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RESEARCH COLLABORATION INITIATIVES

Office of
Biological
& Physical
Research

John Emond
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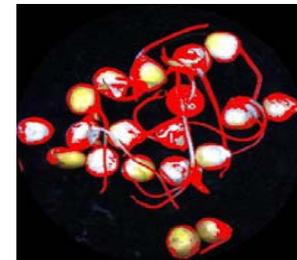
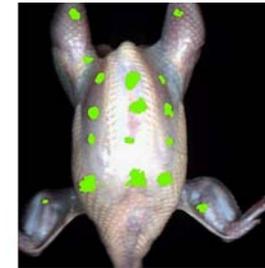
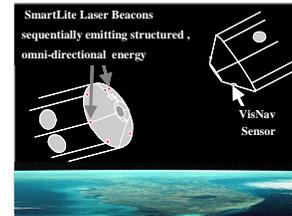


Partnerships with other Government agencies

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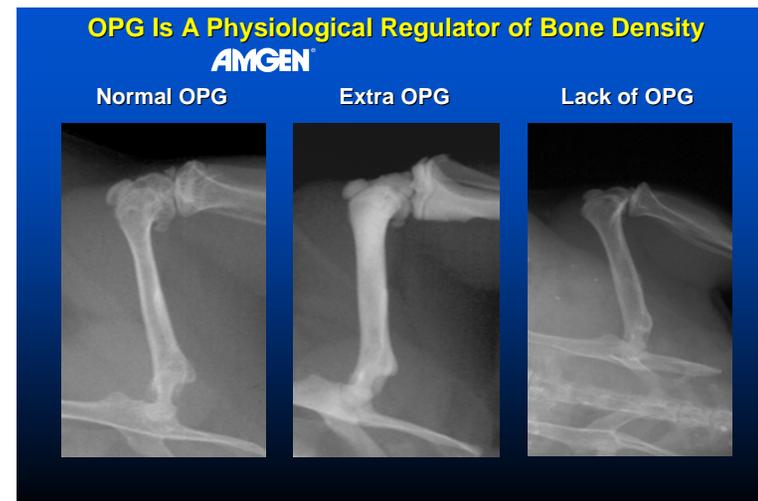
- Center for Disease Control
- Federal Bureau of Investigation
- US Department of Agriculture
- DARPA
- Department of Defense
- Department of Energy
- National Institutes of Health
- National Institute of Standards and Technology
- National Science Foundation
- Naval Research Laboratory
- Office of Naval Research
- US Air Force Research Laboratory
- US Army
- US ARMY (CECOM)
- US ARMY (SMDC)





Example Product: Osteoprotegrin Research Flown on STS 108

- Space-treated mice had:
 - Greater elastic bone strength
 - Greater whole-bone mineral mass
 - Greater bone mineral density



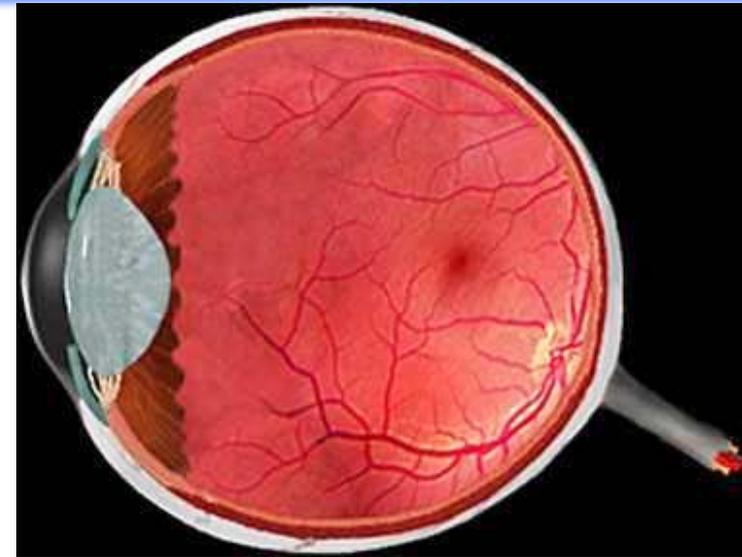
- Currently in Phase II clinical trials by industrial partner Amgen for treatment of Osteoporosis and Metastatic Bone Cancer.



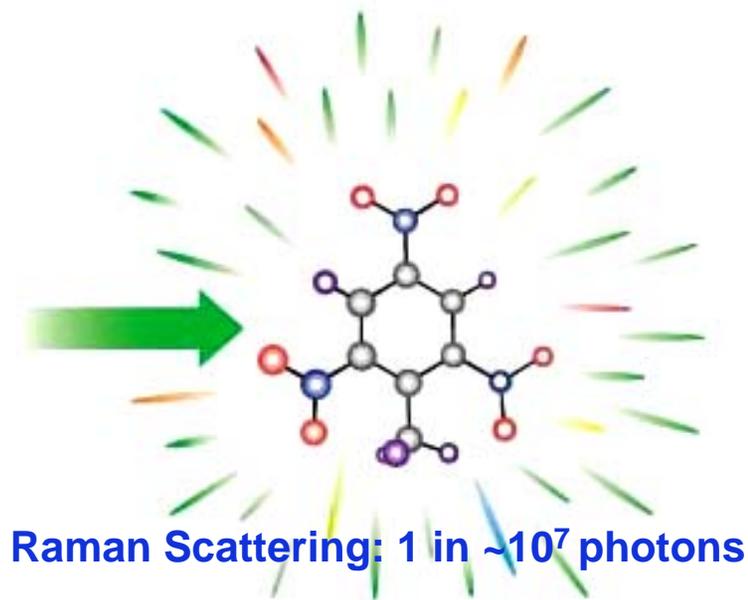
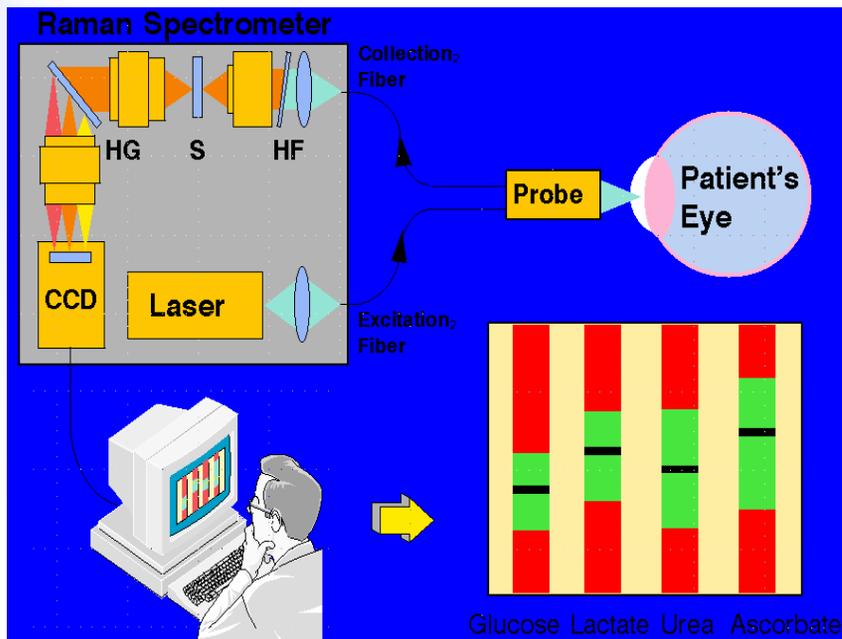
Non-invasive Optical Technologies

Non-Invasive Glucose Monitor

- ✓ 6% of US Population has Diabetes
- ✓ Leading Cause of Blindness in Adults
- ✓ 4-6 Glucose Measurements/day
- ✓ James Lambert, JPL; Mark Borchert, Childrens Hospital LA
- ✓ US Patent 6,181,957, Jan 30, 2001, CHLA & Caltech



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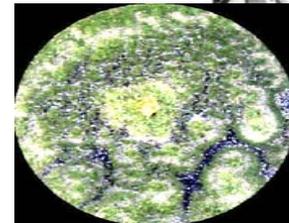
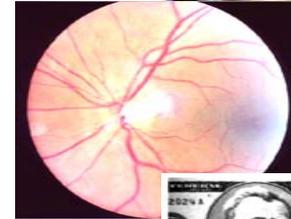


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Example Product: Hyperspectral Imaging, ProVision Technologies RPC

- Long used in remote sensing from space, astronomy
- Now being applied to Earth-based industries; e.g.,
 - Meat inspection
 - Ophthalmology
 - Forensics
 - Mold identification

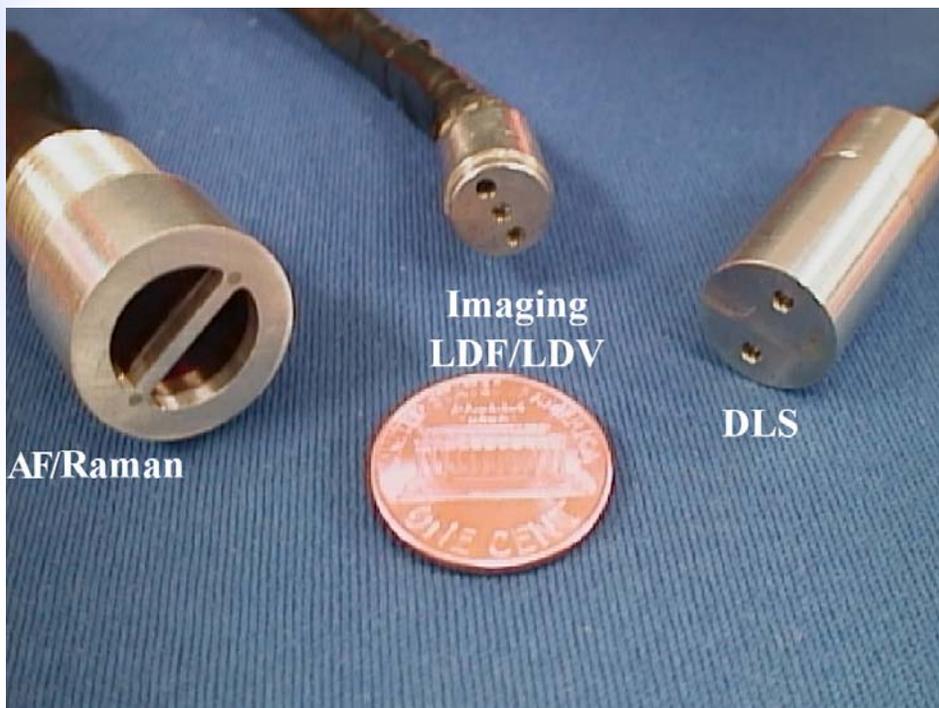




NEI-NASA Inter-Agency Agreement

NASA Dynamic Light Scattering Technology

- ✓ Diagnose diseases non-invasively long before the clinical symptoms appear and help find non-surgical countermeasures
- ✓ Manuel B. Datiles III, M.D., National Eye Institute – N.I.H.
- ✓ Rafat R. Ansari, Ph.D., NASA Glenn Research Center



Conventional DLS Systems

- ☹ Large in size
- ☹ Tedious optical alignment
- ☹ Moving parts
- ☹ Index matching fluid
- ☹ Dilute solutions
- ☹ Poor signal/noise
- ☹ Require large power
- ☹ Long data acquisition times
- ☹ Not modular in design
- ☹ Not suitable for on-line applications



NASA-Developed DLS Eye Diagnostics Device in Clinical Use at NEI/NIH

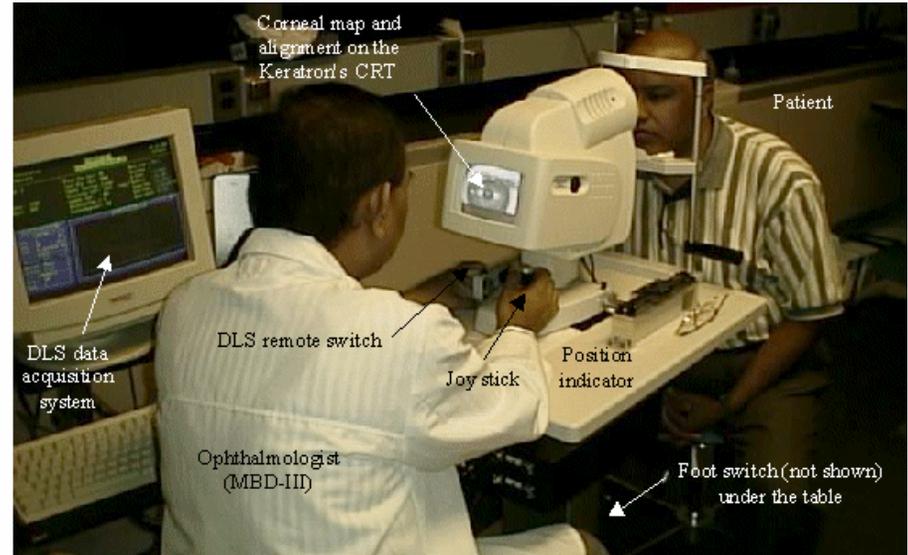
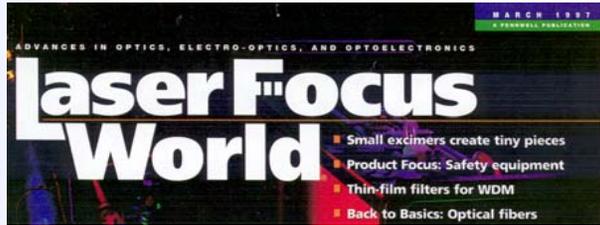


Figure 3. Instrument in clinical operation

~3 orders of magnitude more sensitive

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Future Technology, 1996

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NASA'S EXPLORATION MANDATE



- On January 14, 2004, President Bush announced a new vision for the Nation's space exploration efforts. In support of this vision, NASA will:
 - ✓ Implement a sustained and affordable human and robotic program to explore the solar system and beyond
 - ✓ Extend human presence across the solar system, starting with a human return to the Moon by the year 2020 in preparation for human exploration of Mars and other destinations
 - ✓ Develop the innovative technologies, knowledge, and infrastructures both to explore and support decisions about the destinations for human exploration
 - ✓ Promote international and commercial participation in exploration to further U.S. scientific, security, and economic interests