

Don't Forget the People!

New Roles and Technologies in Ever-more Automated Smart Manufacturing

Today's digital manufacturing landscape is thought by some to be headed toward fields of robots communicating and analyzing data and ultimately designing and operating tomorrow's production facility. Humans may however still have a fighting chance to contribute to the future of manufacturing. Understanding the best way to design future systems in order to leverage the best of human abilities will require convergent understanding in Machine Learning (today's AI), coded intelligence and decision-making (tomorrow's AI), automated sensing, interpretation and control, how people and technology can team together (organizational psychology), and how people are motivated and fulfilled to do their best (personal psychology). This is an exciting time to be studying and improving manufacturing, especially how technologies can be developed to better integrate humans to the emerging digital automated landscape. This integration is the key focus of a NSF-sponsored graduate program at Clemson called THINKER (Technology-Human INtegrated Knowledge, Education and Research), where graduate students team with technical college students to investigate and evaluate new roles and prototypes for people in manufacturing.



Laine Mears is the BMW SmartState Endowed Chair of Automotive Manufacturing, Professor and founding faculty member in the Automotive Engineering department at Clemson University. He teaches and conducts research in manufacturing quality estimation, Intelligent Machining Systems, manufacturing process design and control, and manufacturing equipment diagnostics, at the Clemson University International Center for Automotive Research. Current efforts are in expanding the Multimaterial Joining Lab and growing a new Center of Automotive Assembly. He has published over 160 peer-reviewed articles, and is the recipient of the NSF CAREER award, SAE Ralph Teetor Educational Award, the South Carolina Governor's Young Researcher Award for Excellence in Scientific Research, and the IMECHE George Stephenson Gold Medal and Thatcher Bros. Prize. He currently directs the Clemson Vehicle Assembly Center and the NSF THINKER Research Traineeship Program.

In addition to academic experience, Dr. Mears has over 10 years in industry, holding positions with Hitachi Automotive and SKF Bearings as both Manufacturing Engineer and Engineering Manager in high-volume precision manufacturing environments. Applicable work in industry includes leading quality implementation teams for QS-9000 and IATF-16949 quality systems, power optimization of hard machining processes, and startup of a new bulk deformation rolling process. Dr. Mears has a B.S. in mechanical engineering from Virginia Tech (1993) and M.S. (2001) and Ph.D. (2006) degrees in mechanical engineering from Georgia Tech. He is a Fellow of both the American Society of Mechanical Engineers and SME, and a Senior Member of the American Society for Quality. He is an SME Certified Manufacturing Engineer, ASQ Certified Quality Engineer (CQE), BMW Lean Six Sigma Black Belt, and licensed Professional Engineer.