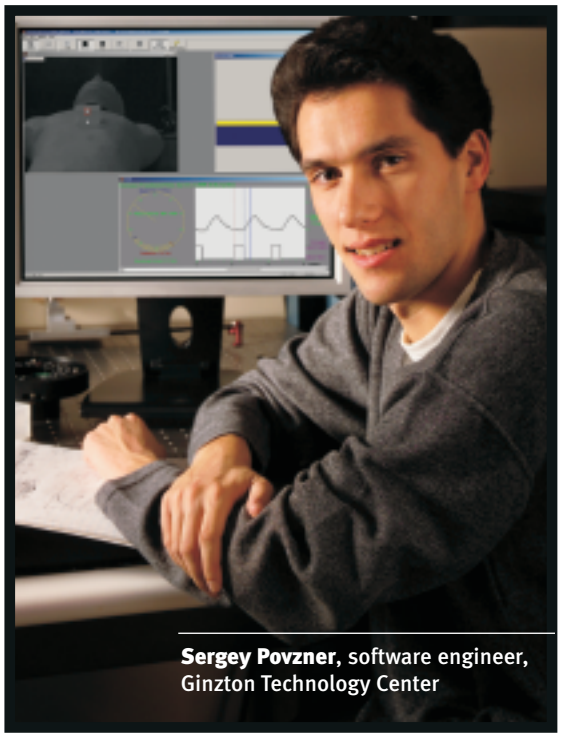
PUSHING THE TECHNOLOGICAL ENVELOPE

Digital X-ray imagers. *Prostate targeting using implanted, radiopaque marker seeds. Volumetric cone-beam CT (3D) and respiration-synchronized (4D) imaging and treatment. These are some of the challenging problems that scientists at Varian's Ginzton Technology Center (GTC) have tackled recently. The results of their work turn up in new product offerings from Varian Medical Systems.*



Sergey Povzner, software engineer, Ginzton Technology Center

Varian's GTC research and development organization serves as the company's incubator for new or so-called "disruptive" technologies that can create significantly enhanced capabilities for Varian's customers.

"We work to create growth opportunities for Varian Medical Systems by developing technologies that eclipse current capabilities in radiation therapy and X-ray imaging or that lead to entirely new businesses," says George Zdasiuk, PhD, vice president and chief technology officer at Varian and director of the GTC. "A disruptive technology is a new, more cost-effective way of accomplishing something."

> "We create growth opportunities by developing technologies that eclipse current capabilities."
>
> *George Zdasiuk, PhD, Ginzton Technology Center*

TURNING RESEARCH INTO REALITY

Headquartered in Mountain View, California, with a staff of about 45, the GTC has existed since the 1960s when it was known as Varian's Central Research Department. The organization's mission is to explore new scientific frontiers and push the technological envelope in search of answers to the question: *What's next?*

"One of our main jobs is to take as much risk as possible out of a new technology," Zdasiuk says. "We work with Varian's marketing and engineering teams and their customers to investigate a promising idea and assess whether it one day will result in a meaningful product or service."

Probably the best example of a seedling technology that GTC researchers helped nurture into a commercial product is the flat-panel X-ray image detector. "We partnered with Xerox PARC researchers in the early 1990s to develop the early prototypes," Zdasiuk says. "Working with Varian's engineering department, we were able to incorporate this technology into the world's first FDA-cleared amorphous-silicon-based portal imaging product." Today, Varian's flat-panel imagers have been incorporated into a wide spectrum of products (see story on page 14).

GTC scientists have also been instrumental in the development of cone-beam computed tomography (CT), which can create three-dimensional images of tumors and surrounding healthy anatomy. Cone-beam CT technology has now been incorporated into Varian's Acuity™ simulator and also the On-Board Imager™ accessory to the Clinac® and Trilogy™ accelerators, ushering in a new age of image-guided radiation therapy (see story on page 6).

WORKING ON WHAT'S NEXT

GTC researchers helped develop the RPM™ respiratory gating system (see story on page 9). As part of the next step in Varian's initiative for image-guided radiation therapy, GTC researchers are now working to develop a new generation of motion-tracking tools using X rays to monitor tumor movements in real time.

The GTC is also engaged in a research effort encompassing the use of radiation-activated chemical agents that can enhance radiotherapy outcomes as well as the use of radiation to enhance therapies involving genes or cancer-killing chemical agents.

"Right now, we're focused on tracking soft tissue and dealing with anatomical distortion. And we hope to improve targeting further using biochemical markers and functional images that show where the cancer really is located," Zdasiuk says. "An important role for GTC is to develop the technology that will analyze images and extract information that oncologists can act upon." ●