

# Laser Light and the Nano Gold Rush

***Marek Romanowski and Marty Pagel are using femtosecond laser pulses to target drug delivery and create bioimages.***

Marek Romanowski, associate professor in the biomedical engineering department, heads a UA research team that recently won an NSF award to help fund a broadly tunable femtosecond laser facility. When used in medical imaging, femtosecond laser pulses can produce clearer images and more accurate diagnoses of disease with not tissue damage and no background interference.

Romanowski's research involves sending light-responsive gold nanocapsules to target specific cells within the body. Laser pulses cause the gold capsule to self-destruct so it can be flushed out through the kidneys. In addition to delivering a drug, gold particles could also deliver genetic material to a cell to modify the cell's DNA, a key step in gene therapy.



**Professor Marek Romanowski**

In related research, Mark "Marty" Pagel, associate professor in the biomedical engineering department, is developing contrast agents for photoacoustic imaging, whereby nonionizing laser pulses are fired into biological tissue. Some of the delivered energy is absorbed and converted into heat, leading to transient thermoelastic expansion and thus wideband ultrasonic emission. Transducers then detect the ultrasonic waves, which are used to form images.