



INDUSTRIAL PARTNERSHIP
FOR RESEARCH IN
INTERFACIAL AND MATERIALS ENGINEERING

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](#) (Pharmaceutics/BME)
(Program Director)

[Effi Kokkoli](#) (CEMS)

[Jayanth Panyam](#) (Pharmaceutics)

[Changquan Calvin Sun](#) (Pharmaceutics)

[Raj Suryanarayanan](#) (Pharmaceutics)

[Bob Tranquillo](#) (BME, CEMS)

[Chun Wang](#) (BME)

[Wei Shen](#) (BME)

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

Bioadhesion and Drug Targeting

Nanoparticulate Therapeutic Delivery

Crystal and Granular Properties of Solid Drugs

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

Fabrication/characterization of bioartificial artery, cardiovascular
valve, myocardial patch

Biomaterial/tissue interactions, gene delivery, immunotherapy

Bioactive materials

Facilities:

We have at our disposal state of the art equipment from both IT, 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 lewis@cems.umn.edu.

Visit the IPRIME website at www.iprime.umn.edu