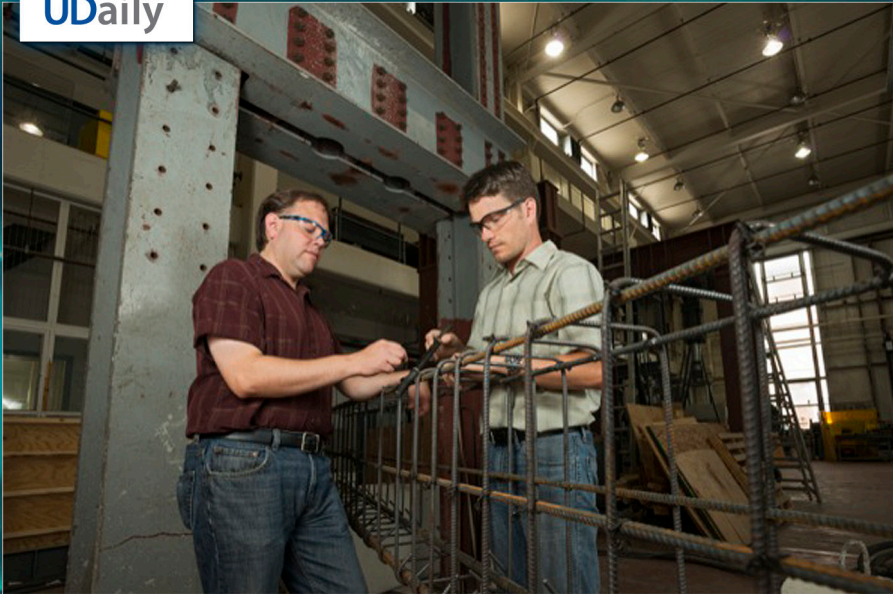




TOP STORY

TINY TUBES TELL OF THREAT RESEARCH TEAM INVESTIGATES CARBON NANOTUBE COMPOSITES FOR STRUCTURAL HEALTH MONITORING

An interdisciplinary team of researchers at the [University of Delaware](#) is developing a novel structural health monitoring system using carbon nanotube-based sensing composites for civil infrastructure.



Erik Thostenson (left) and Thomas Schumacher in UD's Center for Composite Materials have received a three-year \$300,000 grant to investigate the use of carbon nanotube-based sensing composites for structural health monitoring of civil infrastructure.

The collapse was attributed to a design deficiency that resulted in a gusset plate failing during ongoing construction work.

Now, an interdisciplinary team of researchers at the University of Delaware is developing a novel structural health monitoring system that could avert such disasters in the future.

Erik Thostenson and Thomas Schumacher, both affiliated faculty members in the UD Center for Composite Materials, have received a three-year \$300,000 grant from the National Science Foundation to investigate the use of carbon nanotube composites as a kind of “smart skin” for structures.

In preliminary research, the two found that a carbon nanotube hybrid glass-fiber composite attached to small-scale concrete beams formed a continuous conductive skin that is exceptionally sensitive to changes in strain as well as to the development and growth of damage.

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

OTHER NEWS

Advani Named ME Department Chair

Suresh Advani, George W. Laird Professor, has been named chair of UD's Department of Mechanical Engineering. Advani is also associate director of the Center for Composite Materials, a position he has held since 2000.

Advani joined the UD faculty in 1987 after earning a bachelor's degree in mechanical engineering from the Indian Institute of Technology in Bombay, India, and a doctorate from the University of Illinois at Urbana-Champaign.

"My goals as chair include mentoring young faculty and building stronger interdisciplinary ties for research in areas such as composites, energy and biomechanics," Advani says. "I also want to increase interactions with local industry so that we can expand our opportunities for collaborative research, student internships, and senior design projects."

Advani's research interests are in materials and processing, rheology, fluid mechanics and heat transfer as applied to composite processing, and alternate energy sources such as fuel cells and hydrogen storage.

He has co-authored over 200 journal articles and has contributed chapters to over twenty books. He also co-authored a recent text, *Process Modeling in Composites Manufacturing*.

Advani is a Fellow of the American Society of Mechanical Engineers and is the North American Editor for the journal *Composites A: Applied Science and Manufacturing*. He has graduated over 70 master's and Ph.D. students and was awarded the Outstanding Doctoral Graduate Student Advising and Mentoring award in 2008.



Suresh G. Advani
George W. Laird Professor
CCM Associate Director
Chair, Department of
Mechanical Engineering

CHEMICAL & BIOMOLECULAR ENGINEERING

2012 Fall Lecture Series

The Department of Chemical and Biomolecular Engineering is hosting its 2012 Fall Lecture Series, featuring the work of distinguished researchers from prestigious institutions across the country.

All lectures take place at 10:00 a.m. in Room 102 Colburn Laboratory. The lectures are free and open to the public. Refreshments will be served 15 minutes prior to all lectures.

[Click here for the full schedule.](#)

OTHER NEWS

*CCM Doctoral Student Receives TRFA Award*

Gaurav Pandey, a Ph.D. student in mechanical engineering, has received an Honorable Mention in the 2012 Thermoset Resin Formulators Association (TRFA) Excellence in Thermoset Polymer Research Award competition for his paper “Smart Tooling for Thermoset Polymer Based Fiber Composites,” which was co-authored by E. Thostenson and D. Heider.

In addition to receiving an award certificate and a gift card, Pandey will have his technical paper posted on the TRFA website and included on the CD of conference proceedings that will be presented to all attendees of the TRFA 2012 Annual Meeting. He has also been invited to provide a poster of his research for display at the TRFA Tabletop Showcase on October 29th.

*Prof Tsu-Wei
Chou and
artist Lisa
Bartolozzi*

*CCM Founding Fathers Portraits On Display*

These amazingly life-like portraits of the CCM Founding Fathers, Prof. Tsu-Wei Chou, Prof. Jack Vinson, Prof. Byron Pipes, and the late Prof. Roy L. McCullough were painted by [artist Lisa Bartolozzi](#). Lisa's work has been presented in a number of solo exhibitions, including shows in Wilmington, Philadelphia, New York and Florence, Italy.

Hung on September 12, 2012, the paintings can be found in the upstairs lobby of The Composites Manufacturing Science Laboratory.



OTHER NEWS

(Continued)

UDaily

Out of this world

UD professor reports smart fluids research in scientific journal

7:53 a.m., Sept. 18, 2012--Imagine a computer chip that can assemble itself.

According to Eric M. Furst, professor of chemical and biomolecular engineering at the University of Delaware, engineers and scientists are closer to making this and other scalable forms of nanotechnology a reality as a result of new milestones in using nanoparticles as building blocks in functional materials.

Furst and his postdoctoral researchers, James Swan and Paula Vasquez, along with colleagues at NASA, the European Space Agency, Zin Technologies and Lehigh University, reported the finding Sept. 17 in an article in the Proceedings of the National Academies of Science (PNAS) online edition.

Entitled “Multi-scale kinetics of a field-directed colloidal phase transition,” the article details how the research team’s exploration of colloids, microscopic particles that are mere hundredths the diameter of a human hair, to better understand how nano-“building blocks” can be directed to “self-assemble” into specific structures.

The research team studied paramagnetic colloids while periodically applying an external magnetic field at different intervals. With just the right frequency and field strength, the team was able to watch the particles transition from a random, solid like material into highly organized crystalline structures or lattices.

According to Furst, a professor in UD’s Department of Chemical and Biomolecular Engineering, no one before has ever witnessed this guided “phase separation” of particles.

“This development is exciting because it provides insight into how researchers can build organized structures, crystals of particles, using directing fields and it may prompt new discoveries into how we can get materials to organize themselves,” Furst said.

Article by Karen B. Roberts

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

Eric M. Furst reports new findings of how tiny particle building blocks can be directed to self-assemble into specific structures.

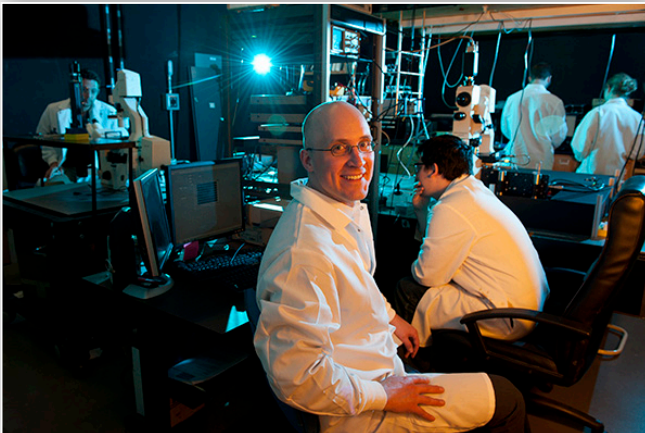


Photo by Kathy F. Atkinson

NEW PUBLICATIONS

Journals

Haque, B. Z. (Gama) and J. W. Gillespie, Jr., "A Combined Theoretical-Semiempirical Penetration Model of Ballistic Penetration of Thick Section Composites," *Journal of Thermo-plastic Composite Materials*, 25 (5), pp. 631-659; DOI: 10.1177/0892705712450296, August 2012. <http://jtc.sagepub.com/content/25/5/631.full.pdf>

Lopatnikov, S. and J. W. Gillespie, Jr., "Poroelasticity – III: Conditions on the Interfaces," *Transport in Porous Media*, doi:10.1007/s11242-012-9971-6; 93 (3), pp. 597-607, July 2012. <http://www.springerlink.com/index/x5k9h0j6l328074m.pdf>

McAllister, Q. P., J. W. Gillespie, Jr., and M. VanLandingham, "[The Influence of Surface Microstructure on the Scratch Characteristics of Kevlar Fibers](#)," *Journal of Materials Science*, DOI: 10.0007/s10853-012-6872-6, September 2012.

McAllister, Q. P., J. W. Gillespie, Jr., and M. VanLandingham, "Evaluation of the Three-Dimensional Properties of Kevlar across Length Scales," *Journal of Materials Research*, doi: 10.1557/jmr.2012.80; 27 (14), pp. 1824-1837, July 2012

Nilakantan, G., E. D. Wetzel, T. A. Bogetti, J. W. Gillespie, Jr., "Finite Element Analysis of Projectile Size and Shape Effects on the Probabilistic Penetration Response of High Strength Fabrics," *Composite Structures*, doi:10.1016/j.compstruct.2011.12.028, 94, (5) pp. 1846–1854, April 2012. <http://www.sciencedirect.com/science/article/pii/S026382231100506X>

Varischetti, J., J. Jang, R. F. Gibson, and J. Suhr, "Effect of Filler Waviness and Orientation on the Damping Behavior of CNF-reinforced Epoxy Composites", *Journal of Material Science*, DOI: 10.1007/s10853-012-6803-6, 2012. <http://www.springerlink.com/index/3814107457201314.pdf>

Conferences

Chowdhury, S. C., B. Z. (Gama) Haque, J. W. Gillespie, Jr., "Peridynamic Approximation of Graphene and Carbon Nanotube Response," *American Society for Composites 27th Technical Conference*, Arlington, Texas, October 1-3, 2012.

NEW PUBLICATIONS

(Gama) Haque, B. Z., Q. P. McAllister, S. C. Chowdhury, A. C. Caulfield, J. W. Gillespie, Jr., T. A. Bogetti, and M. R. VanLandingham “Modeling the Nanoindentation Mechanics of Kevlar Fibers,” American Society for Composites 27th Technical Conference, Arlington, Texas, October 1-3, 2012.

(Gama) Haque, B. Z., I. Biswas, S. C. Chowdhury, J. W. Gillespie, Jr. and D. R. Hartman, “Modeling the Depth of Penetration and Ballistic Impact on S-Glass/Phenolic Thick-Section Composites,” American Society for Composites 27th Technical Conference, Arlington, Texas, October 1-3, 2012.

Jang, J., H. Kim, W. Zhao and J. Suhr, “Particle Size Effect on Tensile Toughness and Fracture Toughness of Particulate Composites with Micro and Nano Particles for Energy Absorbing”, Conference on Smart Materials, Adaptive Structures & Intelligent Systems (SMASIS), Stone Mountain, Georgia, September 19-21, 2012.

Tamrakar, S., B. Z. (Gama) Haque, and J. W. Gillespie, Jr., “Modeling and Simulation of the Miniature Tensile Hopkinson Bar for Characterizing the Dynamic Properties of Fibers,” American Society for Composites 27th Technical Conference, Arlington, Texas, October 1-3, 2012.

*Keep a look out for the October 2012
Composited Update, which will highlight the
impressive new capabilities CCM has
acquired over the past year.*

DON'T MISS IT!

CONSORTIUM MEMBER NEWS

We would like to thank all of our current consortium members for continuing to participate in our 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



Celebrating 38 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>

201 Composites Manufacturing Science Laboratory ♦ phone 302.831.8149
University of Delaware, Newark, Delaware 19716-3144 ♦ fax 302.831.8525



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