



# Modernizing MEDITATION

**Researchers create a virtual environment to teach and enhance meditation.**

by JANE M. SANDERS

It took a 3D scientific visualization of the arterial tears and plaque buildup caused by high blood pressure for Diane Gromala to fully understand why she should reduce her stress level.

She turned to meditation for help and not only found that it reduced her stress, it also became the only treatment that systematically worked to deal with the chronic pain for which her doctors can provide no cure.

"I was resistant to the idea at first because it seemed to suggest that I was the problem," says Gromala, an associate professor in the Georgia Institute of Technology's School of Literature, Communication and Culture. "If I could just relax, then it would be all right. I wondered if meditation could do anything.... It does work, though, because it forces one to focus in precise detail on how one's body works. You can reconfigure your sense of how your body works and physically change it to some degree."

Now a 15-year veteran of meditation and convinced of its benefits, Gromala has collaborated with colleagues Larry Hodges and Chris Shaw in the Georgia Tech College of Computing on a project that may make meditation more appealing. The researchers

**Diane Gromala, associate professor in the Georgia Institute of Technology's School of Literature, Communication and Culture, is collaborating with computer scientists on a virtual meditation chamber.**

PHOTO BY GARY MEERK



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**"Meditation chamber" users wear a head-mounted display and clip-on sensors for gathering biofeedback information, such as respiration and pulse. Computer science Professor Larry Hodges collaborated with colleagues Diane Gromala and Chris Shaw to develop the virtual-reality based technology.**

and their students have created a virtual reality-based "meditation chamber," which they have field-tested and are now refining for potential commercialization.

In its current form, the program is a 15-minute virtual experience in relaxation techniques and meditation. Users wear a head-mounted display with audio and video that guides them through a series of sunset and moonrise scenes and muscle relaxation exercises. The system also monitors the users' respiration, pulse rate and sweat gland activity (a measure of calmness) to provide real-time biofeedback regarding the effectiveness of the virtual experience.

"This project started as a support system for doing meditation," explains Larry Hodges, a professor of computing and virtual reality expert, who is leading the research team. "... Some people find it very easy to see in their head whatever is the image they want to visualize. But some people have a very difficult time with this, so having visual images to look at and the audio helps a lot."

Also, the added benefit of biofeedback allows the program to modify the user's experience based

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on what their body is doing. "When the sun is going down and the moon is going up, the actual timing of that depends on how your body is relaxing," explains Hodges, also a veteran meditator. "If you're having a hard time, the program gives you a chance to start over. It actually says, 'Let's try again.' "

Researchers demonstrated the meditation chamber for almost 500 attendees at SIGGRAPH, the preeminent graphics conference held in Los Angeles in August 2001. With four booths, the researchers were booked for a week doing 20-minute individual demonstrations for people in the arts, animation and academics. Researchers are now analyzing biofeedback data from those demos and are also reviewing questionnaires completed by participants.

"From the anecdotal evidence people offered at SIGGRAPH, we found that people new to meditation thought it was great," Gromala says. "Even the computer scientists who were really cynical about it actually saw the benefits of the meditation chamber and thought it worked. They were really enthusiastic about it."

Researchers believe the meditation chamber's greatest value will be as a training tool and for delivering feedback to meditators of any experience level. They are now gathering information from clinical psychologists around the country who are offering the meditation chamber experience to their patients. The psychologists are customers of Hodges' Atlanta-based company, Virtually Better, which has an exclusive license to produce several virtual reality-based therapeutic technologies developed at Georgia Tech by Hodges and his colleague Barbara Rothbaum, a professor of psychiatry at Emory University and co-owner of the company.

Hodges believes patients who might not otherwise try meditation will embrace the virtual environment to learn and practice it. "If you read the medical literature, you see that the positive effects of regular meditation are undisputable," he says. "The problem is that people don't do it because it requires discipline. You have to make the time in your life to do these things.

"This is where the virtual environment comes in. It gives the structure to lead you through meditation, not only the audio cues, but also the visualizations," Hodges adds.

From a research standpoint, Shaw says: "The meditation chamber may be useful in situations where you want a standard exposure to a relaxation therapy that is timed relatively precisely. It may form a basis for comparative studies of relaxation."

Researchers hope to complete a second-generation version of the meditation chamber this summer based on feedback from the SIGGRAPH demos and psychologists' trials. It may expand to a 20- to 30-minute, more detailed and effective meditation experience.

"We'd like to refine it so your biofeedback is more obvious and continuous," Gromala says. "The tough problem in a multimedia realm with multiple inputs is which one you pay attention to. It's difficult in meditation because you want to block out any input. So to continually have graphs and charts being output is not a wise idea. So we're looking at when and how to give people feedback in real time. Maybe it will be a haptic device that you squeeze when you want the feedback."

Also, to give the program wider appeal, researchers plan to make the second version as neutral as possible in terms of audiovisual inferences to various meditation traditions. And they plan to give it a more inviting name, such as "the relaxation environment."

When the meditation chamber is ready for consumer use, Virtually Better will pursue three markets. One is its current target customer — clinical psychologists already using virtual environments and/or biofeedback for treatment. Another market is health spas, corporate wellness centers or even airport-based booths. The third, and perhaps largest, market is the home- and/or office-based consumer, who would run a shorter, PC-based version of the program that might include simple biofeedback.

Hodges estimates that the software might cost around \$5,000 if sold to smaller markets, such as therapists. But a PC-based version for a large market would be much less expensive. If Virtually

Better pursues this market, it would sublicense the technology to a distributor, Hodges adds.

Gromala believes the desktop version of the meditation chamber would even appeal to veteran meditators like her. "It would give me a sense of ambient time and cues," she explains. "When you meditate, even if you're experienced, it's still easy to be distracted. The meditation chamber will keep you focused." **RH**

■ For more information, contact Diane Gromala, School of Literature, Communication and Culture, Georgia Tech, Atlanta, GA 30332-0165 (Telephone: 404-385-1496) (E-mail: [diane.gromala@lcc.gatech.edu](mailto:diane.gromala@lcc.gatech.edu)); or Chris Shaw, College of Computing, Georgia Tech, Atlanta, GA 30332-0280. (Telephone: 404-894-6328) (E-mail: [christopher.shaw@cc.gatech.edu](mailto:christopher.shaw@cc.gatech.edu)). To read more about the meditation chamber experience, see <http://gtresearchnews.gatech.edu/reshor/rh-ss02/rlinkss02/med-experience.html>.



IMAGE COURTESY OF DIANE GROMALA

**The meditation chamber's creators describe the program as a blend of Eastern and Western meditation traditions.**

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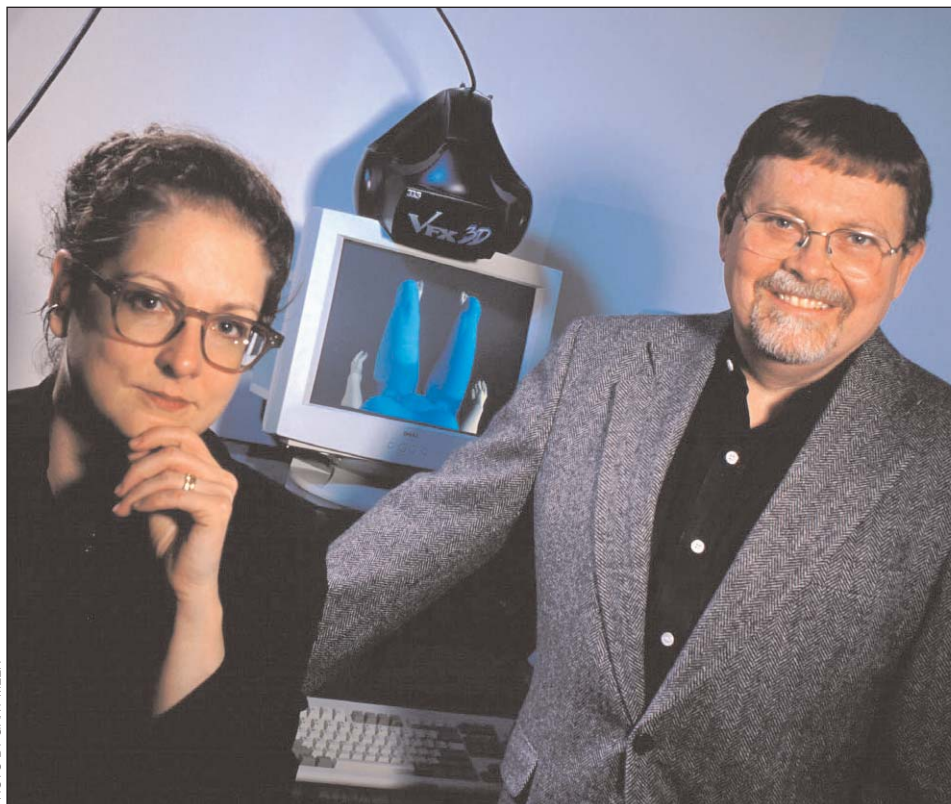


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