

# The Art of Science

*High Art from High Tech*

By Daniel Murphy '97



*The work of Pasteur and Picasso are distinct examples of genius in most people's minds. Yet, when bright splotches of color on a cell phone map remind you of a Jackson Pollack painting and the intricate and repetitive borders of a fractal suggest an Escher drawing, then the line between art and science has blurred. The following pages feature the artistic side of alumni whose careers allow them to create high art from high tech.*

## Fine's Fractals

Ira Fine '74, '95 first discovered a passion for fractals at an exhibit of fractal art created by mathematics Professor Tom Osler. "The show was incredible," said Fine. "The idea that these complex and beautiful images were based on relatively simple mathematical formulas just blew me away."

Fine, a math teacher at Washington Township High School, wrote a com-

puter program that created fractals while earning his master's degree in mathematics. In the classroom, Fine uses his fractals to help illustrate concepts and formulas for his students.

A fractal is simply a depiction of a mathematical algorithm that repeats itself. "First, the formula creates thousands of points in space," said Fine, "then the computer assigns a color value to the distance between those points. It is variations in point distances that produce the colorful images."

Fractals feature infinite depth and definition along their borders. Zooming in on a particular area in a fractal will create an entirely new fractal image. "All the color happens along the borders. It's here where the points are plotted off the chart and create the waves of beautiful colors," said Fine.



## Coloring Comets



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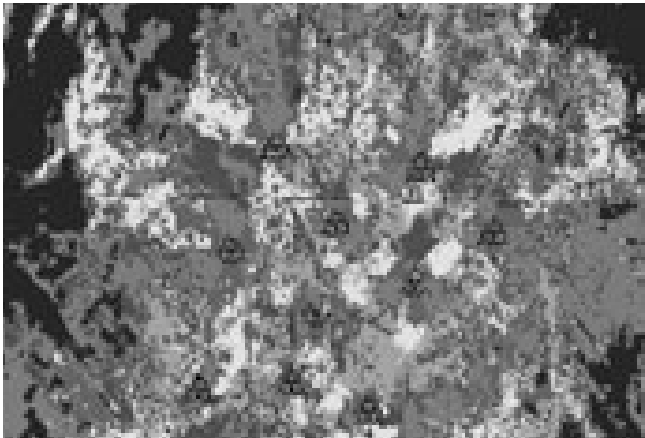
Even amid all the hi-tech scientific equipment and instruments of his laboratory at NASA's Goddard Space Flight Center, Dan Greenspan '97 would tell you he's an artist first—then a scientist. "Most good science is art," says Greenspan. "It doesn't just rely on the facts."

Greenspan is a member of a team constructing a Fast Cryogenic Array Spectrometer (FCAS). The instrument will be used to capture images of comets streaking through space. "The images will help us detect chemical compounds in the comets," he said, "and hopefully, help us better understand our planet, solar system and universe."

But even as Greenspan's spectrometer is unlocking the universe's complex secrets, its pictures are revealing a deeper beauty. "The images are as beautiful and sinuous as a Michaelangelo sculpture," said Greenspan. "They have an effect on you—like listening to a renowned orchestra or seeing a great painting."

### Plotting Predictions

Anthony (Rick) Burke '79 takes color seriously—he intentionally designs his maps and graphs to be visual-



ly appealing as well as informative. "It's very important that the final product excite our clients," said Burke. "Many of our clients make multi-million dollar business decisions based on our prediction plots."

Burke is the president of MLJ, Inc., a telecommunications engineering and consulting firm specializing in wireless (radio frequency) network communications. He believes using plot prediction maps also makes the job more interesting. "The data collected may be scientific in nature," said Burke, "but the final product is a work of art. In fact, we decorate



the office walls with many of the maps and charts."

Burke's software can identify, design and optimize new cellular telephone network sites, illustrate and predict network coverage, manage interference and make changes to a network site. It can also determine how well a cellular telephone network is performing in dense urban areas. Using complex 3-D databases of buildings, Burke is able to predict and show cell phone coverage not just on the streets and sidewalks, but inside buildings and cars as well.

### Mark Xs the Spot

Mark Waters '93 never has to pull into a gas station for directions—at least in Gloucester County. A geographic information systems specialist with the Gloucester County Planning Board, Waters knows where almost everything is in the county because he's probably had to map it.

Using advanced geographic information systems (GIS) software, Waters designs and produces all types of topographical and geographical maps. He maps roads for new housing developments, mercury studies, water, hydrology and watersheds projects, open-space (parks, wildlife, botanical) preservation areas, proposed rail lines and tourist-themed maps.

Waters uses different art elements when producing his maps. "Colors—especially on a map—can have a big impression on peoples' perceptions," said Waters. "I try to stay to the standard conventions—red for boundaries, green for pastures, brown for farms and fields and black for man-made items like roads and buildings."

In addition to color concerns, Waters also recognizes the importance and powerful meaning of symbols. "With whatever type of map that's being made, you have to be careful not to propagandize," said Waters. "Everything on a map has meaning. Making one symbol larger than another or making different symbols different sizes will affect the way the map is perceived." ■

