

TUTORIAL

Chemistry at the Boundary

Some scientists are delighted if you call their work *superficial*. They are surface chemists, who probe reactions that occur at the junctions between different phases of matter—such as where oxygen reacts with silicon during the production of a computer chip. Surface chemistry is also important for applications ranging from pollution control to rust prevention. The seven illustrated sections of this brisk tutorial, written for undergraduates or beginning grad students by chemist Roger Nix of Queen Mary University in London, cover the basics of the field, from the structure of metallic surfaces to imaging techniques. Follow links to galleries of images of highly magnified surfaces such as this semiconductor marred by a clod of silicon dioxide (above).

www.chem.qmw.ac.uk/surfaces/scc/sccinfo.htm

RESOURCES

Measuring the Web's Reach

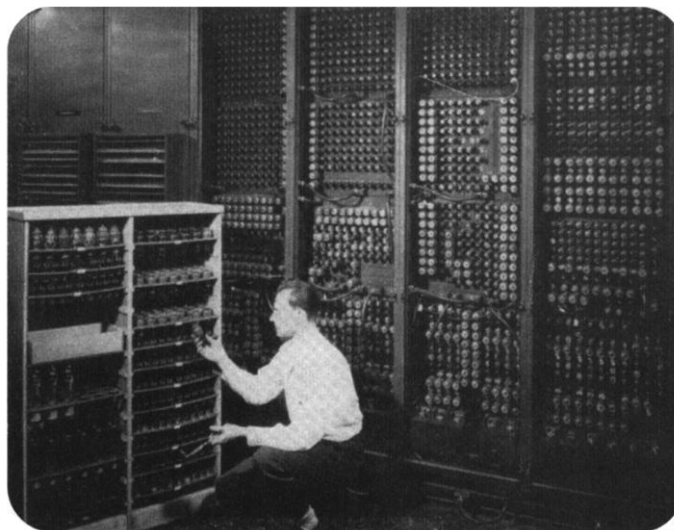
Spend a lot of time surfing the Internet? Then, depending on which recent study you believe, you must be a morose, alienated loner clicking away your life in quiet desperation, or a well-adjusted, solid character with a large circle of friends. How is the Internet really shaping our lives? Researchers with the Pew Internet and American

LINKS

Memory Lane

This is what tech support was like 50 years ago, when a technician replaced one of the 19,000 vacuum tubes in the 30-ton ENIAC, the first electronic digital computer. The vintage photo comes from a gallery of early computer images noted at the Virtual Museum of Computing. The curators have gleaned more than 100 links that span the first designs for calculating machines to the Internet. Biographical sites track the lives of computer pioneers like Alan Turing, who helped crack the German Enigma code during World War II but was driven to suicide after the war because of his homosexuality. You can also read official histories of companies like IBM and Intel or check out sites for many earth-bound computer museums and historical associations. The deeply nostalgic can even download emulator software that will allow their computers to run like a mid-1980s Commodore Amiga or a 1950 EDSAC mainframe.

vmoc.museophile.sbu.ac.uk



Life Project are trying to find out, using surveys, interviews, and other techniques. Along with its own 20-plus reports on topics such as the use of the Internet by Hispanics, religion in cyberspace, and downloading music, the project's Web site offers recent news clips and factoids from other surveys and studies. A well-stocked links section lists academic departments and other organizations probing everything from Internet health privacy to cybercrime. As a bonus, researchers can download raw data from the project's reports 6 months after publication.

www.pewinternet.org

DICTIONARY

The Meaning of Light

Engineers and others working in the field of photonics, which involves the transmission of information using light, may find this dictionary handy. The nearly 5000 terms run from "abaxial spherical aberration" to zoom lens. The site also explains common abbreviations in photonics.

www.photonicsdictionary.com

EDUCATION

Next-Generation Computing?

The sands of time are running out for silicon, as ever-smaller computer chips near a physical limit. However, the days of faster, better, cheaper machines may not end if scientists can develop quantum computers that encode information in the different quantum states of individual atoms. To learn more about the principles behind this embryonic technology, try this primer.† You'll need a grounding in physics and mathematics to follow the explanations of subjects like why the bits in a quantum

computer (known as qubits) can be in both the 0 and 1 states simultaneously and how an obscure method for factoring numbers, known as Shor's algorithm, spurred interest in quantum computing. This shorter, denser treatment covers some of the same ground.†

www.imsa.edu/~matth/cs299

† www.sees.bangor.ac.uk/~schmuel/comp/comp.html

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