



## Rangaramanujam M. Kannan

Associate Professor Chemical Eng. and Mat. Sci., Biomed. Eng.  
 B.E. (Hons.) [Birla Institute of Technology and Science](#), 1987  
 Ph.D. [California Institute of Technology](#), 1994  
 Postdoc. [University of Minnesota](#), 1994-1995

- ◆ Fellow of the American Academy of Nanomedicine (August 2006)
- ◆ Chief Technical Officer, [nanoScience Engineering Corp.](#), (7/2006- to date)
- ◆ Member, [Karmanos Cancer Institute](#)
- ◆ Ad hoc Member, National Cancer Institute Special Emphasis Study Section
- ◆ NSF CAREER Award (1999)
- ◆ Unilever Award for outstanding Ph.D. thesis in Polymer Science by ACS (1995)

Curriculum Vitae: [pdf](#)

### AREAS OF RESEARCH

#### Dendrimer Nanomedicine

Dendrimers are tree-like polymers (~5-10 nm) with a well-defined branching architecture that offer a new length scale for multifunctional delivery systems, with an ability to deliver therapeutics in a targeted manner, with simultaneous imaging. Our drug delivery group seeks to maximize the unique surface, cellular and in vivo properties of dendrimers for improved therapeutic efficacy. We do this through synthesis, in vitro and in vivo characterization of custom-designed dendrimer-based multifunctional nanodevices for cancer, inflammation (neuro and lung), and eye diseases. Translational research is enabled through inter-disciplinary collaborations with various components of the Wayne State Medical School.

[PRB Nanotechnology Lab](#)

#### Supercritical CO<sub>2</sub>-dispersed polymer nanocomposites

Achieving clay dispersion and improving polymer-clay interactions are key to producing superior nanocomposites. Using a patented, licensed technology based on the unique properties of supercritical carbon dioxide [discovered by Wayne State (Gulari, Manke, Kannan), and Ford researchers], we are preparing dispersed nanoclays and polymer clay nanocomposites. Current research focuses on improving processing times, and diversification of the scCO<sub>2</sub> processing to a wide variety of commercial polymers. X-ray diffraction, rheology, mechanical and rheo-optical techniques play a key role in understanding the dispersed nanocomposite properties.



Contact Information:  
 e-mail:

[rkannan@che.eng.wayne.edu](mailto:rkannan@che.eng.wayne.edu)  
 phone: (313) 577-3879  
 fax: (313) 577-3810

Dept of Chemical Engineering  
 1121 Engineering Building  
 5050 Anthony Wayne Drive  
 Detroit, MI 48202

### Selected Publications

'Drug release characteristics of PAMAM dendrimer drug conjugates with different linkers.', Yunus E. Kurtoglu, Manoj K. Mishra, Sujatha Kannan, Rangaramanujam M. Kannan, International Journal of Pharmaceutics (In Press)

'Poly(amidoamine) dendrimer-drug conjugates with disulfide linkages for intracellular drug delivery.', Kurtoglu, Yunus E.; Navath, Raghavendra S.; Wang, Bing; Kannan, Sujatha; Romero, Robert; Kannan, Rangaramanujam M., Biomaterials (2009), 30(11), 2112-2121.

'Role of polymer-clay interactions and nano-clay dispersion on the viscoelastic response of supercritical CO<sub>2</sub> dispersed polyvinylmethylether (PVME)-Clay nanocomposites.', Manitlu, Mihai; Horsch, Steven; Gulari, Esin; Kannan, Rangaramanujam M., Polymer (2009), 50(15), 3786-3796.

'Anti-inflammatory and anti-oxidant activity of anionic dendrimer-N-acetyl cysteine conjugates in activated microglial cells', Wang, Bing; Navath, Raghavendra S.; Romero, Roberto; Kannan, Sujatha; Kannan, Rangaramanujam. International Journal of Pharmaceutics (2009), 377(1-2), 159-168.

'Structure and mechanical properties of supercritical carbon dioxide processed porous resorbable polymer constructs', Baker, KC, R. Bellair, M. Manitlu, HN Herkowitz, RM Kannan. Journal of Mechanical Behavior of Biomedical Materials (2009), 2(6) 620-626

'Dendrimer-drug conjugates for tailored intracellular drug release based on glutathione levels.', Navath, R. Y. Kurtoglu; B. Wang; S. Kannan; R. Romero; R.M. Kannan. Bioconjugate Chemistry (2008), 19(12), 2446-2455.

'Supercritical Carbon Dioxide-Processed Dispersed Polystyrene-Clay Nanocomposites.', Manitlu, Mihai; Bellair, Robert J.; Horsch, Steven; Gulari, Esin; Kannan, Rangaramanujam M. Macromolecules (2008), 41 (21), 8038-8046.

'The effect of surface functionality on cellular trafficking of dendrimers.', Perumal, Omathanu P.; Inapagolla, Rajyalakshmi; Kannan, Sujatha; Kannan, Rangaramanujam M. Biomaterials (2008), 29(24-25), 3469-3476.

'Engineering Strength, Porosity, and Emission Intensity of Nanostructured CdSe Networks by Altering the Building-Block Shape', Yu, Hongtao; Bellair, Robert; Kannan, Rangaramanujam M.; Brock, Stephanie L. Journal of the American Chemical Society (2008), 130(15), 5054-5055