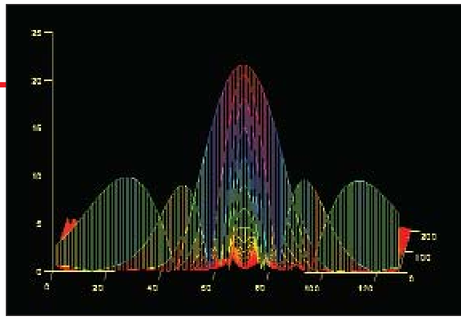
# NETWATCH

edited by Mitch Leslie

EDUCATION

## Making Wavelets



The mathematical technique known as wavelet analysis is useful for everything from recognizing abnormal heart rhythms to digitally storing fingerprints to squeezing trends out of long-term climate data. This tutorial by engineering professor Robi Polikar of Rowan University in Glassboro, New Jersey, lets you plunge into wavelets without drowning in mathematics. Geared for engineers and other nonmathematicians, the tutorial explains how wavelet analysis works and delineates its advantage—superior resolution—over other methods of signal analysis, such as the Fourier transform. The overview boasts a friendly style and plentiful illustrations.

engineering.rowan.edu/~polikar/WAVELETS/WTtutorial.html

TOOLS

## Nucleic Acid Origami

To combat illnesses ranging from cancer to AIDS, scientists hope to turn RNA against itself. They envision using enzymes to chop up the RNA genome of the AIDS virus, for example, and dispatching small RNAs to block the RNA messages that keep cancer cells dividing. But to target an RNA's vulnerable spots, researchers need to know how the string of nucleic acids folds. Sfold, a set of tools from the Wadsworth Center of the New York State Department of Health, predicts the likely folding patterns of a particular RNA sequence and helps researchers design RNA snippets that could chop or obstruct it. For example, one tool devises short-interfering RNAs (siRNAs), which shut off a gene by sticking to its messenger RNA molecules. Another of the site's tools pinpoints locations in an RNA molecule—such as the genome of the AIDS virus—that can be snipped by RNA enzymes.

sfold.wadsworth.org/index.pl

DATABASE

## On Again, Off Again

Genes are shift workers—while some labor, others relax, waiting for their chance to join the action. The Gene Expression Database, hosted by the Jackson Laboratory in Bar Harbor, Maine, holds data on the activity of thousands of mouse genes, using information gleaned from the literature or submitted by researchers. The collection focuses on gene expression during development. You can pick a particular stage—from single-celled egg to postbirth pup—and determine what genes are working in particular structures, such as the heart or brain. Entries summarize the methods and gene activity measurements for each study and provide figures from the original paper.

www.informatics.jax.org/mgihome/GXD/aboutGXD.shtml

WEB TEXT

## Climate Change 101

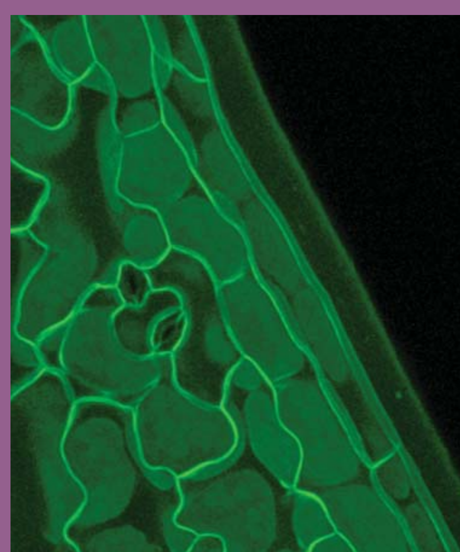
Climate change is one of today's hottest fields, and students can immerse themselves in the subject with this comprehensive tutorial from Manchester Metropolitan University, U.K. The six detailed chapters are aimed at undergraduates in geography, earth sciences, and similar fields. The primer starts by explaining how the atmosphere, oceans, living things, and other influences interact to shape the climate. Then it moves on to causes of climate change such as variations in Earth's orbit; mathematical modeling of climate; ice cores and other methods for inferring past temperatures and precipitation; and Earth's climate history. The authors also devote a chapter to the warming since the industrial revolution, describing possible impacts of rising temperatures and discussing the uncertainties in climate projections.

www.ace.mmu.ac.uk/Resources/gcc/contents.html

IMAGES

## Lighting Up Plant Cells

Green fluorescent protein (GFP) has allowed researchers to peer into the bustling world inside cells. Cell and developmental biologists use the glowing molecule, originally discovered in jellyfish, to track molecules and cellular components. To see what GFP has revealed about the inner workings of plant cells, check out this gallery of stills and movies compiled by David Ehrhardt and colleagues at the Carnegie Institution of Washington at Stanford. You can watch chromosomes pulling apart during cell division and follow the elongation of microtubules, thin structures that help prop up a cell. Ehrhardt and colleagues have discovered that the tiny tubes move by "treadmilling," building up one end and breaking down the opposite end. The protein can also highlight details of particular structures, such as the growing tip of a root and the pores known as stomata. Here, GFP bound to cell membranes emphasizes the irregular surface of a young leaf (above).



deepgreen.stanford.edu

Send site suggestions to netwatch@aaas.org. Archive: www.sciencemag.org/netwatch

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Science

# DATABASE: On Again, Off Again

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