Best Papers

SPE® Announces 2016 Automotive Composites Conference and Exhibition (ACCE) Best Paper Award Winners

The 2016 SPE ACCE *Dr. Jackie Rehkopf Best Paper Award* winners received the highest average ratings by conference peer reviewers out of a field of 92 contenders. All three winners will be honored for excellence in technical writing with a commemorative plaque during SPE ACCE opening ceremonies on September 7.

Sebastian Goris, a doctoral student at the University of Wisconsin-Madison (Madison, Wis., U.S.A.) and graduate research assistant at the Polymer Engineering Center (PEC) took first place in this year's competition; **Dr. Ying Fan**, a research engineer in the Department of Mechanical and Materials Engineering at Western University (formerly University of Western Ontario; London, Ont., Canada) took second place; and **Christoph Kuhn**, who is simultaneously working as a project engineer in the Group Research department at Volkswagen AG (Wolfsburg, Germany) and also pursuing a doctorate degree at Friedrich-Alexander University Erlangen-Nuremberg, (Erlangen, Germany) placed third in the competition.

The conference's best paper awards honor long-time SPE ACCE committee member, session organizer, two-times technical program co-chair, and long-time automotive-composites industry researcher, Dr. Jackie Rehkopf.

Goris was lead author along with his advisor, Prof. Tim Osswald of the Polymer Engineering Center (PEC) at University of Wisconsin-Madison (UW-Madison) on a paper entitled *Progress on the Characterization of the Process-Induced Fiber Microstructure of Long Glass Fiber-Reinforced Thermoplastics*. The paper will be presented on **September 8 from 11:00-11:30 a.m.** in the *Virtual Prototyping & Testing - Part 4* session at the conference. About his topic, the author says, "The work described in this paper discusses new measurement approaches that we've developed at the PEC to determine the full three-dimensional fiber architecture obtained using micro computed tomography technology for fiber orientation and fiber density distribution as well as an automated process to determine the fiber-length distribution. Results of the work measured on 40-wt% injection molded long [glass] fiber-[reinforced] thermoplastic polypropylene [LFT-PP] suggest that the common assumption of uniform fiber length and fiber density distribution in injection molded parts is not correct. The potential impact of the heterogeneity of process-induced microstructure that we found can be critical for accurate analysis of LFT parts and should inform future material modeling approaches."

Originally from Germany, Goris holds a B.S. degree from the Department of Mechanical Engineering at RWTH Aachen University (Aachen, Germany). In 2012, he received a full one-year scholarship from the German Academic Exchange Service (DAAD) to attend graduate school at UW-Madison where, under the direction of Prof. Osswald, he completed his M.S. degree in Mechanical Engineering and now is pursuing a doctorate in the same discipline as well as a minor in Business Administration. Already Goris has authored or co-authored papers in six conference proceedings as well as a chapter on Composites Manufacturing Processes for the Mechanical Engineering Handbook, 2nd edition. Additionally his work has been featured on posters and presentations given at conferences in the U.S., Germany, and Israel. Besides working as a graduate research assistant, Goris also holds the position of chief engineer at the PEC at UW-Madison. In 2013, Goris' course project placed second in the Ratner Award Competition at UW-Madison. The following year he was a recipient of an SPE ACCE graduate scholarship from the SPE Automotive and Composites Divisions as well as an Academic Achievement Award from the Division of International Studies and International Services at UW-Madison. In 2016, he won a Dr. Jackie Rehkopf scholarship also from the SPE Automotive and Composites Divisions. After graduating, Goris plans to work in transportation research on composite materials and processes.

Fan was lead author on a paper entitled *Effects of Processing Parameters on the Thermal & Mechanical Properties of LFT-D-ECM Glass Fiber/Polyamide 6 Composites.* Her co-authors were Y.C Liu, T. Whitfield, T. Kuboki and J.T. Wood from Western University as well as V. Ugresic from the Fraunhofer Project Centre for Composites Research (London, Ont., Canada). The paper will be presented on **September 7 from 2:30-3:00 p.m.** in the *Advances in Thermoplastic Composites - Part 3* session. About her topic, Fan explains "We investigated the influences of process parameters — including melt temperature, extruder fill level, glass fiber temperature, and screw speed in the mixing extruder — on the thermal and mechanical properties of direct/inline compounded 30-wt% long [glass] fiber-reinforced thermoplastic [D-LFT] polyamide 6 [PA 6, also called nylon 6], which was subsequently compression molded. The effects of processing parameters on glass transition temperature [T_g], melt temperature [T_m], and relative degree of crystallinity will be presented in this work."

Previously, Fan was a postdoctoral associate in the Department of Mechanical & Materials Engineering at Western University working under Dr. J.T. Wood from 2013-2015. Before that, she was an associate professor at Hebei University of Technology (Tianjin, China) from 2009-2013, an assistant general manager at Yingzida Materials Co. Ltd. (Hangzhou, China) in 2009, and an assistant professor at Dalian Jiaotong University (Dalian, China) from 1997-2002. She earned a doctorate in Mechanical Engineering (Polymer Engineering) from Western University in 2008 and has published more than 30 peer-reviewed journal papers.

Kuhn was lead author along with William Kucinski and Olaf Taeger at Volkswagen Group Research and Prof. Tim Osswald at University of Wisconsin-Madison on a paper entitled *Lightweight Design with Long Fiber Reinforced Polymers — Technological Challenges due to the Effect of Fiber Matrix Separation.* The paper will be presented on **September 7 from 1:30-2:00 p.m**. in the *Advances in Thermoplastic Composites - Part 3* session. About his research, Kuhn comments, "A major effect that results when processing long fiber-reinforced thermoplastics [LFT] is fiber matrix separation [FMS], which leads to a non-uniform fiber density distribution throughout the part. Experimental investigations in compression molding with LFT composites have shown an unequal distribution of fiber content in free-flow regions and especially in complex geometries. In the case of rib sections, for example, fiber content decreases greatly, leading to a significant change in component behavior. Through experimentation, our team analyzed the governing mechanism of FMS and developed a new approach for predicting the phenomenon."

After earning his undergraduate degree in Mechanical Engineering at the RWTH Aachen University in 2013, Kuhn was then awarded a full one-year scholarship from the German Academic Exchange Service to attend graduate school at UW-Madison. There, under the direction of Prof. Osswald, he completed his M.S. degree in Mechanical Engineering in 2014 and returned to RWTH Aachen University to complete a second master's degree in Plastics and Textile Technology in 2015. Since 2014 he also has been pursuing his Ph.D. degree through the industrial doctorate program at Volkswagen AG's Group Research under the guidance of Prof. Osswald at the Friedrich-Alexander University Erlangen-Nuremberg. Kuhn's work at Volkswagen is focused on lightweight design projects with thermoplastic and thermoset composites for use on many Volkswagen brands. His work has been featured in numerous publications and presentations in Europe and the U.S.