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Contact:

Creig Bowland
SPE Auto. Composites Conf. Chair
PPG Industries
Phone: +1.704.466.1505
eMail: acce-chair@speautomotive.com

or

Peggy Malnati
SPE Auto. Div. Communications Chair
Malnati & Associates
+1.248.592.0765
media@speautomotive.com

SPE® ANNOUNCES SECOND WINNER OF FIFTH-ANNUAL ACCE GRADUATE SCHOLARSHIP ON AUTOMOTIVE COMPOSITES

University of Wisconsin-Madison Ph.D. Candidate to Receive Funds for Research on Processing Effects on Short-Fiber Composites

TROY (DETROIT), MICH. – **Thomas (Tom) G. Loken**, a doctoral candidate in Mechanical Engineering at ***University of Wisconsin-Madison*** (Madison, Wisc.) as well as a project engineer at The Madison Group (Madison, Wisc.), is the second 2011-2012 winner of the ***SPE Automotive Composites Conference & Exhibition (ACCE)*** graduate-level scholarship in transportation composites research. Loken, who is from Winona, Minn. and expects to graduate in 2014, won this year's second scholarship for a research project analyzing the effects of processing conditions on fiber-length distribution in short-fiber composites. He will receive his $2,000 USD check this fall and will report the results of his research during the twelfth-annual SPE ACCE, September 11-13, 2012.

Short-fiber thermoplastic composite materials are widely used in the automotive industry. These materials offer enhanced mechanical properties over unfilled resins, yet remain viable for high-volume production methods, such as injection molding, making metals replacement cost-effective thanks to parts consolidation, weight reduction, and elimination of secondary-finishing operations. However, the mechanical properties of fiber-filled composites are strongly influenced by orientation and length/diameter (L/D) ratios of reinforcing fibers, making final part properties highly dependent upon processing conditions. In the case of injection molding, fiber damage and attrition can occur during processing, reducing final L/D ratio. Therefore it is useful to understand which process parameters have the greatest effect on final fiber length distribution.

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"The focus of my research is to study the effects of varying process conditions on the final fiber-length distribution in short-fiber thermoplastic composites," explains Loken. "I am studying injection molding of a commercially available grade of short-glass/polypropylene and the influence of process variables like injection speed, screw speed, mold temperature, and barrel temperature. Injection speed controls the shear rate of the resin as it passes through the nozzle, runner, gate, and into the mold cavity. Screw speed controls the shear rate of the material during plastification in the barrel. Barrel temperature impacts the resin viscosity. And mold temperature affects material flow into the tool. Once test specimens have been molded, they will tensile tested per ASTM-D638 specifications to obtain tensile strength and modulus values, which will be studied as response variables. Samples with the most varied tensile properties will be selected for fiber-length distribution measurements. I've set my project up as a two-level factorial design of experiments (DOE) study to evaluate interaction between process variables. Because temperatures are hard to change, a split-plot design will be used. From personal experience, I've found that experimental designs are useful because full randomization is neither cost effective, nor practical. However, careful examination of the treatment variables to account for the split-plot design and randomization restrictions is necessary. I hope that the results will show which variable or variables have the greatest influence on tensile properties, what process interactions are present, and how varying process parameters influences the final fiber L/D ratio and measurement technique."

Thomas Loken holds a B.S. degree in Composite Materials Engineering from Winona State University (Winona, Minn.), which he received in 2009. During his undergraduate studies he worked as a testing intern at the school's Composite Materials Technology Center (COMTEC), where he conducted mechanical and analytical testing on composites and plastics. He also worked as a process engineering intern at RTP Co. (Winona, Minn.) in the extrusion/compounding of thermoplastics and short-fiber composites. At RTP, Loken was responsible for SPC charting, corrective actions, and process studies. After graduating, he served as the manufacturing engineer at Rolco Inc. (Kasota, Minn.) where he managed work instructions, corrective action requests, and process optimization, and project managed four family tools used to produce automotive parts using glass-filled polyamide – from mold inspection, to sampling, to production. Loken also conducted considerable research – using factorial screening experiments, response surface experiments, and validation – on secondary spin-welding operations for these parts to ensure a hermetic seal was achieved. He is currently a project engineer at The Madison Group where he conducts failure analysis of plastics and provides consulting services to the plastics community. Loken is concurrently a full-time graduate student in the Mechanical Engineering department at the University of Wisconsin-Madison working with Drs. Tim Osswald and Paul Gramann.

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About the SPE ACCE

Held annually in suburban Detroit, the SPE ACCE typically draws 400+ speakers, exhibitors, sponsors, and attendees from 14 countries on five continents and provides an environment dedicated solely to discussion and networking about advances in transportation composites. Its global appeal is evident in the diversity of exhibitors, speakers, and attendees who come to the conference from Europe, the Middle East, Africa, and Asia / Pacific as well as North America and who represent transportation OEMs -- traditional automotive and light truck, as well as agriculture, truck & bus, and aviation – and tier suppliers; composite materials, processing equipment, additives, and reinforcement suppliers; trade associations, consultants, university and government labs; media; and investment bankers. The show is sponsored jointly by SPE's Automotive and Composites Divisions.

Current sponsors and exhibitors for the show include: Ticona Engineering Polymers, Dieffenbacher GmbH, Magna Exteriors and Interiors, Continental Structural Plastics, RTP Co., American Composite Manufacturers Assoc.'s (ACMA's) Automotive Composites Alliance (ACA), Bayer MaterialScience, Addcomp North America, Inc., AOC Resins, Asahi Kasei Plastics North America, Inc., Toho Tenax America, Inc., PPG Industries, Acrolab, Ltd., OCV Reinforcements, Bulk Molding Compounds Inc., The Composites Group, Quantum Composites, Ashland Inc., American Chemistry Council - Plastics Div., Dassault Systèmes, BASF, e-Xstream engineering, Flow International Corp., Polystrand, Williams, White & Co., Plasan Carbon Composites, Mitsubishi Rayon Co. Ltd., Newport Adhesives & Composites Inc., National Research Council Canada (NRC), DASI Solutions, LayStitch Technologies, Core Molding Technologies, Inc., *Reinforced Plastics* magazine, *Composites Technology* magazine, *High-Performance Composites* magazine, *CompositesWorld Weekly* eZine, *Ward's AutoWorld* magazine, WardsAuto.com, *Plastics Technology* magazine, Plaspec Global Plastics Selector, *Polymotive* magazine, *Automotive Design & Production* magazine, AutoField Blog, *China Plastics & Rubber Journal*, *China Plastics & Rubber Journal International*, *Plastics Engineering* magazine, *Automotive NewsWire* eZine, SAE International, *Automotive Engineering International* magazine, JEC Group, Composites Europe, and Modern Plastics India Magazine.

The mission of SPE is to promote scientific and engineering knowledge relating to plastics. SPE's Automotive and Composites Divisions work to advance plastics and plastic-based composites technologies worldwide and to educate industry, academia, and the public about these advances. Both divisions are dedicated to educating, promoting, recognizing, and communicating technical accomplishments for all phases of plastics and plastic-based composite developments, including materials, processing, equipment, tooling, design and testing, and application development.

For more information about the SPE Automotive Composites Conference & Exhibition, visit the Automotive Division's website at **http://speautomotive.com/comp.htm**, or the Composites' Division website at **http://compositeshelp.com**, or contact the group at +1.248.244.8993, or write SPE Automotive Division, 1800 Crooks Road, Suite A, Troy, MI 48084, USA. For more information on the Society of Plastics Engineers or other SPE events, visit the SPE website at **www.4spe.org**, or call +1.203.775.0471.

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Attention Editors: Medium-resolution digital photography is available upon request.