

2021-2022 GRANT RECIPIENT REPORT

Nilesh Kumar University of Alabama

KENT D. PEASLEE JUNIOR FACULTY AWARD

The proposal outlined a strategy to forge a relationship with Nucor Steel Tuscaloosa Inc., steps to create interests among students in steel industry and an approach to organize a steel-related event at the University of Alabama. The proposed research work involved establishing processing – microstructure – mechanical properties correlation in a new grade of dual-phase steel developed by Nucor Steel for automotive lightweighting.

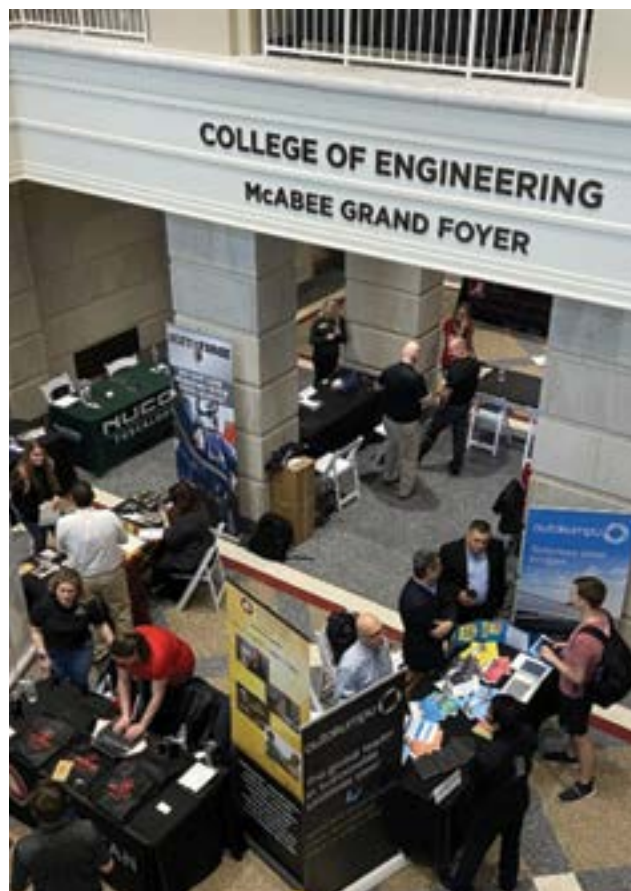
Until recently, two Ph.D. students, one master's student and three undergraduate students have been involved in steel-related research. In addition to involving existing undergraduate and graduate students in steel-related research, a number of outreach activities were pursued to recruit more students. It included advertising about AIST on E-day, a guest lecture titled "MTE 121: Introduction to Materials," a course to talk about Material Advantage, AIST, the importance of undergraduate research, and availability of steel-related research opportunities within the group Kumar started. He also participated in a virtual Faculty Research Showcase meant for student recruitment. As a result of his participation in this showcase, an undergraduate student Aaron Hardon, a mechanical engineering major, was hired in the spring of 2021.

To engage and expose students further with opportunities existing in steel related industries, a virtual Steel Day event was held on 23 February 2021 and hosted 57 participants. This was the second steel day event at the University of Alabama, and several steel and steel-related companies participated. However, due to the COVID-19 pandemic, it was not possible to organize this event in person. Although the event was well advertised, the participation was smaller than the previous year. Despite the lower level of participation, the event received positive feedback.

University of Alabama and Nucor Steel-Decatur LLC have collaborated to develop third-generation advanced high-strength steel through thermomechanical processing.

Work has also taken place in the direction of a high-Mn transformation-induced plasticity steel. The focus of this research is electrochemical and stress corrosion cracking response of the alloy at room temperature in 3.5 wt.% NaCl solution.

Additionally, there has been collaboration with Missouri University of Science and Technology involving WC-Co tool development for steels and other high-temperature materials. ♦



The Steel Day event resumed in person in 2022 at the University of Alabama, continuing Nilesh Kumar's efforts to bring the next generation into the steel industry.