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Prof.'s work gives new look at climate change

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Posted: 3/17/08

He may not be working for NASA or the Department of Defense, but one Brown professor can predict the course of climate change with his physics equations.

During a March 11 presentation at an American Physical Society conference in New Orleans, Professor of Physics Brad Marston introduced his work on using statistical models to forecast climate change, an approach that may facilitate the accurate prediction of some of the effects of global warming.

Marston is working to produce a set of equations that will more directly assess climate patterns. He said scientists traditionally use weather models that run for an extended time into the future and take the averages of those outputs to assess how the climate is going to change.

"That seems like an inefficient way to think about climate because you have to put it all in this really large supercomputer and follow every little detail of the weather to eventually calculate averages," Marston said.

Marston applies statistical physics and quantum mechanics to create equations that, in his view, reach the average properties to get a more accurate view of climate change.

Marston's work focuses on climate directly rather than using weather models. He said that people often confuse the two.

"Climate is really the average weather, and we can't predict the weather more than a few weeks in advance," Marston said. "But we can predict the climate because it is statistical. It's something that is much more robust than the weather."

Marston said his research is focused on creating simple models that do not immediately answer practical questions of climate change. He said he hopes that, if his work produces accurate models, other climate groups and researchers will apply his methods to climate models.

But Marston's work won't necessarily predict global warming. Climate change covers global warming and other aspects of the climate, such as precipitation changes and geographical patterns, said Professor of Biology Osvaldo Sala, director of the Center for Environmental Studies and the University's Environmental Change Initiative. He said researchers at Brown focus on studying climate change to address the very specific problem of global warming, which concentrates on rising temperatures and

their effects. Since Marston's research covers climate change, it may not give a comprehensive view of the future of global warming.

"In a warming world, what we really want to know are better regional predictions of climate change - what will happen to New England winters, for example," Marston said. "Probably, the models do a pretty good job of describing the average temperature of the Earth but do a poorer job of answering the questions about where California will be experiencing a shorter drought."

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