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**SUBMIT AN ABSTRACT TO:**

## **LIGHT METALS**

# **GREATER THAN THE SUM OF ITS PARTS – CONCURRENT ALLOY DESIGN AND PROCESSING SCIENCE: AN LMD SYMPOSIUM HONORING RAYMOND DECKER**

The most impactful developments in materials science are rarely just a new material or a new process; it is the simultaneous and complementary advancement of alloy and process together that can drive an innovation into the marketplace. Few researchers have adopted and been as successful with this design philosophy as Ray Decker. Over his more than 50 years of experience as a research metallurgist, he has applied this over a wide range of alloys. His work in superalloys revealed alloying strategies for improved strength via coherency hardening. At the same time, his work revealed that trace elements from the crucible could play a role in the mechanical properties of the alloy. Developments in alloying strategy and improved heat treatments were equally critical in his work as a co-inventor of maraging steel. In his most recent venture, he has applied this philosophy to Mg alloys, developing and broadly commercializing thixomolding technology to obtain refined microstructures with high strength and retained ductility that are able to be thermomechanically processed without developing a deleterious amount of crystallographic texture. He has taken this processing technology and combined it with alloy design, resulting in his recent development of the BioMg 250 for bioabsorbable surgical implants.

Thixomolding (or magnesium injection molding), as a light-alloy processing technology, was globalized by the vision of Ray and his partners in the commercialization of the semi-solid process through their company, Thixomat LLC. Leading Thixomat, Ray expanded the use of this technology from a few dozen thixomolding machines, to today where there are hundreds if not thousands of semi-solid, thixomolding machines through Thixomat and their affiliates. This has resulted in millions of parts for the video, cell phone, automotive, computer and other industries being produced with improved properties, integrated part design and net-shape manufacturing. Over his career, Ray Decker has made critical technological advances to address challenges including reducing environmental damage, conserving energy, and making more effective orthopedic devices. In addition to his contributions as a technologist, Ray has consistently taken a long-term vision for his work by involving graduates and undergraduate students through strong collaborations with university faculty and volunteering through his professional societies.

His career is certainly greater than the sum of its parts, and it is the Light Metals Division's great honor to his lifetime of achievements at TMS 2021. This symposium honors the theme of Dr. Decker's career by accepting papers on the intertwined development of alloying and processing of metallic materials, with preference for application-driven research.

## **ORGANIZERS**

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**Abstract Deadline is July 1, 2020. Submit online at**  
[www.programmaster.org/TMS2021](http://www.programmaster.org/TMS2021).

**Questions?**  
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