Area of Specialty:

**Tissue engineering and in particular cell-surface interactions** with applications in the development of cell-based biosensors and/or assays for high throughput screening (HTS). **Renewable energy utilization** at the bottom of the economic pyramid with emphasis on biogas-powered cooling. **Global service learning** with emphasis on long term effects, well after graduation.

Research:

Cell-surface interaction research is driven by the hypothesis that there exists ubiquitous factors (biomarkers) that are necessary and sufficient and when expressed, qualify cultures as "three-dimensional" or physiologically relevant in a complex way. Related investigations include developing platforms consistent with current HTS instrumentation, and demonstrating that use of 3D cell-based biosensors in drug discovery reduces development compounds attrition.

Service:

Through ENGR 4920, a team of undergraduates work on an engineering problem in collaboration with their counterparts oversease, via e-mail and skype. They travel during spring breat to gain first hand knowledge. Promising solutions are implemented oversease in summer by a new team. The common theme of current and completed projects is renewable enrgy utilization. Graduates are participating in a longitudinal study of service-learning. See smallholderfortunes link below.

Instruction:

ENGR 8XXX: Three-dimensional cell-based biosensors, offered in fall of odd years.

ENGR 8950: Graduate seminar, offeref in fall.

ENGR 4920: Engineering design project (intenational section, with service-learning component), offered in spring.

ENGR 3720: Engineering physiology, offered in fall.

Selected Publications:

Cheng, K.; Lai, Yinzhi; Kisaalita, W.S. 2008. Three-dimensional polymer scaffolds for high throughput cell-based assya systems. Biomaterials 29:2802-2812.

Wu, Z.-Z.; Zhao, Y.-P.; Kisaalita, W.S. 2006. A packed cytodex microbead array for three-dimensional cell-based biosensing. Biosensors & Bioelectronics 22:685-693.

DiRamio, J.A.; Kisaalita, W.S.; Majetich, G.F.; Shimkus, J.M. 2005. Poly(ethylene glycol) methacrylated/dimethacrylate hydrogels for controlled relaase of hydrophobic drugs. Biotechnology Progress 21:1281-1288.

Mao, C.; Kisaalita, W.S. 2004. Characterization of 3D collagen hydrogels for functional cell-based biosensing. Biosensots & Bioelectronics 19:1075-1088.

Kisaalita, W.S.; Tippie, A.; Faircloth, W.; Franklin, J.; Boyer, B. 2006. Comparative feasibility analysis of alternative renewable energy sources for small milk cooling plants of southwestern Uganda. Agricultural Mechanization in Asia, Africa, and Latin America 37(4):69-75.

Contracts and Grants:

UNDER COSTRUCTION

Additional Links:

* [Smallholder Fortunes](http://www.smallholderfortunes.uga.edu)