

Membrane & Filtration Applied Science and Technology (MemFAST) Center

(DRAFT) PROSPECTUS

Overview

We plan to establish the **Membrane and Filtration Applied Science and Technology Center** (MemFAST) as a National Science Foundation (NSF) Industry/University Cooperative Research Center (I/UCRC) in July 2008. The NSF award that charters the Center must be matched by membership fees from the membrane and filtration industries. In addition, the Center will be expected to obtain grants, contracts and gifts from federal and state agencies as well as industry. Under current NSF guidelines, the Center will have a 10-year maximum lifetime in the NSF I/UCRC program. The initial sites and directors of the Center are listed in Table 1.

Table 1. Initial Sites and Directors of the MemFast Center

The Nonwovens Institute NC State University Raleigh, NC 27695-8301 Behnam Pourdeyhimi	Mechanical Engineering University of Colorado Boulder, CO 80309-0427 Alan R. Greenberg
Polymer, Textile and Fiber Engineering Georgia Institute of Technology Atlanta, GA 30332-0295 Karl Jacob	Chemical Engineering The University of Akron Akron, Ohio 44325-3906 George Chase

Charter

The Membrane and Filtration Applied Science and Technology (MemFAST) Center will serve the membrane and filtration industries through relevant fundamental and applied research, a strong educational program and effective technology transfer.

The research program is organized into Center Research and Spin-Off Research. Center research projects are developed jointly by the Center faculty/staff and the MemFAST member companies. Center-Sponsored research projects focus on areas of basic expertise including Novel Materials Engineering and Synthesis, Structure Formation & Modification, Characterization (Analytical, Sensing & Modeling), as well as relevant separation applications in water, bio/pharma, food/beverage, chemical/energy and air quality.

Center-sponsored research projects are supported by funds from membership fees from MemFAST Center member companies as well as support received from each of the partner universities. The results of the research are proprietary to MemFAST and to all member companies of the Center. This information is placed in the public domain, through presentations and publications, poster presentations, software, and patent disclosures, only after the approval of the MemFAST Center Industrial Advisory Board (IAB). The policies governing intellectual property conform to those required by NSF and the participating universities and enable sponsors to receive either royalty-free nonexclusive licenses or royalty-bearing exclusive licenses depending on the specific situation.

Spin-off research focuses on ideas and expertise developed through work on completed Center projects and can be initiated by one or more Center sponsors or by Center faculty. Funding for such work is obtained from one or more Center sponsors or government agencies. In either case funding for spin-off projects is

subject to standard university requirements and does not receive the preferential low-overhead rate; in addition, potential IP and research results are not shared with Center sponsors.

The educational program features formal classroom undergraduate and graduate courses in membrane and filtration technologies. These specialized courses are supported by the broad array of more general discipline-based courses that comprise the requirements for undergraduate or graduate degrees.

The Center will carry out an active program of technology transfer. Short courses and on-line courses serve the needs of Center sponsors and support both the Center educational program and technology transfer activities by seeking to disseminate technology developed by the Center along with existing knowledge of the fundamentals of membrane and filtration materials and processes. Technology transfer activities include:

- training and assistance in the implementation of Center-developed technology
- courses taught at industrial sites
- workshops at the Center
- industrial internships
- focused seminars, symposia, and conferences
- one-on-one consulting

To carry out its research mission, the MemFAST Center will seek out talent at its sites at North Carolina State University, University of Colorado, Georgia Institute of Technology and the University of Akron. The Center will also incorporate sites at affiliated universities located both inside and outside of the U.S. Potential affiliated sites include Colorado State University, the Colorado School of Mines, the University of Leeds and the National University of Singapore.

Vision

Our vision is that MemFAST will be the Global Leader for Membrane and Filtration Research and Education. The achievement of this aspiration is indeed a formidable task, for current membranes and filters are highly complex, innovative, “engineered” products requiring a diverse set of expertise depending on the application. Today, meaningful performance benefits and superior value are predominantly based on innovations in both the design of products, and on innovative materials from which these products are fabricated. This necessitates radically upgrading our research and development capability by bringing together a critical mass of R&D talent. This is indeed the path that the MemFAST Center will pursue by bringing together groups from full and affiliated sites that represent U.S. and international universities who will bring critical multidisciplinary expertise to the Center.

The facilities at our various sites are unique and unmatched by any organization in the World. At NCSU these include high-speed, flexible, pilot-scale manufacturing equipment that covers a broad spectrum of technologies. These unique capabilities will permit our industrial sponsors to engage in product development and process design as well as research and engineering. When coupled with the highly sophisticated analytical capabilities available at the Center sites, the MemFAST Center will be unquestionably “the worldwide resource for membrane and filtration technologies.” It is clear that along with evolutions in the industry, our roles in academic institutions are also undergoing redefinition. The establishment of exceptional and targeted facilities is part of this redefinition.

Organization

North Carolina State University will be the lead site and University of Colorado, Georgia Institute of Technology and the University of Akron will be the partner sites. Additional partner sites as well as national and international affiliated sites will be included if such inclusion provides clear benefits for the Center. Specific policies for these additional sites will be developed by the directors and the IAB.

The Center will have an executive director as well as site directors. The executive director and the site directors are responsible for:

- recruiting new members and retaining existing sponsors
- long-range planning of Center activities
- maintaining close relationships with the Center IAB
- seeking IAB assistance and counsel in matters related to membership and research needs

A University Policy Committee, consisting of senior staff of the University, the Center executive director and site directors as well as the Center Evaluators, serves to facilitate effective operation of the Center. Center Evaluators approved by the National Science Foundation (NSF) will monitor the operation of the Center to ensure that NSF guidelines are met, and therefore have a critical advisory role.

Membership

Membership in the MemFAST Center is governed by the Center Bylaws approved by the IAB, and is available to companies with U.S. operations in the membrane and filtration industries. Member companies (sponsors) are represented on the IAB and have voting rights. Therefore, they directly influence the nature of the Center-sponsored research undertaken by the Center and monitor its progress. Sponsor representatives are entitled to attend meetings of the Center where results of the Center-sponsored research programs are reported. They also receive semi-annual progress reports and an annual report from the Center. Their staff members are entitled to attend workshops, training seminars, and research symposia organized by the Center, at reduced fees, mutually agreed upon by the IAB and the Center executive director and site directors.

Industrial Advisory Board

Each member company (sponsor) is represented on the Center Industrial Advisory Board. The IAB meets at least twice a year and gives guidance on the nature and progress of the Center-Sponsored research projects. Research proposals are developed by the faculty in consultation with member companies based on IAB input regarding key industrial needs. The IAB helps prioritize funding decisions for these proposals. Research project progress reports are presented to the IAB twice a year. The IAB discusses the importance and quality of the results and recommends appropriate modifications of the research direction.

The IAB will also monitor operational aspects of the Center, play an important role in the recruitment of new members, and help establish policy with regard to membership criteria and operation of the Center.

Research Programs

Center-sponsored research projects are developed jointly by the Center faculty/staff and the IAB. Joint faculty/staff/industry *Technology Focus Groups* are key to this effort. Based on these discussions, projects are formulated by the faculty in response to sponsor interests and are presented to the IAB. Each IAB member assesses the usefulness of the proposed project and rates the quality and relevance of the proposed project to their organization. In addition to the Center-sponsored research projects, the Center also seeks to develop spin-off research projects funded by companies or government agencies. The results of this research are not shared with other Center sponsors, and IP arrangements involve only the funding provider and the university.