



November 4-6, 2019
Microsoft Corporate
Conference Center
Redmond, Washington



THERMAL TECHNOLOGIES WORKSHOP 2019

ANNOUNCEMENT AND CALL FOR ABSTRACTS Abstract Deadline September 30, 2019

Abstracts for presentations may be submitted via the SEMI-THERM web site:
<https://www.semi-therm.org/>

Abstracts for the 2019 Thermal Technologies Workshop (TTW) are solicited for technical presentations on electronics thermal management; topics include:

- Advanced thermal interface materials developments, testing, and characterization
- Developments in CTE-matched thermal composites
- Applications of 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 tools

Keynote presentations:

Hewlett Packard Laboratories – Developments in Silicon Photonics
Microsoft Corporation – Developments in Quantum Computing

The workshop takes place at the Microsoft Corporation Conference Center on the Microsoft headquarters campus, near Seattle WA. This new venue allows us to expand the number of attendees and number of technical exhibits.

The headquarters hotel will be the [Seattle Marriott Redmond](#), with a reduced Workshop attendee rate of \$190/night plus tax until October 11, 2019. The Marriott Redmond is a full-service Marriott hotel and will be utilized for additional networking opportunities in the evenings.

Speakers and attendees are asked to attend the entire Workshop to encourage greater interaction between registered attendees. Authors and attendees find this workshop format to be a highly effective forum for announcement of new developments and excellent networking between all participants. The reduced registration fee for speakers makes active participation in the program even more beneficial. Activities beyond the technical program, including meals, breaks, and exhibit hours, are focused on maximizing networking effectiveness.

This Workshop includes two breakfasts, two lunches, and two dinners; this is to enhance our opportunities for one-on-one and group discussions. Attendees typically view individual discussions during this event to be a critical aspect of attendance and participation – to a much greater extent than in a typical technical conference.

More information is available at: semi-therm.org

Register at: <https://semitherm.regfox.com/semi-therm-thermal-technologies-workshop-2019>

Student Abstract Competition

A student abstract competition will also include cash stipends for winning graduate and undergraduate science and engineering student presentations. Stipends are funded by sponsor companies.

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, and notebooks 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 no later than **Sept. 13, 2019**. 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 15 business days after the event. The speaker's presentation file must be provided during the workshop.

An abstract submittal button is available 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 on the SEMI-THERM archived website.

Organizing Committee

Vadim Gektin, Distinguished Engineer, Futurewei Technologies

Bill Maltz, President, Electronic Cooling Solutions, Inc.

Nader Nikfar, Principal Thermal Engineer, Qualcomm Technologies, Inc.

John Peeples, Professor and Chair, Electrical and Computer Engineering, The Citadel

Emil Rahim, Senior Thermal Engineer, Google Inc.

Adriana Rangel, Mechanical Engineer, Cisco Systems Inc.

Dave Saums, Principal, DS&A LLC

Tejas Shah, Senior Thermal Engineer, nVidia Corporation

Guy Wagner, Director, Electronic Cooling Solutions, Inc.

Ross Wilcoxon, Associate Director, Mechanical Engineering, Mission Systems, Collins Aerospace Inc.