

## Biomaterials and Pharmaceutical Materials Program

### Research Areas:

- Synthesis and characterization of novel hard and soft materials and composites for biomedical and pharmaceutical applications
- Dynamics of mechanical, chemical, and transport properties of biomaterials
- Evaluation and elucidation of materials interactions with biological tissues and media, and with pharmaceuticals

### Applications:

- Drug and biomolecule delivery
- Passive and active surface coatings for medical devices
- Artificial tissue replacement materials
- Scaffolds for tissue engineering

### Principal Investigators and their primary areas of expertise:

#### Ron Siegel Program Leader

(Pharmaceutics/BME)

Drug and hormone delivery, biosensing, hydrogels, microfabrication, drug/polymer dynamics

#### Effi Kokkoli (CEMS)

Bioadhesion and drug targeting

#### Jayanth Panyam (Pharmaceutics)

Nanoparticulate therapeutic delivery

#### Wei Shen (BME)

Bioactive materials

#### Chanquan Calvin Sun (Pharmaceutics)

Crystal and granular properties of solid drugs

#### Raj Suryanarayanan (Pharmaceutics)

Solid state properties of drugs, stability of drug/biomaterial formulations

#### Bob Tranquillo (BME/CEMS)

Biopolymers as tissue scaffolds; cell-matrix interactions

#### Chun Wang (BME)

Biomaterial/tissue interactions, gene delivery, immunotherapy

### Facilities:

We have at our disposal state of the art equipment from both the College of Science and Engineering, the Department of Pharmaceutics, and the Academic Health Center. Polymer molecular characterization can be carried out using x-ray diffraction and scattering (SAXS and WAXS, PXRD), and light scattering (static and dynamic). PXRD can also be used to characterize polymorphism and solvation characteristics of pharmaceuticals, by themselves or in the presence of polymers. Other available molecular characterization techniques include DSC (scanning and oscillating), TGA, and Confocal Raman Microscopy. Several novel instrumentations at the Characterization Facility and the Biomedical Image Processing Laboratory are available, including cryo-SEM and cryo-TEM, cryo-microtomy, AFM, profilometry/micromechanical testing, and nanoindentation.

### Contact:

To learn more about the Biomaterials and Pharmaceutical Materials Program and IPRIME, contact Bob Lewis, Director of Technology Transfer, at 612-625-1269 or [boblewis@umn.edu](mailto:boblewis@umn.edu).

Visit the IPRIME website at [www.iprime.umn.edu](http://www.iprime.umn.edu)