

ГЦ

UPDAT

Ш

SIT

0

OMP

CCM DIRECTOR JOHN W. GILLESPIE, JR. Recognized by international Professional Society

John W. Gillespie Jr., director of the University of Delaware Center for Composite Materials (CCM), has been named a fellow of the Society for Advanced Materials and Process Engineering (SAMPE).

The designation recognizes SAMPE members for their distinguished, lifelong contributions in the fields of materials and processes. Since its inception in 1982, only 147 individuals have been designated as SAMPE fellows.

Gillespie, Donald C. Phillips Professor of Civil and Environmental Engineering, with appointments in Materials Science & Engineering and Mechanical Engineering was cited for his "lifelong contributions to the advancement of the science and engineering of composite materials through the education of students and development and transition of composites technology to industry."



Society for the Advancement of Material & Process Engineering

He and the other four 2015 SAMPE Fellows will be honored at a special ceremony at the <u>Composites and Advanced Materials Expo</u> in Dallas, Texas, on October 26.

Gillespie's 34-year career at the University of Delaware is marked by a number of major accomplishments, including the creation and commercialization of new processes, automated equipment, materials and composite structures. These accomplishments have led to 17 patents and more than 750 publications, including 158 SAMPE papers co-authored with his students and research collaborators and presented at the annual SAMPE meetings.

"Jack has had a significant impact on furthering the insertion of composite materials in various applications by addressing the technological hurdles in a systematic and scientific way," says CCM associate director Suresh Advani.

Gillespie has also been heavily involved with the education of students at the interdisciplinary CCM. In addition to advising more than 90 master's and Ph.D. students, he has served as the



faculty advisor for the UD-CCM SAMPE student chapter since 2000 and received SAMPE's Faculty Advisors Award in 2001.

"Jack has made a tremendous commitment to supporting student groups who have competed successfully in SAMPE design competitions," says Advani, who is also George W. Laird Professor of Mechanical Engineering. "His graduate students have also done well in research competitions, with four of his doctoral students winning the Ph.D. competition and presenting at meetings in Europe and Japan."

Gillespie has also been proactive in promoting composites at historically black colleges and universities (HBCUs) and minority institutions (MIs). He was a member of the National Science Foundation task force for development of the first doctoral program at Tuskegee University. Today, he is an adjunct faculty member at Tuskegee. He also served as chair of the external advisory board for the NSF CREST program for Southern University, and he has hosted faculty and students from both of these HBCUs at CCM.

Article by Diane Kukich



ABOUT THE PROFESSOR

Jack Gillespie has served as a member of the National Research Council Board on Manufacturing and Engineering Design and as chair of the National Materials Advisory Board Committee on High-Performance Structural Fibers for Advanced Polymer-Matrix Composites. He has been editor of the Journal of Thermoplastic Composite Materials since 1993, and he serves on numerous editorial boards.

Gillespie earned bachelor's, master's and doctoral degrees in mechanical and aerospace engineering at UD, and he has joint appointments in the Department of Materials Science and Engineering, Department of Civil and Environmental Engineering and the Department of Mechanical Engineering.

He has received a number of awards, including most recently the American Society for Civil Engineers Charles Pankow Award for Innovation for commercializing composite bridge structures. He is also a fellow of the Society of Manufacturing Engineers (SME) and the American Society for Composites (ASC).



CENTER FOR COMPOSITE MATERIALS Internationally Recognized Excellence

302-831-8149 info-ccm@udel.edu 101 Academy Street Newark, DE 19716

You are invited to attend Advanced Manufacturing Composites Course: Composites at BMW

Dates: August 12-14, 2015 Time: 8:30 am - 4pm each day Cost: Free

The University of Delaware Center for Composite Materials will host a three-day course for science and engineering students and CCM Industrial Consortium members, "Advanced Manufacturing Composites," from Aug. 12-14. The event is co-hosted by the Delaware Valley Industrial Resource Center (DVIRC).

Stefan Kercher, head of the Materials and Process Technology Laboratory at BMW Group Munich, will present a two-day course, "Composites at BMW," on Aug. 12-13. The program on Aug. 14 is devoted to hands-on laboratory experiences for students.

"Composites at BMW" has four parts:

- · An introduction to BMW's i series program and the background behind it;
- Theoretical background of the materials used in composites at BMW, including carbon fibers and matrix systems;
- · Coupon-level testing; and
- · Crash concepts and energy absorption of composite structures.

Topics to be covered on the third day include chemical and mechanical materials characterization, thermoforming of thermoplastics and liquid molding processing.

The agenda for this workshop can be found <u>here</u>. This event is free to UD Students and CCM Consortium Members. UD students can register via email to Jennifer Enoch <u>jenoch@dvirc.org</u>. Members of CCM's Industrial Consortium can register via email to Corinne Hamed <u>hamed@udel.edu</u>

NEWS CCM STUDENTS AND STAFF HONORED

On Friday, May 8, 2015 the Center for Composite Materials honored 16 individualseight students, six researchers and two administrators with seven different awards.

"We have over 60 graduate and undergraduate students who do research with affiliated faculty and staff at the Center for Composite Materials," says Associate Director Suresh Advani. "We are very proud of the interdisciplinary research conducted by our students in exploring new frontiers in composite materials, and the students selected for the awards have shown special initiative to deserve this honor.



R.L. MCCULLOUGH SCHOLARS AWARD

The Scholars Award recognizes original contributions to the literature on composite materials. The tribute, consisting of a monetary award, is bestowed on a graduate student author of a paper accepted for publication in a refereed journal. Selection of the recipient for this award is based on the quality of the paper.

Recipient: Subramani Sockalingam, Ph.D.M.E. Advisor: Professor John W. Gillespie, Jr.

PROGRESS AWARD

The Progress Award recognizes research contributions of students to the research goals of the Composites Center. The tribute, consisting of a monetary award, is bestowed on a graduate student author of a CCM Research Report, thesis, or dissertation. Selection of the recipient of this award is based on the quality of the report, thesis, or dissertation.

Recipient: Danning Zhang, Ph.D.M.S.E. Advisor: Professor John W. Gillespie, Jr.

ACHIEVEMENT AWARD

The Achievement Award recognizes outstanding personal growth demonstrated by a Center-affiliated graduate student. The tribute, which consists of a monetary award, is bestowed on a graduate student who has demonstrated superior achievement.

Recipient: Hatice S. Sas, Ph.D.M.E. Advisor: Professor Suresh G. Advani

NEWS CCM STUDENTS AND STAFF HONORED

(Continued)

OUTSTANDING SENIOR AWARD

The Outstanding Senior Award recognizes the contributions of students participating in the Undergraduate Research Program of the Composites Center. The tribute, consisting of a monetary award, is bestowed on an outstanding senior for cumulative contributions (service as well as research) to Center activities.

Recipient: Taylor M. Boyle, B.M.E. Advisor: Associate Professor Erik T. Thostenson

Recipient: Reid B. Bremble, B.M.E. Advisor: Professor John W. Gillespie, Jr.

UNDERGRADUATE RESEARCH AWARD

The Undergraduate Research Award is bestowed on a student in their junior year whose proposal to perform research on composite materials under the guidance of a UD-CCM affiliated faculty member is selected. The student is expected to enroll in UNIV 401 and UNIV 402 and write a senior thesis. Selection of the recipient for this award is based on the research objective and plan submitted by the student in a one page abstract.

Recipient: Gao X. Chen, B.M.E. Advisor: Associate Professor Erik T. Thostenson

Recipient: Francis J. Fish, B.M.E. Advisor: John Tierney, Ph.D.

Recipient: Matthew J. Stevens, B.M.E. Advisor: Professor Bazle Z. Haque

CCM SCHOLARSHIP AWARD

The CCM Scholarship Award recognizes research contributions of Postdoctoral Researchers or Research Professionals affiliated with CCM. Selection of the recipient for this award is based on publication of papers in high quality refereed journals and their impact on the research community of composite materials.

Recipient: Pavel Simacek, Ph.D. Advisor: Professor Suresh G. Advani

DIRECTORS' AWARD

The Directors' Award recognizes outstanding personal growth demonstrated by a Center-affiliated employee or student. The tribute, which consists of a monetary award, is bestowed on an employee or student who has demonstrated superior progress.

Recipient: Winona I. Burris Recipient: Megan E. Meldrum Recipient: Steve R. Sauerbrunn, Ph.D. Recipient: Jessica C. Sun Recipient: Corinne L. Hamed Recipient: William G. Patterson, Ph.D. Recipient: Shashank Sharma

NEWS 2015 SAMPE CONFERENCE AWARDS

The 2015 Society for Materials and Process Engineering (SAMPE) international symposium and exhibition was held in Baltimore, MD on May 18-21.

OUTSTANDING PAPER AWARD WINNER

Danning Zhang, received SAMPE's 2nd Place Outstanding Paper Award for Role of Prepreg Interlayer Permeability on Void Reduction during Oven Vacuum Bag Processing of Thick Section Thermoplastic Composites. Zhang, a doctoral candidate in materials science and engineering and affiliated with the Center for Composite Materials is advised by Prof. Jack Gillespie. SAMPE recognizes outstanding papers submitted to SAMPE Conferences. These works represent the newest applications, innovations, and cutting-edge research taking place in the materials and processes community.

BRIDGE COMPETITION WINNER

A team of 9 students from the SAMPE-UD chapter participated in the 2015 SAMPE Student Bridge Contest. They won the Natural Box category and placed second out of 20 entries in the Carbon I category. The SAMPE Bridge Contest gives students the opportunity to apply theory they learned in courses to a real world application. Students also gain skills such as designing, manufacturing, and testing composite materials.

The UD-SAMPE bridge team included Sagar Doshi (Ph.D.M.E.), Venkateswaran Santhanam (M.M.E.), Raja Ganesh (Ph.D.M.E.), Michael Yeager (Ph.D.M.E.), Vineet Unni (M.M.E.), James Biggs (B.M.E.), Francis Klincewicz (B.M.E.), Francis Fish (B.M.E.), Nolan Kinslow (B.M.E.).



Michael Keefe, Zhenzhen Quan and Tsu-Wei Chou are part of an international team of researchers that is examining the feasibility of using additive manufacturing to produce 3D preforms.

'PREFORMING' MAGIC Research team explores a novel way to fabricate preforms for composites

In the 1967 movie *The Graduate*, young Benjamin Braddock gets a now-famous one-word piece of advice about the future from a family friend: plastics.

At about the same time, the University of Delaware's Tsu-Wei Chou, then a graduate student at Stanford University, sought advice from his adviser about future research directions. His answer contained two words: composite materials.

Chou followed his adviser's suggestion and went on to become a pioneer in advanced composites, working over the years with a wide variety of materials and processes. Almost five decades later, he is still on the hunt for innovations that will make advanced composites more affordable, reliable and functional.



NEWS

CCM SUMMER INTERN AWARDED SOCIETY OF Plastics Engineers Scholarship

Colleen Murray, an intern in CCM's Summer Undergraduate Research Program, is this year's winner of the Harold Giles Scholarship undergraduate award sponsored by the Society of Plastics Engineers (SPE) Composites Division. The Composite Division received seventeen high quality applicants, which made the judging difficult this year, but in the end, Ms. Murray stood out amongst the undergraduate student pack. Colleen is already well-familiarized with composite materials due to her two summer internships at the Center for Composite Materials where she has helped



produce a carbon material database, assisted in designing a customizable orthotic brace, and participated in CCM's Defense Advanced Research Projects Agency (DARPA) Warrior Web program which developed warfighter-wearable and quasi-active suit systems to improve warfighter effectiveness and reduce injury. Colleen received first place for her poster titled "System Integration and Durability Analysis for Warrior Web" in CCM's 2014 Summer Undergraduate Research Symposium. Her advisor Dr. Yarlagadda said, "Colleen is a very motivated and intelligent person, she has the ability to adapt quickly and is always up for a challenge. I am confident that she would make an excellent engineer."

"Having the opportunity to work at CCM allowed me to explore Mechanical Engineering and learn about the protocols in a collegiate laboratory," Colleen said. "My mentors and the fellow interns were very accepting and offered great advice whether it came to the various projects or when talking about colleges."

ABOUT THE HAROLD GILES SCHOLARSHIP

The SPE Composite Division hopes to continue to offer the Harold Giles Scholarship to worthy candidates in the future which was developed to honor the late Dr. Harold Giles, a past Composite Division Awards Chair. As a former University Professor at the University of North Carolina, Azdel employee, and GE employee, Harold Giles knew full well the value of scholarships to students. He was always a proponent of awarding worthy students and served the society well in this capacity.

http://www.4spe.org/Resources/news.aspx?ItemNumber=22499

PUBLICATIONS

CONFERENCES

Boztepe, S., E. T. Thostenson, and D. Heider, "Characterization of Damage Sensing Capaiblity of Carbon Nanotube Sheet Integrated Fiber-Reinforced Composites," SAMPE 2015, Baltimore, MD, May 18-21, 2015.

Chowdhury, S. C., B. Z. (Gama) Haque, A. C. T. van Duin, T. A. Bogetti, and J. W. Gillespie, Jr., "Study of the Mechanical Properties of Kevlar Fibril using Molecular Dynamics Simulations," SAMPE 2015, Baltimore, MD, May 18-21, 2015.

Chowdhury, S. C., S. Sockalingam, and J. W. Gillespie, Jr., "Molecular Dynamics Modeling of Compression Kinking in Kevlar," SAMPE 2015, Baltimore, MD, May 18-21, 2015.

Chowdhury, S. C., R. M. Elder, T. Sirk, B. Z. (Gama) Haque, J. W. Andzelm, and J. W. Gillespie, Jr., "Modeling Glass Fiber Sizing Interphase Layer using Molecular Dynamics Simulations," SAMPE 2015, Baltimore, MD, May 18-21, 2015.

Fish, F., C. Scott, J. Tierney, J. W. Gillespie, Jr., and S. Yarlagadda, "Flexible Tooling System for the Manufacturing of a Passive Dynamic Ankle Foot Orthosis," SAMPE 2015, Baltimore, MD, May 18-21, 2015. Haque, B. Z. (Gama), M. A. Ali, and J. W. Gillespie, Jr., "Modeling Transverse Impact on UHMWPE Soft Ballistic Sub-Laminate," SAMPE 2015, Baltimore, MD, May 18-21, 2015.

Haque, B. Z. (Gama), M. A. Ali, and J. W. Gillespie, Jr., "Modeling Constant Velocity Transverse Impact on UHMWPE Soft Ballistic Sub-Laminate," Haque, B. Z. (Gama), M. A. Ali, and J. W. Gillespie, Jr., SAMPE 2015, Baltimore, MD, May 18-21, 2015.

Khattra, N. S., S. Sharma, S. Yarlagadda, and J. W. Gillespie, Jr., "Design and Analysis of a Passive Dynamic Ankle-Foot Orthotic Device," SAMPE 2015, Baltimore, MD, May 18-21, 2015.

Misumi, J., R. Ganesh, S. Sockalingam, and J. W. Gillespie, Jr., "Evaluation of Size Effect on Epoxy Resin Tensile Properties using Micro-Scaled Specimens," SAMPE 2015, Baltimore, MD, May 18-21, 2015.

Park, J-H., P. Stegall, S. K. Agrawal, S. Yarlagadda, J. Tierney, S. Sharma, and J. W. Gillespie, Jr., "Wearable Upper Body Suit for Assisting Human Load Carriage," Proceedings of the ASME 2015 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2015, Boston, MA, August 2-5, 2015.

(Continued)

PUBLICATIONS

CONFERENCES

Sockalingam, S., R. Bremble, S. C. Chowdhury, J. W. Gillespie, Jr., and M. Keefe, "Modeling Kevlar KM2 Single Fiber Transverse Impact and the Effect of Compressive Kinking on Residual Tensile Strength," SAMPE 2015, Baltimore, MD, May 18-21, 2015.

Sockalingam, S., J. W. Gillespie, Jr., and M. Keefe, "Transverse Compression Behavior of Kevlar KM2 Fiber – Experimental Testing and Finite Element Analysis," Semi-finalist in the SAMPE URSP (University Research Symposium Program Competition), April 30, 2015.

Tierney, J. J. and J. W. Gillespie, Jr., "Development of a XML Framework for Materials, Processing and Testing of Composites," SAMPE 2015, Baltimore, MD, May 18-21, 2015. Tierney, J. J., S. Sharma, M. Victor, R. Dill, and J. W. Gillespie, Jr., "Advanced Military Footwear System with Composite Orthotic," SAMPE 2015, Baltimore, MD, May 18-21, 2015.

Zhang, D., D. Heider, and J. W. Gillespie, Jr., "Role of Prepreg Interlayer Permeability on Void Reduction During Oven Vacuum Bag Processing of Thick Section Thermoplastic Composites," Outstanding Paper Award, 2nd Place, SAMPE 2015, Baltimore, MD, May 18-21, 2015.

COMPOSITES UPDATE JULY 2015

Consortium **NEWS**

We would like to thank <u>CGTech</u>, <u>FlexPipe Systems</u>, Hybrid Components & Coatings, LLC and <u>Rogers Corp</u> for becoming our newest Consortium members and all our current members for continuing to participate in CCM's research and development activities.

To learn more about the benefits of becoming a member, please visit us on the web at http://www.ccm.udel.edu/industry/industry-partnerships/



CELEBRATING 41 YEARS OF SIGNIFICANT CONTRIBUTIONS TO COMPOSITES SCIENCE AND TECHNOLOGY, THE EDUCATION OF STUDENTS, AND THE CREATION AND TRANSFER OF TECHNOLOGY TO INDUSTRY.



This is a newsletter publication of the UNIVERSITY OF DELAWARE CENTER FOR COMPOSITE MATERIALS

201 COMPOSITES MANUFACTURING SCIENCE LABORATORY UNIVERSITY OF DELAWARE NEWARK, DE 19716-3144 P: 302.831.8149 F: 302.831.8525 W: <u>WWW.CCM.UDEL.EDU</u>