**Professional Synopsis for Kenneth M. Golden**

Kenneth M. Golden is a Professor of Mathematics and Adjunct Professor of Bioengineering at the University of Utah. His scientific interests lie in sea ice, climate change, composite materials, phase transitions, inverse problems and remote sensing. He has published papers in mathematics, physics, geophysics, oceanography, electrical engineering, mechanical engineering, and biomechanics journals, and given over 400 invited lectures on six continents, including three presentations in the US Congress.

Dr. Golden has journeyed seven times to Antarctica and ten times to the Arctic to study sea ice and its role in the climate system. His theoretical research focuses on using the mathematics of multiscale composites and statistical physics to analyze sea ice properties and processes. This work is helping to advance how sea ice is represented in climate models, and improve projections of the fate of Earth's ice packs and the ecosystems they support. In particular, Golden has studied the microphysics of sea ice, developing mathematical theories of fluid flow through the porous brine microstructure, which mediates key climatological and biological processes in the polar marine environment. Moreover, he has developed theories and methods to help electromagnetically monitor such processes in sea ice, to extend remote sensing capabilities. He has also conducted extensive field experiments in the Arctic and Antarctic which both aid the theory and corroborate the predictions. Recently Golden has been applying mathematical ideas used in studying the microphysics of sea ice to much larger scale phenomena, such as the evolution of melt ponds on the surface of Arctic sea ice. They control the albedo or reflectance of sea ice during late spring and summer, a key parameter in climate modeling.

In high school Golden became fascinated by the polar regions, studying satellite images of sea ice at NASA/Goddard Space Flight Center. As an undergraduate he worked at the US Army Cold Regions Research and Engineering Laboratory on using radar to gauge sea ice thickness, while completing degrees in Mathematics and Physics at Dartmouth College. Dr. Golden received his Ph.D. in Mathematics at the Courant Institute of NYU in 1984. Prior to moving to Utah in 1991, he was an Assistant Professor of Mathematics at Princeton University, and a National Science Foundation Postdoctoral Fellow at Rutgers University in mathematical physics. In 2011 Professor Golden was selected as a Fellow of the Society for Industrial and Applied Mathematics for "extraordinary interdisciplinary work on the mathematics of sea ice," and in 2013 he was an Inaugural Fellow of the American Mathematical Society. Professor Golden received the University of Utah's highest award for teaching in 2007 and for research in 2012. In 2014 Golden was elected a Fellow of the [Explorers Club](http://www.explorers.org/index.php/about/about_the_club). His polar expeditions and mathematical work have been covered in over 40 newspaper, magazine, and web articles, including profiles in Science, Science News, and Scientific American. He has also been interviewed numerous times on radio and television, and featured in videos produced by National Science Foundation and NBC.

**Suggested Questions**

1. What role does sea ice play in Earth’s climate system?
2. How is math being used to study sea ice?
3. Why has melting in the polar regions so dramatically outpaced climate model projections and how is math helping to improve the projections?
4. Does the math you develop to study sea ice apply to other areas of science?
5. How did a mathematician get involved in sea ice and polar expeditions? What was the most exciting moment during your polar expeditions?