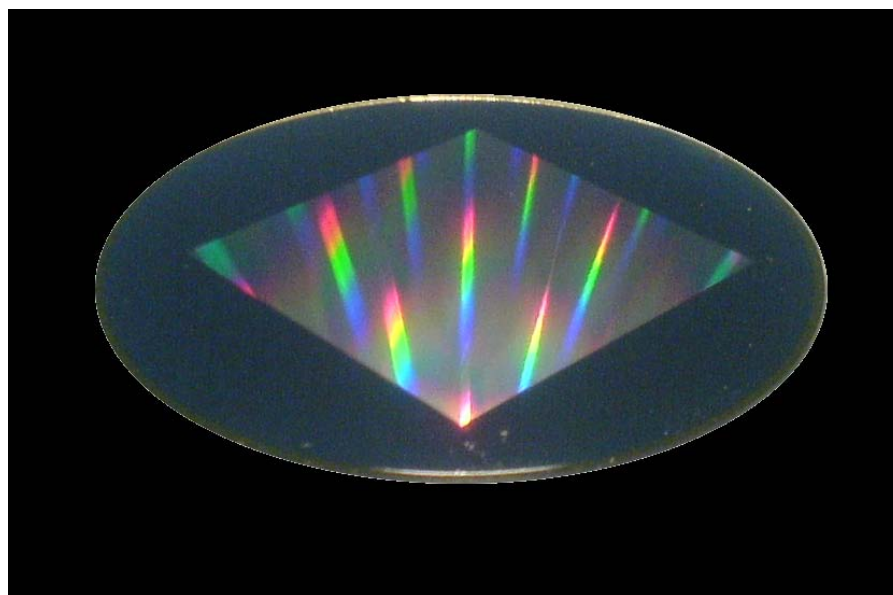


Color MRI contrast agents using magnetic microstructures

G. Zabow

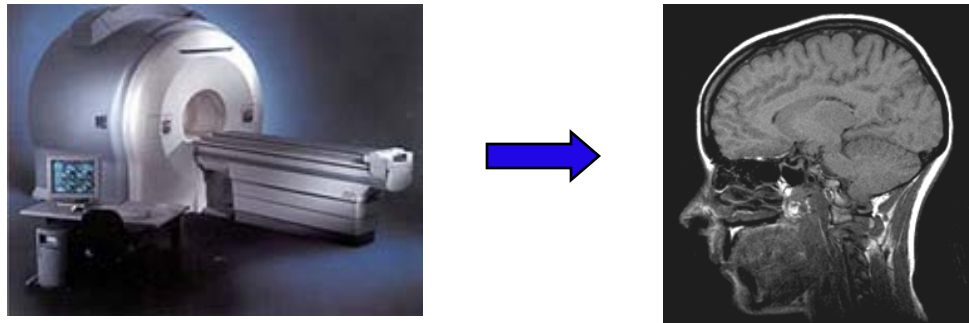
S. Dodd, J. Moreland, A. Koretsky

NIH & NIST



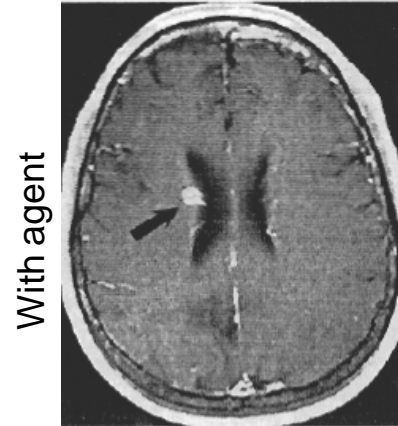
U.S. Department of Health and Human Services
National Institutes of Health

Magnetic Resonance Imaging (MRI)



- ⊕ MRI equipment market ~ \$ 5 Billion / yr (and growing...)
- ⊕ ~ 30 million MRI exams in the U.S. in 2008 alone.

MRI contrast agents

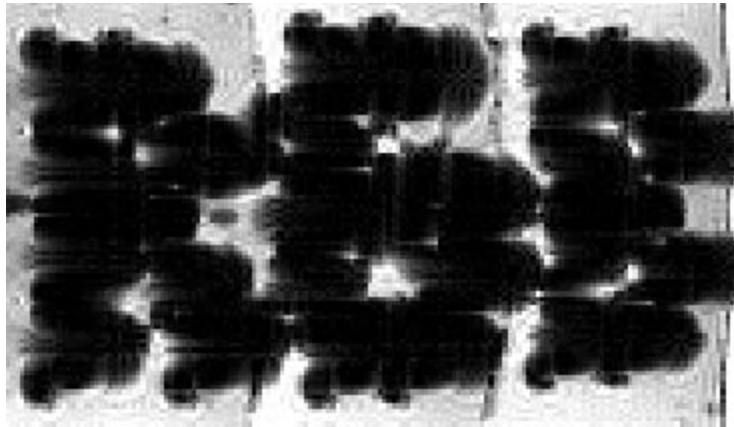


Topics in Magnetic Resonance Imaging
7(3):181-195 © 1995 Raven Press, Ltd., New York

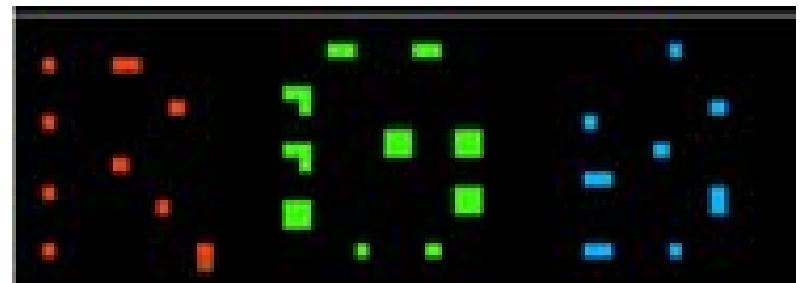
- ⊕ Contrast agents >> \$ 1 Billion / yr

From Grayscale Contrast to Color

- ✚ Color gives extra dimension
- ✚ Different regions “tagged” with different colors
- ✚ Multiplexing / increased throughput
- ✚ Imagine: cancerous / diseased tissue appearing red while normal tissue appears blue....

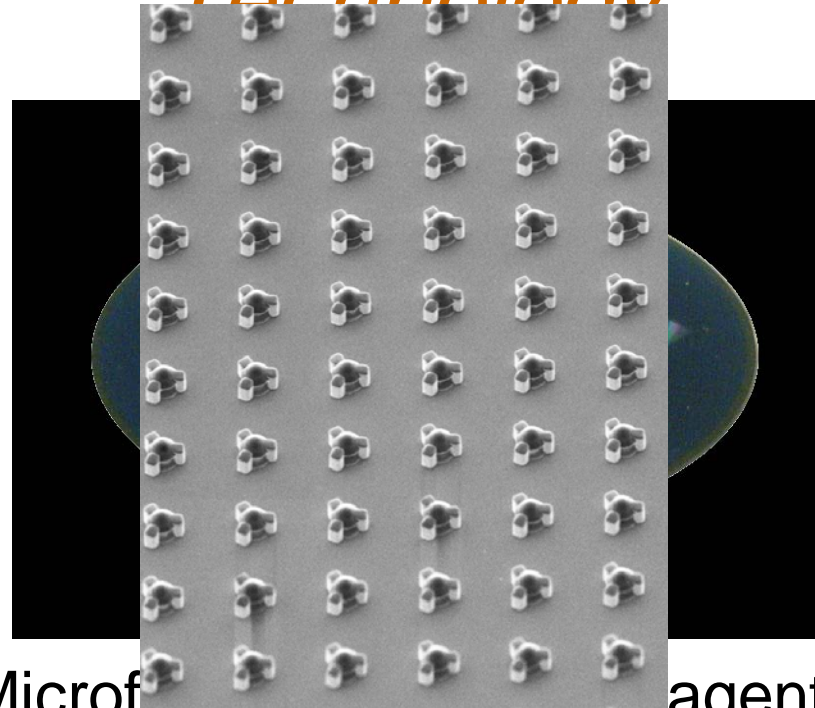


Grayscale



Multispectral “Color”

Technology



Microfabricated contrast agents

- Massively parallel wafer-level microfabrication
- Shape determines color.
- Can be turned on or off, sensing physiological conditions
- Structure composition can be from same (FDA approved) materials used in regular contrast agents

Commercial Applications

- ⊕ Provides unique color contrast, and can also double as regular MRI contrast agent (similar to, e.g. Feridex)
- ⊕ On/off functionality allows for in-vivo real-time physiological sensing, i.e. dynamic contrast.
- ⊕ Agent sensitivity can exceed that of regular gadolinium MRI agents
- ⊕ Fluid flow monitoring / stent applications
- ⊕ Microscale RFID tags, RFID-based microfluidics

Technology stage

- ➊ Early stage technology
- ➋ Patent pending
- ➌ But, already substantial interest:
 - ❑ Initial *Nature* paper, broad media coverage:



REUTERS

The Washington Post

Technology
PUBLISHED BY MIT
Review

- ❑ Selected by *Nature* editors as one of their favorite papers of 2008.
- ❑ Follow-up paper selected as cover article in *Nanotechnology* (Sept. 2009).

Collaboration Opportunities

Do you have expertise in any of these fields?

- ✦ *MRI contrast agents*
- ✦ *MRI calibration*
- ✦ *Micro-RFID tags and microfluidics*
- ✦ *Stent technology*
- ✦ *Flow Cytometry*
- ✦ *MEMS Technology*
- ✦ *Detection/labeling/tracking of biologics*

Then, let's talk....



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