



## Yusheng Feng, Ph.D.

### Associate Professor

Department of Mechanical Engineering

#### Areas of Teaching Interest:

- Biomechanics and Bioheat Transfer
- Finite Element Methods and Numerical Simulation
- Computational Bioengineering and Biomedicine

#### Areas of Research Interest:

- Biomechanics and Bioheat Transfer;
- Computational Cancer Research:
  - Cancer treatment simulation and outcome prediction,
  - Cancer metastasis prediction using cell biophysics principle,
  - Prostate cancer prognosis using physics based tumor growth modeling,
  - Thermal (laser, RF, Ultra-Sound) therapy simulation,
  - Nano-drug delivery simulation, and
  - Multi-scale modeling and system biology by integrating genomics, proteomics, and tissue electro-mechanics.
- Image-Guided Real-Time Surgical Control;
- Haptic Device Enabled Surgical Simulation;
- Medical Device Design and Optimization;
- Mathematical Modeling, Parallel Computing and Large Scale Visualization.

## Journals

- **Adaptive Real-Time Bioheat Transfer Models for Computer Driven MR-Guided Laser Induced Thermal Therapy**  
A. Elliott, Y. Feng, D. Fuentes, R.J. McNichols, J.T. Oden, A. Shetty and R.J. Stafford, IEEE Trans. BME, 57(5): 1024-1030, (2010).
- **Computational Modeling of Wound Healing based on Continuum Mixture Theory**  
Y. Feng, R. Ranjan, A. Nordquist and J. Zhou, submitted to Journal Biomech Eng., (2012).
- **A General Class of Bi-Phase Bioheat Transfer Models with Explicit Perfusion Derived From Continuum Mixture Theory**  
Y. Feng, J.T. Oden and J. Zhou, submitted to J. Biomech Eng., (2012).
- **Measurement and Mathematical Modeling of Thermally Induced Injury and Heat Shock Protein Expression Kinetics in Normal and Cancerous Prostate Cells**  
K. Diller, Y. Feng, M.N. Rylander and K. Zimmermann, Int'l J Hyperthermia, Special Issue on Thermal Therapy for Prostate Cancer (In press).
- **Medical Applications in Bone Remodeling, Wound Healing, Tumor Growth and Cardiovascular Systems**  
Y. Feng and R. Ranjan, to appear in Encyclopedia in Computational and Applied Mathematics.
- **Model-Based Planning and Real-Time Predictive Control for Laser-Induced Thermal Therapy**  
Y. Feng and D. Fuentes, Int'l J. Hyperthermia, 27(8), 751-761, (2011).
- **mRNA-HSP Interaction Modeling and in vitro Experiments of Sub-cellular Interaction of mRNA and Heat Shock Protein (HSP) 70**  
S.J. Boukhris, Y. Feng, Livi C, V.D. Sivalanka, M.N. Rylander and G.J. Wilmlink, submitted to Cell Stress and Chaperones, (2012).
- **A Numerical Solution Method for Initial-Value Problems Using Harmonic Analysis and Taylor Series Approximations**  
Y. Feng and R. Bagley, International Journal of Applied Mathematics, 24(6): 841-860, (2011).
- **Parallel Spectral/hp Stabilized Finite Element Formulations and Applications to Computational Fluid Dynamics**  
Y. Feng and R. Ranjan, submitted to J. Comp Phy, (2012).
- **Probabilistic Sensitivity Analysis with respect to Bounds of Truncated Random Variables**  
Y. Feng and H. Millwater, ASME J. Mech. Design.
- **Real-Time Predictive Surgical Control for Cancer Treatment Using Laser Ablation (Life Science)**  
Y. Feng and D. Fuentes, Signal Processing Magazine, IEEE, 28 (3): p. 134-138, (2011).
- **Spectral/hp Stabilized Finite Element Formulations and Applications to Computational Fluid Dynamics**  
Y. Feng and R. Ranjan, submitted to Journal of Comp. Physics, (2012).

## Conference Proceedings

- **Bioheat Modeling of Bovine Liver with Embedded Vasculature Under RF Ablation**  
C. Acosta, Y. Feng and D. Fuentes, October 12, 2011, Biomedical Engineering Society Annual Conference, Hartford, CT.
- **Constructing Laser-Induced in Vitro Cell Damage Model Based on Thermal Analysis Using COMSOL Multiphysics**  
S. Boukhris and Y. Feng, October 2011, COMSOL Conference, Boston, MA.  
S. Boukhris and Y. Feng, March 2012, SiVIRT Advisory Board Meeting, San Antonio, TX.
- **Computational Study of RF Effect of Mobile Phones and Its Biological Effect on Brain Cancer**  
Y. Feng, S. Gogineni and A. Nordquist, 2010, BMES.
- **Effective Shape Feature Extraction Algorithms for Prostate Cancer Image Analysis**  
Y. Feng, D. Stockton and J. F. Yuan, 2010, BMES.
- **Image-Guided Nanoparticle Mediated Thermotherapy: Opportunities and Challenges**  
Y. Feng, April 20, 2012, Invited talk, ASME Workshop on Nanotechnology for Biomedicine, Washington D.C.
- **Introduction to Bioheat Transfer and Therapeutic Outcome Prediction**  
Y. Feng, April 15, 2012, Mini-Refresher Course, Annual Conference of Society of Thermal Medicine, Portland, OR.
- **Lead Exhibition to Promote Doctoral Programs**  
S. Boukhris and Y. Feng, September 2012, South Africa Ph.D. Project Conference, Cape Town, South Africa.
- **Mathematical Modeling and in Vitro Experimental Validation of 3D Cancer Cell Migration in a Vascularized Tumor**  
S. Boukhris and Y. Feng, September 2012, Princeton University Workshop on Failure in Clinical Treatment of Cancer, Princeton, NJ.
- **Modeling of Bioheat Transfer in Human Kidney and Experimental Validation in Vivo**  
R. Canty, L. Davila, Y. Feng, J. Long and D. Parekh, 2010, BMES.
- **mRNA-HSP Interaction Modeling and in Vitro Experiments of Sub-Cellular Interaction of mRNA and Seath Shock Protein (HSP) 70**  
S. Boukhris and Y. Feng, November 2012, Cancer Therapy & Research Center Annual Symposium, San Antonio, TX.
- **A New Bioheat Transfer Model and its Application to RF Ablation in Liver Cancer Treatment**  
C. Acosta, Y. Feng and C. Zhou, October 24-27, 2012, 2012 Biomedical Engineering Society Annual Conference, Atlanta, Georgia.
- **Numerical Simulation of Bioheat Transfer in Liver with Explicit Perfusion Using Continuous Mixture Theory: Modeling, Validation and Visualization**  
Y. Feng, April 14, 2012, Annual Conference of Society of Thermal Medicine, Portland, OR.
- **Shape Effects on the Drag Force and Motion of Particles in a Viscous Fluid at Low Reynolds**  
M. Anderson, Y. Feng and Z. Feng, November 9-15, 2012, Proceedings of the ASME 2012 Int'l Mechanical Engineering Congress & Exposition IMECE2012.