



Sammy Tin

The 14th International Symposium on Superalloys (Superalloys 2020) will take place September 13–17, 2020, at the Seven Springs Mountain Resort in Seven Springs, Pennsylvania. Held once every four years over a span of six decades, this international meeting celebrates the latest and most significant innovations in superalloys. This is a tremendous opportunity to interact and exchange ideas with other researchers working in the superalloys community—from across academia, industries, and government labs.

A keynote talk will begin the conference on Sunday evening, presented by **Christian Dumont**, chief of the materials and processing modeling department at Aubert & Duval, and **Arnaud Longuet**, an expert in the mechanics of high temperature materials at SAFRAN Aircraft Engines. They will provide a unique overview of how data and information generated from process modeling tools used by the supply chain have been integrated in lifting methodologies used by the engine's original equipment manufacturer (OEM).

Superalloys 2020 will continue to offer a program where presentations are scheduled through the morning and an extended afternoon break allows guests to network with others working within the international superalloys community, with attendees reconvening for evening presentations. Multiple interactive poster sessions also will be scheduled, so that attendees have ample opportunities to participate in technical discussions over various sessions.

Originality and academic or industrial relevance are the major criteria used by the program committee for evaluating the presented manuscripts and topics. This symposium will continue a longstanding

tradition of having a peer-reviewed publication of all papers presented in a proceedings volume that will be available at the time of the conference. For many, the compiled collection of Superalloys Proceedings serves as the primary archival resource that documents the major trends and advances impacting the community. **(Editor's note: The Superalloys Proceedings Archive, offering more than 1,000 papers from superalloys-related meetings since 1968, can be accessed at www.tms.org/SuperalloysArchive.)**

Over the past 70-plus years, superalloys have served as key enabling technologies that have been critical to the development of ultra-efficient gas turbines with reduced fuel consumption and minimization of CO₂ and NO_x emissions. Superalloys offer a truly unique combination of mechanical and physical attributes at elevated temperatures that makes them ideal for use in hot section gas turbine components for propulsion and power generation applications. However, in many advanced gas turbines, superalloys are being used at temperatures and stresses that approach the limits of their current capabilities, and they often serve as design limiting materials.

In order to design turbines with even higher efficiencies, there is demand for innovative technologies that lead to both superalloys with increasing temperature capability and superalloys that possess equivalent properties to existing alloys but can be produced at significantly reduced costs. Addressing these challenges requires attaining knowledge of the underlying metal physics governing their characteristic behavior and the development of engineering solutions that overcome these limitations through the optimization of composition, microstructure, and processing routes.

The images above represent a variety of superalloys applications. From left to right: a Merlin engine on a test stand from SpaceX; a ceramic-based aluminate coating made to protect steels and superalloys from Pacific Northwest National Laboratory; a SuperDraco rocket engine from SpaceX; and the Holloman AFB F-4 Phantom II from the U.S. Air Force.



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In recent years, the superalloys community has benefited greatly from advances in the development of property models, computational tools, processing methods, and innovative characterization techniques that have contributed to an improved fundamental understanding of the material behavior. For example, 3D meso-scale through atomic scale characterization, machine learning algorithms, integrated computational materials engineering (ICME), and physics-based property models have all contributed to improve the processing and performance of existing materials, while accelerating the development of new alloys. These and other innovative technologies for lifecycle improvement of

superalloys will be a focus of Superalloys 2020.

The Superalloys 2020 symposium will continue to explore the traditional areas of alloy development, processing, coatings and environmental effects, and mechanical behavior, while incorporating innovative new technologies that have contributed to lifecycle improvements. Attendees will learn about relevant and timely findings from investigations on the development of novel classes of blade and disk alloys and original structure, chemistry, and property relationships that provide new insight into the behavior of these alloys. The significance of manufacturing processes, both conventional solidification and thermal-mechanical along with

state-of-the-art advances in additive manufacturing of Ni-base superalloys, will be discussed. This is an area where the application of computational tools, modeling methodologies, “big data,” and machine learning has successfully contributed to the optimization of processing routes that can be used to engineer the microstructure to produce desired properties.

Regular attendees speak highly of the conference’s social events. Housed at Seven Springs Mountain Resort in southwestern Pennsylvania’s Laurel Highlands region, the venue offers a refined backdrop to the welcome reception, networking mixer, and evening banquet. Tour tickets will be available through Superalloys 2020 registration for those interested in seeing Frank Lloyd Wright’s Fallingwater, a world-renowned architectural masterpiece.

Registration is open for Superalloys 2020. Save your spot today as colleagues mark their calendars and prepare to keep the tradition of improvement and innovation in superalloys going for generations to come.

Sammy Tin is a professor of materials engineering at Illinois Institute of Technology and the organizing chair of Superalloys 2020.



Register Today!

Join one of the most established and impactful conferences on superalloys. Mark your calendar for the 14th International Symposium on Superalloys, September 13–17, 2020, and reserve your stay at Seven Springs Mountain Resort in scenic southwestern Pennsylvania.

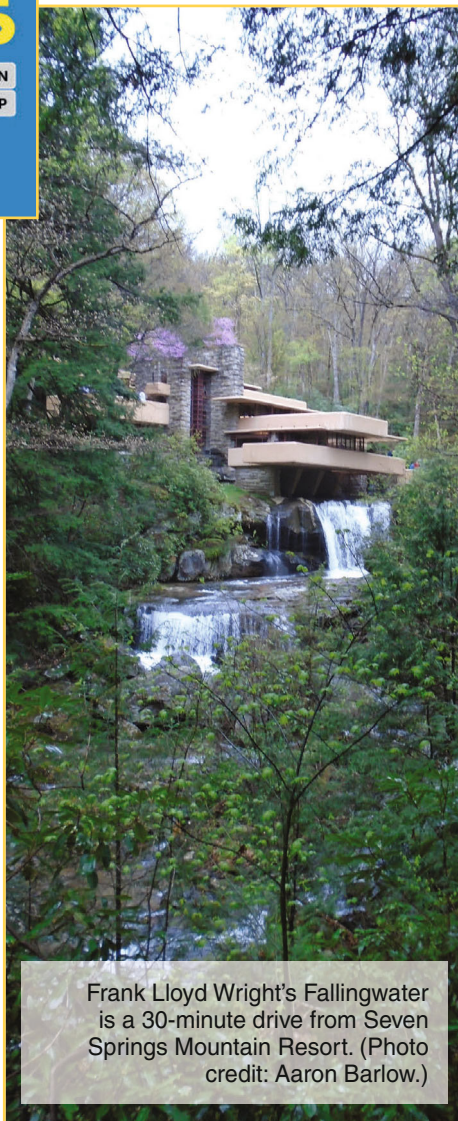
Housing Deadline:

August 12, 2020

Discount Registration

Deadline: August 13, 2020

Additional opportunities for networking and learning include two short courses on Sunday, September 13—Vacuum Precision Investment Casting: An Overview and Manufacture of Ni-based Superalloys Forgings—and a tour of Fallingwater on Tuesday, September 15. Tour tickets and course registration may be purchased through the symposium registration form. More information and registration is available at www.tms.org/Superalloys2020.



Frank Lloyd Wright's Fallingwater is a 30-minute drive from Seven Springs Mountain Resort. (Photo credit: Aaron Barlow.)