

Member Login | [Login help](#)

Username:

Password:

Remember

Me

- ✧ [Home](#)
- ✧ [About the NAS](#)
- ✧ [Members](#)
- ✧ [Nomination and Election](#)
- ✧ [Awards](#)
- ✧ [Proceedings \(PNAS\)](#)
- ✧ [The National Academies Studies and Reports](#)

#### ACTIVITIES


- ✧ [Koshland Science Museum](#)
- ✧ [Evolution Resources](#)
- ✧ [International Visitors Office](#)
- ✧ [Sackler Colloquia](#)
- ✧ [Kavli Frontiers of Science](#)
  - [US Frontiers](#)
  - [Chinese-American Frontiers](#)
  - [German-American Frontiers](#)
  - [Indo-US Frontiers](#)
  - [Japanese-American Frontiers](#)
  - [UK-US Frontiers](#)
- ✧ [InterViews](#)
- ✧ [Science Classics](#)
- ✧ [Keck Futures Initiative](#)
- ✧ [Exhibitions and Cultural Programs](#)

## Japanese-American Kavli Frontiers of Science

### 11th Annual Japanese-American Kavli Frontiers of Science Symposium

Japan Society for the Promotion of Science  
U.S. National Academy of Sciences

Arnold and Mabel Beckman Center  
December 5-7, 2008  
Irvine, California

Nanoshells for Photothermal Cancer Therapy -[Presentation](#)   
*Jennifer West, Rice University*

Please click on the above link to watch the presentation - both slides and audio.  
This presentation file is in [Adobe Flash player](#) format, available free online.

Metal nanoshells are a new class of nanoparticles with highly tunable optical properties. Metal nanoshells consist of a dielectric core nanoparticle such as silica surrounded by an ultrathin metal shell, usually composed of gold for biomedical applications. Depending on the size and composition of each layer of the nanoshell, particles can be designed to either absorb or scatter light over much of the visible and infrared regions of the electromagnetic spectrum, including the near infrared region where penetration of light through tissue is maximal. These particles are also easily conjugated to antibodies and other biomolecules. One can envision a myriad of potential applications of such tunable particles. Several potential biomedical applications are under development, including immunoassays, modulated drug delivery, photothermal cancer therapy, and imaging contrast agents. For example, in photothermal cancer therapy, nanoshells can be injected intravenously, accumulate at tumor sites due to the EPR effect and/or molecular targeting, then generate heat upon illumination with near infrared light, leading to destruction of the tumor. This has shown very promising results in a mouse colon carcinoma model, with 100% survival of nanoshell treated mice at 1 year. Furthermore, integrated imaging and therapy applications have been accomplished with these materials.

Review Article:

Related Links:

[Watch Cutting Edge Science on the Web](#)

[Chinese-American Kavli Frontiers \(2006\):](#)

- ✧ [Alternative Energy Fuels](#)
- ✧ [Bionics/Human Machine Interface](#)
- ✧ [Black Hole Growth and their Host Environments](#)
- ✧ [Bioremediation of Contaminated Elements](#)
- ✧ [Smart Surface-responsive Materials](#)
- ✧ [The Genetics of Race and Human Populations](#)
- ✧ [Multiscale Modeling and Optimization](#)
- ✧ [Nanomedicine: Navigating into the Cell](#)

[U.S. Kavli Frontiers \(2006\):](#)

- ✧ [Artificial Photosynthesis / Alternative Energy Sources](#)
- ✧ [Biometrics: Identity Technologies](#)
- ✧ [Evolutionary Origins of Human Cognition and Behavior](#)
- ✧ [Extrasolar Planets](#)
- ✧ [Frontiers in Population Biology using Ancient DNA](#)
- ✧ [How Many Dimensions Does the Universe Have?](#)
- ✧ [Memory and Learning](#)
- ✧ [Prepare Immediately for Whatever Happens Next](#)

[Japanese-American Kavli Frontiers \(2006\):](#)

- ✧ [Chemical Biology](#)
- ✧ [Climate Change](#)
- ✧ [DNA Based Nanosystems](#)
- ✧ [Evolution of Modern Humans](#)
- ✧ [Extreme Photonics](#)
- ✧ [Meditation and the Brain](#)
- ✧ [Single Molecule Nano-Biology](#)
- ✧ [Slow Light](#)

[Indo-American Frontiers \(2007\):](#)

- ✧ [Algebra and Computation](#)

Hirsch, L., Lowery, A., Drezek, R., Halas, N, and West, J, "Metal Nanoshells," *Annals of Biomedical Engineering*. 34: 15-22 (2006).

- ✦ Climate Connection
- ✦ Macromolecular Machines
- ✦ The Magnetic Universe
- ✦ Molecular Architectures and Assemblies
- ✦ Stimuli Responsive Materials
- ✦ Stress in Neurodegeneration
- ✦ Systems Biology

---

National Academy of Sciences  
500 Fifth Street, NW  
Washington, DC 20001

[Terms of Use](#) | [Privacy Policy](#)  
[Contact Us](#) | [Site Map](#)