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News Release

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FOR IMMEDIATE RELEASE

SDSU Researcher Gets National Science Foundation Grant to Study Ozone's Effectiveness Against Anthrax

SAN DIEGO, Wednesday, April 24, 2002 — Mirat Gurol and her colleagues at San Diego State University received a \$100,000 research grant from the National Science Foundation to study ozone's effectiveness at fighting anthrax, the most feared biochemical terror agent.

This one-year study will define the parameters for ozone technology to combat bioterrorism through decontamination of enclosed spaces, like the U.S. Senate buildings and other prominent national locations that have been subject to anthrax exposures or threats since the September 11 terrorist attacks against the United States. The results will enable the industry to ready the technology within a short period of time for full-scale applications in treatment of anthrax-contaminated buildings.

"It's not a matter of whether or not it will work, because we know that ozone is the best weapon to fight anthrax," said Gurol, a mechanical engineer. "The real question we have to answer is under what conditions will ozone work best? What should the concentration be? How long does it need to be administered?"

Dr. Esin Gulari, NSF assistant director for Engineering, said, "Science and engineering lay the foundation for the technologies needed to address homeland security needs. The National Science Foundation is engaged in supporting both rapid and long-term responses."

The NSF approved the grant under the Small Grant for Exploratory Research Program, which is designed to fund high priority research, especially as it pertains to homeland defense.

Ozone is a strong disinfectant in both gaseous and water phases. Gurol said it is far more effective against anthrax than other available disinfectants and has fewer side effects. For example, chlorine dioxide, which was used recently three times in multiple sequences in the U.S. Senate building to inactivate anthrax spores, is produced from pressurized chlorine gas under relatively unsafe conditions, and leaves toxic residues

for weeks. However, ozone is produced from oxygen by an on-site ozone generator, and it safely decomposes back to oxygen, leaving no residual after the process is terminated.

While electronic or ultraviolet radiation is suitable for killing anthrax spores in the mail, Gurol said it is not a viable choice to disinfect a room as it must directly hit anthrax spores to be effective. Conversely, ozone gas is capable of diffusing into crevices and difficult-to-reach areas in buildings where anthrax spores might settle.

Gurol, with her students and research associates, including Dr. David Lipson of the SDSU Biology department, will investigate the inactivation of an accepted anthrax simulant, *Bacillus subtilis* spores, in a specially designed ozone chamber. They will test its effectiveness on different surfaces, including various types of carpeting and vinyl floor material, textile, wood, multiple types of plastics and plaster. Data will be gathered on the required ozone concentrations and contact times to produce desired levels of inactivation of the spores, the ozone demand of different type of surfaces, and the effect of humidity, level of hydration of spores, and temperature on the inactivation rates of the spores. The effect of ozone on the surfaces for collateral damage also will be investigated visually and microscopically.

Gurol is an expert on the fundamentals and applications of ozone for decontamination of water, wastewater, soil and air. Her research in the last 25 years has resulted in more than 60 publications and two patents. She has been a member of the editorial board of *Ozone: Science & Engineering* since 1984. She is also a board member and chair of the technical advisory committee of Pure-O3-Tech, a leading ozone company located in Escondido, Calif.

San Diego State University is the oldest and largest higher education institution in the San Diego region. Since its founding in 1897, the university has grown to offer bachelor's degrees in 78 areas, master's degrees in 61 areas and doctorates in 13 areas. Students participate in academic curriculum distinguished by direct contact with faculty and an increasing international emphasis that prepares them for a global future. For more information, visit www.sdsu.edu.

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