



*UD's Tsu-Wei Chou has been selected to receive the Nadai Medal from the American Society of Mechanical Engineers.*



## UDAILY STORY

### COMPOSITES INNOVATOR: UD'S TSU-WEI CHOU HONORED FOR WORK IN MATERIALS ENGINEERING

9:46 a.m., Nov. 18, 2013--Highly cited researcher. World Fellow of composites. One of the top 100 materials scientists of the decade. Tsu-Wei Chou has received all of these accolades and many more during his four-decade career, and he recently added another one — Nadai Medal from ASME.

Chou, who is the Pierre S. du Pont Chair of Engineering at the University of Delaware, will share his perspectives on composites science and technology during the Nadai Medal Lecture at the 2013 ASME Mechanical Engineering Congress and Exposition in San Diego on Wednesday, Nov. 20.

“It has been a privilege to witness the monumental changes in this field over nearly half a century,” says Chou. “And it’s been an exciting journey to be part of that growth and evolution.”

Chou’s involvement in composite materials dates back to his graduate school days at Stanford University in the late 1960s, when he asked his professor about future research directions.

“He told me to try composite materials,” Chou recalls. “Although I had no knowledge of this mysterious subject, just the thought of getting into a new research area excited me immensely.”

TOP STORY  
*Continued*

That excitement has been at the foundation of this composites pioneer's work for the past 43 years. He has worked with a wide variety of materials and geometries, including hybrid composites, textile structural composites, flexible composites, and most recently nanocomposites. He and his research team have demonstrated unique applications of carbon nanotube-based continuous fibers in multifunctional composites and energy storage devices.

[Click here to read the entire story in UDaily.](#)



### Green Innovator: UD's Wool wins Presidential Green Chemistry Challenge Award

2:03 p.m., Dec. 11, 2013--The Environmental Protection Agency has honored the University of Delaware's Richard Wool with its Presidential Green Chemistry Challenge Award for his extensive work developing bio-based materials to support the green energy infrastructure.

Wool was recognized today during a presentation at EPA headquarters in Washington, D.C.

*Wool is a UD professor of chemical and biomolecular engineering and director of the Affordable Composites from Renewable Resources (ACRES) program.*

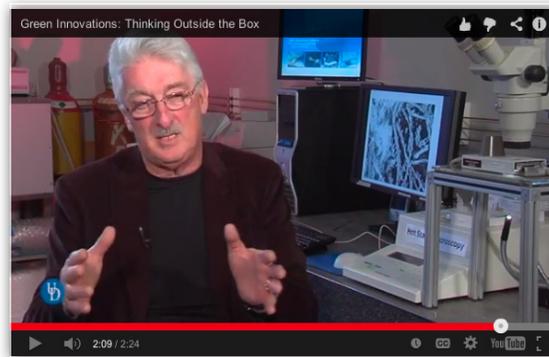
Now in its 18th year, the EPA awards program recognizes the design of safer and more sustainable chemicals, processes and products. Awards are conferred annually in five categories: Academic, Small Business, Greener Synthetic Pathways, Greener Reaction Conditions and Designing Greener Chemicals.

Wool, UD professor of chemical and biomolecular engineering and director of the Affordable Composites from Renewable Resources (ACRES) program, is a world leader in developing safer chemical substances from renewable resources through processes that require less water and energy, and produce less hazardous waste compared to petroleum-based processes.

The products can be used as adhesives, composites and foams — even circuit boards, hurricane resistant energy efficient roofs and leather substitutes.

[Click here to read the entire story in UDaily.](#)

*Click the video below to view UD's Richard Wool as he discusses his work in green chemistry, for which he has been honored by the EPA.*



## NEWS



Astronauts are exposed to many dangers in space, particularly debris encountered while working outside the spacecraft. Micrometeoroid and orbital debris (MMOD) are sub-centimeter sized particles that can travel up to 19 kilometers per second and have the potential to penetrate space suits [Christiansen, E.L. Handbook for Designing MMOD Protection. Johnson Space Center Report (2009)], placing astronauts at risk and sometimes forcing them to abort their mission. During the past two years as a NASA Delaware Space Grant Fellow, I have studied Shear Thickening Fluids (STFs), a novel nanotechnology comprised of nanoparticles in a carrier fluid that has the potential to dissipate energy upon an impact and improving the material's resistance to the imposed stress. This unique material can be incorporated into fabrics and shows promise to improve MMOD resistance in the next generation space suits while remaining flexible and durable.

Under the supervision of my advisors, Dr. Norman J. Wagner and Dr. John W. Gillespie, I have developed a new test method by combining large amplitude oscillatory shear (LAOS) rheometry and small angle neutron scattering (SANS) methods to understand the shear response and corresponding microstructure of STFs during a dynamic deformation, [A. K. Gurnon, et al. 'Measuring Material Microstructure under Flow Using 1-2 plane flow-Small Angle Neutron Scattering'. Journal of Visual Experiments (In-Press)]. This knowledge is relevant for understanding the response of STF-fabric nanocomposites during hypervelocity impact and can help engineer STFs tailored to meet the challenges of operating in the environment of low earth orbit.

**OTHER NEWS**  
*(Continued)*

I am honored to be a NASA DESGC fellow, and I attribute the significant progress I have made in my research to the added financial flexibility the award afforded me. My first, first-author paper [A. K. Gurnon and N. J. Wagner. *J. Rheol.* 56, 333 (2012)] focuses on the development of constitutive models to predict the dynamic response of non-Newtonian materials undergoing LAOS. I have also presented my Space Grant-supported research annually at the national Society of Rheology (SoR) meeting as well as the International Congress on Rheology (ICR). As the Fraser and Shirley Russell teaching Fellow, I co-instructed the Introduction to Chemical Engineering course this past spring. Further, I am involved in K-12 and women's STEM outreach programs at UDel, during which I use my DESGC sponsored research for laboratory demonstrations.

Finally, this summer I am advising an undergraduate student in the Chemical and Biomolecular Engineering Department. We will focus on the dynamic material properties of STFs undergoing shear for composite material applications as I complete my doctoral dissertation. I am fortunate to have received the DESGC fellowship; it has given me opportunities to develop novel experiments, flexibility to attend conferences directly related to my research and the platform to communicate my work to other researchers and students who match my enthusiasm for research.

# MEMBER NEWS

CONSORTIUM

We would like to thank [Toray Industries, Inc., Ehime, Japan](#), for becoming our newest consortium member. In addition, we thank [Arkema, Inc., King of Prussia, PA](#), [Composite Sourcing Solutions, Yardley, PA](#), [Owens Corning Science & Technology, Novi, MI](#), and [Warrior Sports, Inc., Warren, MI](#), for renewing their memberships and 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 [www.ccm.udel.edu/Consortium/benefits.html](http://www.ccm.udel.edu/Consortium/benefits.html)



Celebrating 40 years of significant contributions to composites science and technology, the education of students, and the creation and transfer of technology to industry.

Please visit us on the web at <http://www.ccm.udel.edu>

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