The Multinational Power Electronics Association

PSMA
Packaging Committee Meeting

John Bultitude, Brian Narveson, Ernie Parker
Co-chairman

September 9th, 2022

PSMA is a not-for-profit organization and a CO-SPONSOR OF APEC

1985-2020

Agenda

Conference Update

- IWIPP August 24-26, 2022 - **Report**
- 3-D PEIM February 1-3, 2023

APEC 2023 Session Planning

- APEC 2023 Industry Session topic recap
- **Submission made September 2, 2022**
- **Recruitment of Speakers Discussion**

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- IWIPP August 24-26, 2022
- Hosted by G2E Labs, University Grenoble Alps
- Hybrid Virtual and In-person Conference
- World's top power, device, integrations and system researchers
- http://iwipp.org

INITIAL REPORT

IWIPP is Sponsored By:

The Fourth International Symposium on 3D Power Electronics Integration and Manufacturing

3D-PEIM 2023

Feb 1-3, Miami, Florida

General Chair
P M Raj
(Florida International University)
Associate Professor

Technical Co-Chair
Vanessa Smet
(Georgia Institute of Technology)
Assistant Professor in Mechanical Engineering, GT

Technical Co-Chair
John Bultitude
(KEMET)
Vice President, Technical Fellow

Brian Narveson, Narveson Consulting, U.S.A – Finance Chairman
Arnold Alderman, Anagenesis, Inc. U.S.A. – Publicity Chairman

The Fourth International Symposium on 3D Power Electronics Integration and Manufacturing

REGISTRATION IS OPEN: http://www.3d-peim.org//

24 Submissions 4 are Posters only

Program at a Glance

Session	Chair
S2: IVR for Computers and Servers	Siddarth Ravichandran
S3: Multiphysics Design & Tools	Rajen Murugan
S4: Additive Manufacturing	Peter Friedrichs
S5: Manufacturing Technologies	Jason Rouse
S7: Materials I Interconnects & Lead Attachments	Andy Mackie
S8: Materials II Substrates & Encapsulants	Ninad Shahane
S9: High Power Module Integration	Cyril Buttay
S11: Thermal Management and Reliability	Patrick McCluskey
S12: Passive Component Integration	John Bultitude
S13: Low Power & Telemetry	Shubhendu Bhardwaj

Plenary Speakers

Professor Fred C. Lee Virginia Tech, “PCB based Integrated Magnetics”

Prof. Katsuaki Suganuma, University Osaka, “Superior heat dissipation by low-pressure Ag sinter joining and real-time AI lifetime prediction for SiC power module”

Dr. Brandon Passmore, Wolfspeed, “Finite-Element Predictive Modeling for Power Modules”

Dr. Mahadevan Iyer, Amkor, “Emerging Power electronics packaging and system integration for automotive applications”

Prof. Madhavan Swaminathan, Georgia Tech, “Integrated Power Delivery for AI Computing: Technology Gaps & Opportunities”

Preliminary Program on-site, Working with Technical Committee & Session Chairs to complete invitations & review submissions

APEC 2023 IS Speaker Recruitment September Actions

1. Innovations in interconnection - **Charles Woychik – Sky Water – Committed –thanks to Andy M.**
2. Meeting the thermal challenge of high-density packaging **– John B to follow up with Justin Weibel, Purdue University**
3. Challenges of manufacturing high density power Danfoss - **Andy Mackie to ask them to present**
4. Voice of the customer on packaging – **Eric Svenson (IBM) has committed to talk. Voice of the Customer on Power Souces form factors.**
5. Transportation –
   1. **Brian to continue to get response from Thomas Foulkes (PSMA transportation Committee) on speaker recommendations and flexible packaging**
   2. **Andy M. has talked to Mark Policks (Binghampton U.) and will follow up him**
6. System level packaging innovations - **Brian to contact Dennis Stevens (Vitesco)**
7. Components – Magnetic Integration – **(Brian will email Raj.) Matt W. may be able to find someone if we need a backup.**
8. Internet of Things – **Jason Rouse to contact Scott Hayes at NXP**
9. Flexible packaging Applications – **John B. to contact Chris Jorgensen (IPC); Andy Mackie to contact Chuck Woychik (Binghampton U.) on Flexible power packaging**

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Next Committee Meeting:

Friday September 23rd, 11:00am CDT?

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Background Material

APEC 2023 Industry Session

Top 10 Topics for APEC 2023

1. Innovations in interconnection to improve reliability and performance – Amphenol, Tyco, Harting, Semikron - Kevork Haddad, Peter Beckedahl (SEMIKRON International GmbH, Germany)
2. Meeting the thermal challenge of high density packaging-Ganesh Subbarayan-Purdue, Sreekant Narumanchi-nrel,Sreekant Narumanc
3. Challenges of manufacturing high density power Danfoss-Andy Mackie, ASE, AMS, Wolfspeed, ST –Micro, Infinieon, Oakridge National Lab- Burak Ozpineci (GQ)
4. Voice of the customer on packaging- Tesla, automotive, John Deere, CAT, Cummins,
5. Transportation – Airplanes, Electrified ships & locomotive (check with Transportation Committee), GE (Wabtec) (locomotives), ABB, Siemens, Alston (Fiat), Bombardier (John Mills), Fiat, Dynex

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APEC 2023 Industry Session

Top 10 Topics for APEC 2023

6. System level packaging innovations (Wolf Speed, Vitesco (Continental) Dennis Stevens
7. Qualification of manufacturing process for power integrated with micro-electronics or other manufacturing topics – Matt Kelly IPC, AMS, ASE
8. Components – Magnetics (Fred Lee VT, Intel, Delta) or Film Capacitors - Kemet –(JB) challenges; smaller with higher voltage, corona discharge & creepage issues, new materials (Multec carbon nanofiber?)
9. Internet of Things – Mike Hayes has contacts
10. Flexible packaging Applications – Mike Hayes has contacts

Initial Session Submitted September 2, 2022

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APEC 2023 Industry Session

PSMA Packaging Committee Industry Session Proposal

Latest 3D-Packaging Technology for Power Electronics

Focus:

The PSMA Packaging Committee is organizing and proposing an Industry Session for APEC 2023 that is focused on the latest 3D-Packaging Technology for power electronics. The session will focus on new packaging technologies that can be used to achieve advanced performance in high density power solutions. Interconnect technologies and new materials will be described for advanced electrical performance and thermal management. The session will provide insight into innovative manufacturing processes to assemble these new technologies. A diverse range of presentations is planned that will describe advanced power packaging through a broad range of power levels. The challenges of packaging wide band gap semiconductors switching at higher frequencies will be described. Power source manufacturers' must consider employing these latest 3-D packaging technologies to realize the customer demands for higher density, more efficient power electronics and this session will bring together leading academic and industrial researchers in this area.

Target Audience:

System and design engineers, program managers involved in design, manufacture or application of power electronics and researchers where decreased size and improved efficiency is required.

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APEC 2023 Industry Session

PSMA Packaging Committee Industry Session Proposal

Latest 3D-Packaging Technology for Power Electronics

Topics / Speakers:

We will recruit 7 presenters from academic institutions and corporations doing leading edge work on advanced 3D-Power Packaging and the materials required for this. Speakers for the following topics are being actively recruited.

-Innovations in Interconnection and components

-Meeting the thermal challenges of high-density power packaging

-Manufacturing challenges and qualification of 3D packaging

-Voice of the customer on 3D packaging

-Power packaging for electrified transportation

-Internet of Things power packaging

-Packaging power for flexible applications

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