

# COMPOSITE TECH BRIEF

## AN INTRODUCTION TO THE CENTER FOR COMPOSITE MATERIALS

Founded in 1974 within the College of Engineering, the Center for Composite Materials (CCM) is an internationally recognized, interdisciplinary center of excellence for composites education and research at the University of Delaware. CCM is dedicated to advancing composites technology through lower costs, higher quality, and reduced risk.

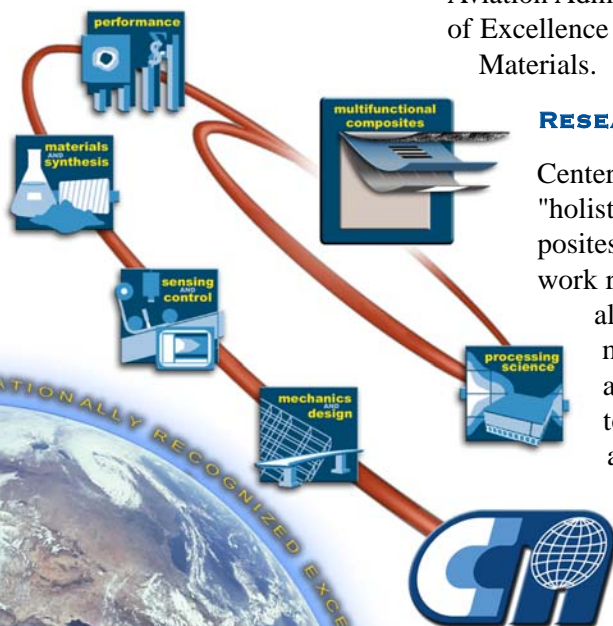
### BACKGROUND

CCM began working with materials suppliers and end users in the aerospace, automotive, civil engineering, and durable goods industries in the mid-1970s. Since then, the Center has collaborated with well over 180 international companies through consortium membership or contracts and grants.

CCM educates engineers, conducts basic research, and provides prompt technology transfer for the composites community. More than 40 faculty members, 100 students, and 25 professional research staff are currently affiliated with the Center. The students earn their degrees in engineering, materials science, physics, business, or chemistry.

CCM has been an Army Research Laboratory Center of Excellence for Composite Materials Research since 1996; in mid-2000, a second Army Research Laboratory Center of Excellence was established for application of composite technology. CCM also hosts the Advanced Materials Intelligent Processing Center funded by the Office of Naval Research. In addition, CCM is a member of the newly established Federal Aviation Administration Center of Excellence for Advanced Materials.

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### RESEARCH

Center researchers take a "holistic" approach to composites research, with the work ranging from materials and synthesis, mechanics and design, and processing science to sensing and control and performance evaluation.

During its thirty-year history, CCM has devel-

oped core competencies in a number of composites science and engineering areas, including liquid molding (resin transfer molding, vacuum-assisted resin infusion), sensing and

control, re-engineering, interphase science, composites from renewable sources, thermoplastic processing, joining, and cost modeling. The Center's state-of-the-art composites manufacturing facilities are used by faculty, research staff, graduate and undergraduate students, and visiting scholars from throughout the world. CCM's integrated approach to manufacturing science builds on the convergence of fundamental and applied research, resulting in the intelligent manufacturing of composites.

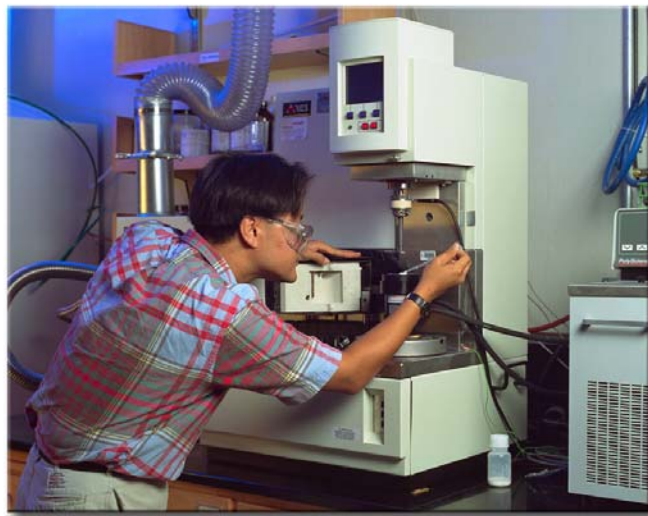
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## TECHNOLOGY TRANSFER

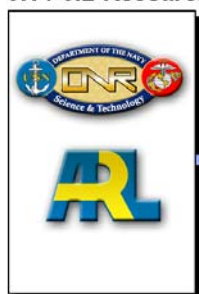
Center researchers view industry and government as partners rather than patrons. Technology transfer thus becomes a logical outgrowth of the research rather than a separate activity. CCM's current research programs are being carried out with the support of, and in collaboration with, industry, the U.S. Army Research Laboratory, federal agencies (ARO, ONR, DARPA, DOE, DOT, NSF, NIST, NAS, and others), and the State of Delaware. Examples of recent technology transfer include a number of workshops tailored to the specific needs of our sponsors and transition of technology into final applications. SMARTMolding has eight beta sites where automated VARTM processing is used for marine, ground vehicle, and other structures. Induction processing of laminates has been implemented by the largest U.S. user of carbon prepreg. Many of CCM's TechBriefs cite specific examples of technology transfer and industrial applications.

## EDUCATION

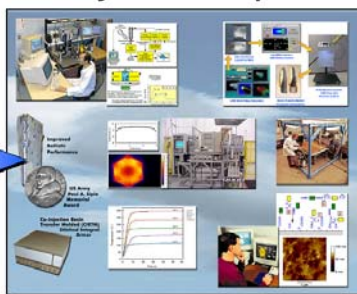
Students and faculty in the Center are affiliated with the University of Delaware departments of Chemical, Civil & Environmental, Electrical & Computer, Materials Science &



### DoD Centers of Excellence 6.1 / 6.2 Research



### 6.3 System Development



Validation

### Industrial Consortium Members



Establish Beta Sites

Reduction To Practice



Commercial

Engineering, Mechanical Engineering, Physics & Astronomy, and Chemistry & Biochemistry; and the College of Business & Economics.

CCM students at all levels are active participants on interdisciplinary research teams; in addition to a solid grounding in the fundamentals, composites students at UD gain practical insight into the solution of real-world engineering problems. They also have the opportunity to interact with visiting students, faculty, and researchers from industry, government agencies, and other

universities in the U.S. and abroad.

CCM has a unique undergraduate research program in collaboration with the University Honors Program that promotes cross-disciplinary education. Some 50 students are involved each year as CCM undergraduate research assistants; more than 1000 students have participated in the program since its inception in 1980.

Related continuing education opportunities include Engineering Outreach and CCM workshops, symposia, and seminar series.

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