SCHOOL OF CHEMICAL, BIOLOGICAL & MATERIALS ENGINEERING

And

UNIVERSITY OF OKLAHOMA BIOENGINEERING CENTER

100 E. Boyd, Sarkeys Energy Center, T-335
405-325-5811
The University of Oklahoma
Norman, Oklahoma

2009 – 2010 Seminar Series

DR. ANNA C. BALAZS

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DEPARTMENT OF CHEMICAL AND PETROLUEM ENGINEERING
UNIVERSITY OF PITTSBURGH
PITTSBURGH, PENNSYLVANIA

Will present a seminar on

"DESIGNING AUTONOMOUSLY MOTILE GEL "WORMS" THAT FOLLOW COMPLEX PATHS"

Using theory and simulation, we determine the effect of light on the motion of polymer gels undergoing the Belousov-Zhabotinsky (BZ) reaction. The BZ gels undergo rhythmic mechanical oscillations in response to the periodic reduction and oxidation of ruthenium catalysts that are grafted to the polymer network. The Ru-catalyzed BZ reaction is photosensitive, with light of a certain wavelength suppressing the oscillations within the gel. We exploit this property to control the self-sustained motion of millimeter-sized BZ gel "worms". By tailoring the arrangement of illuminated and non-illuminated regions, we direct the movement of these worms along complex paths, guiding them to bend, reorient and turn. In particular, these gels can make both 90^0 and U-turns. Notably, the path and the direction of the gel's motion can be dynamically and remotely reconfigured (as opposed to being fixed, for example, by a pattern on an underlying surface). Hence, our findings can be utilized to design intelligent, autonomously moving "soft robots" that can be reprogrammed "on demand" to move to a specific target location and to remain at this location for a chosen period of time.

THURSDAY, OCTOBER 1, 2009

COOKIES AND COFFEE -- 2:45 P.M.

SEMINAR -- 3:00 P.M.

SARKEYS ENERGY CENTER, ROOM M-204

THIS IS A REQUIRED SEMINAR FOR CHE 5971