-off is January 21, 2005)

Housing Accommodations **must** be made directly to:

Hilton Pasadena

168 South Los Robles Avenue
Pasadena, CA 91101

P: 1-800-HILTONS or 626-577-1000

www.pasadena.hilton.com

When making reservation, please reference IMAPS.

Single/Double: \$139

Hilton Pasadena requires a deposit for the first night's room and tax to hold your room. Deposit refunded if reservation is cancelled fourteen (14) days prior to arrival; after which deposit is non-refundable.



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PAYMENT

Workshop Fee: \$ _____

Additional Purchases: \$ _____

Total Payment Due: \$ _____

A \$25 fee must be added to all Wire Transfers.

Enclosed is a check payable in US funds to IMAPS

Charge my fees to:

Visa MasterCard Discover Amex Diners Club

Card# _____ Exp. _____

Signature _____

Card billing address, if different from above: (required)

Mail this form with payment to: IMAPS * 611 2nd Street, NE * Washington, DC 20002-4909. For credit card transactions, register on-line: www.imaps.org; or register by phone with your credit card by calling 202-548-4001; Fax: 202-548-6115. Additional information? E-mail: IMAPS@imaps.org, or visit our web site: <http://www.imaps.org>. Cancellations will be refunded (less a \$50 processing fee) only if written notice is postmarked on or before **February 4, 2005**. No refunds will be issued after that date.

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