

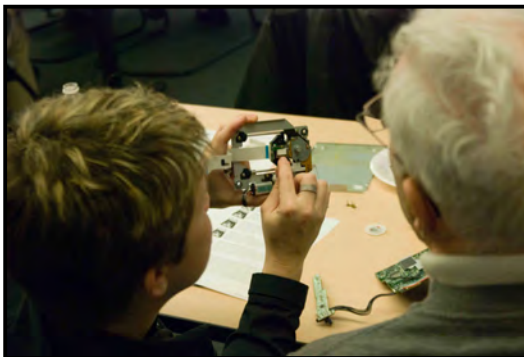
Teaching materials science using modern electronics



Modern electronics, e.g. a smart phone, relies heavily on science and engineering: semiconductors (diodes, transistors), magnetism (hard drives), photoelectric effect (digital camera), photon generation and lasers (LEDs, CD/DVD drives), light polarization (LCD), etc. The immediacy and applicability makes electronics a great tool for teaching science and technology.

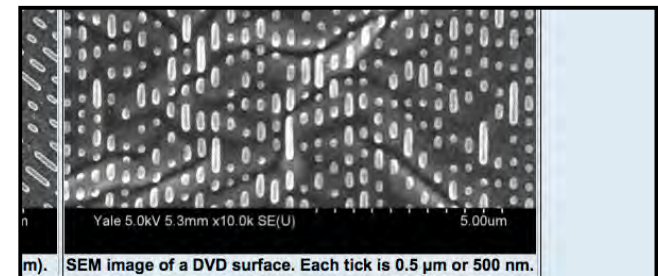


Together with a New Haven public school teacher, we develop web pages (<http://volga.eng.yale.edu/TeachingResources>), presentations, teaching modules, lesson plans, and hands-on kits appropriate for high school students and teachers. CRISP has purchased kits for loan to New Haven area teachers at <https://www.southernct.edu/crisp/index.php>. Our first workshop introducing the material was on March 24, 2010.



Workshop participants disassemble and examine a hard drive as part of the kit

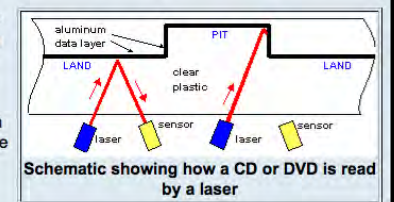
Web page segment: our own SEM images of CD/DVD surfaces, explanations of how data is stored and read



SEM image of a DVD surface. Each tick is 0.5 μm or 500 nm.

ones and zeroes. For a CD, the system chosen is slightly unusual in the transition from a bump to a flat region or a flat region to a bump represents a one while a flat region represents zero. The next question is how this information is read off the CD: how does

based on simple reflection. We've used light move around by changing the angle of reflection; you can't see the CD player's beam of light incident on the surface is reflected by the aluminum, and then detected by the sensor. The laser shoots the beam at the bump will change the angle at which the light is reflected the detector



Schematic showing how a CD or DVD is read by a laser

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