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## Predicting the weather and getting it right

by Brenda McDonald

If there's one thing more common than interest in the weather, it's criticizing a weather forecast that's wrong.

It's the job of **Alexander "Sandy" MacDonald**, '67 Math/Physics, to help make sure those forecasting the weather get it right. He is the director of the Earth System Research Laboratory in Boulder, Colo., and first Deputy Assistant Administrator for NOAA (National Oceanic and Atmospheric Association) Research Laboratories.



COURTESY OF A. MACDONALD

"NOAA runs big computer models four times a day, and all the forecasters across the country use these models to make their forecasts," he said. "The computer model is the engine of prediction. In the 1960s, weather models were bad, computers were so slow that the models were very crude. Now there is legitimate skill in weather predictions, but we still have a long way to go."

It was during his doctorate work at the University of Utah when MacDonald made the connection that computers were the key to weather prediction. Utah was also where he fueled his passion for research.

After he left the University of Utah, he started with NOAA in 1975 as a National Weather Service meteorologist in Salt Lake City.

"Throughout most of my career I did my management work during the day and came home at night to work on a weather prediction model on my home computer," he said. "That was my evening entertainment."

His love of research and his natural curiosity set the stage for a patent he received in 2005 for "Projecting Images on a Sphere."

The object is a six-foot sphere that is a unique way of viewing scientific data in the round, like a motion picture on a sphere. MacDonald made the prototype in his garage focusing a video projector on a beach ball that he painted white. The sphere is currently featured in museums across the country.

He came to MSU because of its reputation in math and physics.

"MSU was a fabulous learning experience for me," he said. "The standards were high and the teachers good."

A large piece of the work that NOAA does is monitoring the climate globally.

"The big thing I'm worried about is climate change," he said. "I've been doing this work for 15 years and the climate system is extremely complex. The globe is warming without question, and it's highly likely that humans are the cause. The Arctic ice may be gone this century, and that will change our climate immensely."

In 1993, years before former vice president Al Gore's focus on global warming, MacDonald was

tapped to work with Gore to develop the GLOBE program. The program used school children around the world to collect climate data in the hope that it would help to understand the earth.

"It was a fascinating time," he said. "I wrote the plan and worked with the administration and Congress to get it funded."

MacDonald secured \$15 million in congressional funding for the program. His current work also takes him to the halls of Congress.

"I was on the hill the other day briefing Sen. Barb Mikulski, D-Md., on using unmanned aircraft for better weather and climate prediction," he said.

MacDonald lives in Boulder with his wife **Susan (Hayes)**, '67 Art Ed, and their three children. 🐾

