



# Daniel M. Sigman

GRFP Recipient: 1991

*Undergraduate Institution:*  
B.S. with Distinction, 1991,  
Stanford University

*Graduate Institution:*  
Ph.D. 1997, Massachusetts  
Institute of Technology/Woods  
Hole Oceanographic Institution  
Joint Program in Oceanography

*Graduate Field of Study:*  
Oceanography, Geochemistry,  
Paleoclimate

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*Current Position:*  
Dusenbury Professor of  
Geological and Geophysical  
Sciences, Department of  
Geosciences, Princeton  
University

## RESEARCH INTERESTS //

Daniel M. Sigman studies the global cycles of biologically active elements, in particular, nitrogen and carbon. He also investigates the history of these cycles in order to understand the causes of past changes in the atmospheric concentration of carbon dioxide, the role of this greenhouse gas in the waxing and waning of ice ages, and the ocean's response to climate change. To advance these efforts, Sigman has developed novel isotopic techniques; for example, to analyze the traces of organic matter trapped within the walls of microscopic fossils.

## A FOND MEMORY FROM MY EXPERIENCE AS A FELLOW //

"I remember, during my first summer in Woods Hole, struggling with my ocean carbon cycle model; the results from the model did not make sense. There had to be an error in the computer code, but I could not find it. Finally, while out for a run, I realized that the results were correct; it was my expectations that had been wrong. This was the first of many times in my research career that the workings of nature have caught me by surprise, proving far richer than I had imagined."

## HOW I BENEFITED FROM THE GRF PROGRAM //

"While my graduate advisor was dedicated to providing me with as much research flexibility as possible, the GRF program was fundamental to my freedom to pursue the work that excited me most and suited me best. The beginning of my graduate school career was a brief time full of decisions that largely defined my current research path. Thus, of all the times to be spared year-to-year financial vagaries, this was the most important."

### BROADER IMPACT OF MY WORK ON SOCIETY //

“As part of my laboratory work, I have sought to develop techniques using the stable isotopes of nitrogen that expand the analytical toolbox available to all fields of inquiry, basic and applied. For example, these techniques are now used in agricultural science and environmental monitoring. In my work on global biogeochemical cycles, I have two goals regarding society at large. First, I hope to contribute to the realization among the public that the natural world, while complex, is systematic and can be analyzed and understood. Second, in my studies of the modern and past environment, I seek to provide new types of information for improving predictions of how the global environment, and the ocean in particular, will respond to intensifying human activities.”

### MY PROFESSIONAL WEBSITE //

<http://www.princeton.edu/sigman>

### AWARDS/ HONORS //

- Science Innovation Award (Heinz Lowenstam Medal), European Association of Geochemistry (2012)
- MacArthur Fellowship (2009)
- Faculty Early Career Development (CAREER) Award, National Science Foundation (2005)
- Friedrich Wilhelm Bessel Award, Alexander von Humboldt Foundation (2004)
- Macelwane Medal, American Geophysical Union (2004)
- Phi Beta Kappa (1991)

### POSITION PROFILE //

- 2009-present - Dusenbury Professor of Geological and Geophysical Sciences, Princeton University
- 2006-09 - Professor of geosciences, Princeton University
- 2000-06 - Assistant professor of geosciences, Princeton University

