Those who wish to attend the meeting need to register. Please go to: www.hfmi.stevens-tech.edu/register address on the web and fill in the electronic form.
Or you can e-mail, call or fax the following information:
• Name, title and company
• Highly filled material of interest
• Any special requests for the day

HfMI contact:
Mr. Mehmet Deliceoglu
tel 201 216 5030
fax 201 216 5601
mdeliceo@stevens-tech.edu

Highly Filled Materials Institute
McLean Chemical Sciences Building, 4th Floor
Stevens Institute of Technology
Hoboken, NJ 07030

The meeting will open at the DeBaun Auditorium on 5th Street, between Hudson and River Streets at 9:30 am.
Information on location and directions is available at the HfMI web site (www.hfmi.stevens-tech.edu). Parking is available at 215 and 315 Hudson Street.

INDUSTRY DAY

Highly Filled Materials Institute
at Stevens

May 20, 2003, Tuesday
9:30 am to 2:00 pm

www.hfmi.stevens-tech.edu
Highly Filled Materials Institute will have an open house on May 20, 2003, to provide a review of its specialized capabilities in continuous processing, rheology, and structural analysis of highly filled systems. Such systems, which involve degrees of solid fill approaching the maximum packing fraction of the solid phase, are encountered in many industries including energetics, personal care, batteries, encapsulation products for chips, composites, pharmaceutical materials, agricultural products, food products, ceramics, and magnetic materials. HfMI was established in 1989 at Stevens to generate various core competencies in continuous processing and structural development control of highly filled suspensions and dispersions.

On May 20, 2003, various technologies that form the backbone of HfMI’s research output will be reviewed. These technologies include:

1. **Characterization of the flow and deformation behavior of highly filled materials**: HfMI has developed a series of rheometers including the adjustable gap in-line and off-line slit rheometers and the squeeze flow rheometer and a number of source codes to enable the parameters of various constitutive equations to be characterized. The rheometers can generally be run remotely, with data collected and analyzed at central locations. The source codes include the means to solve the inverse problems associated with parameter estimation from raw data. Special facilities and source codes were also developed to probe the development of wall slip and viscoplasticity and their quantitative descriptions. The evolution of the structural parameters during flow and deformation and their incorporation into the constitutive equations will also be discussed along with a full description of the capabilities and how they are implemented.

2. **Mathematical modeling of continuous processing operations**: HfMI has been developing a series of 2-D and 3-D FEM-based source codes to simulate the coupled flow and heat transfer occurring in single, co-rotating, tangential and fully-intermeshing counter-rotating twin screw extruders and many types of dies. The simulation source codes are coupled with various computer aided design programs to allow fast machining turnaround times. This extensive mathematical modeling effort forms the backbone of HfMI’s capabilities in the design and manufacturing of dies and specialized extruders and the selection of optimum geometries and operating conditions for various industrial processes.

3. **Design and manufacture of hardware including dies and extruders**: With its Technogenesis partners, HfMI has the capabilities to design and deliver full turn-key technologies. Such technologies include the smallest twin-screw extruder for processing of nanoparticles, the Universal Extruder which offers single, co- and tangential and fully-intermeshing counter-twin with remote control and data acquisition facilities, the continuous shear roll mills for processing of wet systems, specialized screws and barrels, and many shaping dies. The abilities to characterize the materials to be processed in detail and to mathematically model the process provides the wherewithal necessary to tailor the technology specifically for achieving the targeted structure and the ultimate properties of the industrial material of interest at any scale of manufacturing.

4. **Structural analysis tools**: Since 1989 HfMI has been developing its own sets of hardware and software tools for structural analysis of highly filled suspensions and dispersions used in various industries. These technologies encompass the abilities to characterize the degree of mixedness at various scales of examination, coating thicknesses and the characterization of the crystalline particle (grain) size distribution, and various x-ray means to follow other structural features.

### THE AGENDA FOR THE DAY

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>9:30 am to 11:30 am</td>
<td>Overview of HfMI technologies</td>
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<tr>
<td>11:30 am to 12:30 pm</td>
<td>Demonstrations of the technologies</td>
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<tr>
<td>12:30 pm to 1:30 pm</td>
<td>Lunch</td>
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<tr>
<td>1:30 pm to 2:00 pm</td>
<td>Discussions with HfMI staff</td>
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<tr>
<td>2:00 pm</td>
<td>Adjourn</td>
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