SEMI-THERM® Thermal Technologies Workshop

December 7-9, 2021

Virtual Workshop

Announcement and Call for Abstracts

Abstracts for presentations may be submitted to:

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Abstract Deadline Extension: October 15, 2021

Abstracts are solicited for technical presentations on electronics thermal management topics for presentation at this annual advanced technology workshop (see reverse for more detail):

- Advanced thermal interface materials developments, testing, and characterization
- Developments in CTE-matched thermal composites, graphite, and related heat spreader materials
- Applications for vapor chambers and heat pipe assemblies
- Single- and two-phase liquid cooling systems developments
- Commercial and military/aerospace thermal solutions
- Developments in power semiconductor thermal solutions
- Innovations in CFD thermal modeling and characterization tools

Keynote Presentations: This Workshop has been held for more than twenty-five years and has gained industry attention for the excellence of keynote presentations and first announcements of important technology developments. Keynote presentations in the last five years have been given by speakers from AMD, Collins Aerospace, Georgia Institute of Technology, HPE/Hewlett Packard Laboratories, HP Systems Research Labs, IBM Corporation, Intel Corporation, Microsoft, Qualcomm Technologies, Samsung (Korea), Santa Clara University, The Citadel, and University of Colorado. In 2019, this Workshop moved to the Microsoft Corporation Conference Center on the Microsoft headquarters campus, near Seattle WA, allowing us to set a new attendance record and expand the number of technical exhibits, with outstanding response from speakers and attendees.

Conference Virtual Format: The Program Committee has reviewed the current pandemic situation and the continued impacts on ability to travel and gather for an industry event. We have been forced to revert to a virtual workshop for the second year, as the travel and public health restrictions are more uncertain than was the case for planning for the 2020 workshop. This is very unfortunate and we regret having to make this decision; restrictive policies by a large number of companies on employee business travel have made this necessary. Each year, authors and attendees find this workshop format to be a highly effective forum for announcement of new developments and new challenges, as well as for excellent networking between all participants; however, the most important impact of a move to the virtual format is that we will not be able to offer the networking that this event is known for.

The transition to a virtual workshop opens up more opportunities for presentations from overseas participants, which is a welcome positive step.

Exhibits: There will be no forum for industry exhibits for 2021, given the transition to a virtual format.

Student Abstract Competition

We anticipate holding a student abstract competition again for 2021, as we have since 2004. This will include cash stipends for winning graduate and undergraduate science and engineering student presentations. Stipends are funded by sponsor companies, accompanied by waiver of registration fees.

ABSTRACTS ARE SOLICITED IN THE FOLLOWING AREAS:

- **Market drivers**: Understanding thermal challenges and business/economic drivers that influence change in electronic systems design and manufacturing – and how these impact thermal design requirements. Developing market trends, market segmentation, cost drivers and reliability factors are examples of topics that set the framework for where and what types of new technical solutions are viable.
- **Stacked-die packaging**: Advanced packaging technologies, such as System-In-Package, Multi-chip modules, Multi-package modules, and stacked-die packaging provide significant opportunities for miniaturization and performance enhancements. These technologies introduce significant thermal and interconnect challenges that must be balanced against those benefits and require continuing new developments in materials and solutions.
- **Mobile and handheld devices**: Wearables, mobile, medical devices, small displays, tablets, notebooks, AR headsets, and other consumer and mobile devices introduce unique component- and system-level thermal challenges that require novel design approaches and materials.
- **Wireless and telecom infrastructure**: High performance telecom hardware have challenging component and system level requirements that require technical advances to meet the evolving needs for routers, networked systems, and base stations.
- **Power semiconductor thermal components, systems, and solutions**: Developments in IGBT thermal management and packaging strongly influence advances in electronic and electrical drive systems, especially important in the EV/HEV and renewable energy markets.
- **Mil/Aerospace**: Avionics, RF, energy, and microwave components and modules for phased array radar, countermeasures, communications, and other systems, requiring advanced thermal management as well as high-temperature materials and packaging.
- **System-level cooling:** The thermal design of complex systems, such as high-performance computing systems, relies on extensive component- and system-level thermal management analysis to address the broad spectrum of issues that entail a comprehensive system design.
- **Data center cooling:** Data center cooling includes a variety of design optimization activities including cooling provisioning, airflow control, temperature distribution and migration paths that range from forced air convection to system liquid cooling.
- **Liquid cooling, phase-change, and refrigeration:** Advanced cooling methods that use liquid, latent heat and/or active cooling provide opportunities for enhanced performance and design flexibility. Effective designs must balance these advantages against factors including life-cycle cost, reliability and serviceability impact.
- **Thermal interface materials (TIMs) and testing:** Advanced thermal interface materials that may include organic, metallic, graphitic materials in bulk form as well as nanoscale are enabling significant advances in the thermal management of high-performance processors, memory, telecom, IGBT, RF, and microwave components and systems. Effective testing is critical in determining the suitability of a TIM for a given application.
- **CTE-matching and high thermal conductivity materials:** Metallic, ceramic, and composite materials have been engineered to exhibit excellent thermal conductivity with controlled coefficient of thermal expansion (CTE) properties to allow for better matching with GaN, SiC, silicon, or ceramic materials to reduce thermal stresses in component packaging.

Preparation of Abstract

Speakers should submit one copy of a two-paragraph abstract that describes their proposed 25-minute presentation. We have published an abstract deadline extension, to **October 15, 2021**.

NOTE: No formal technical manuscript is required. A post-conference download that includes presentation materials, as provided by the authors, will be sent to all attendees approximately two weeks after the event. Speakers will be asked to sign a permission to publish statement. Abstracts may be submitted to the general and program chairs. An abstract submittal page will also be available at a later date on the SEMI-THERM Educational Foundation website (www.semi-therm.org). Accepted presentations may be considered for subsequent publication with a full manuscript in the annual SEMI-THERM Symposium and can be accessed after the Workshop on the SEMI-THERM Engineering Library archived website, with a passcode.

Organizing Committee

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Adriana Rangel, Mechanical Engineer, Cisco Systems Inc.
Dave Saums, Principal, DS&A LLC
Tejas Shah, Senior Thermal Architect, Intel Corporation
Guy Wagner, Director, Electronic Cooling Solutions, Inc.
Ross Wilcoxon, Associate Director, Mechanical Engineering, Mission Systems, Collins Aerospace, Inc.

More information and registration is available at: www.semi-therm.org.