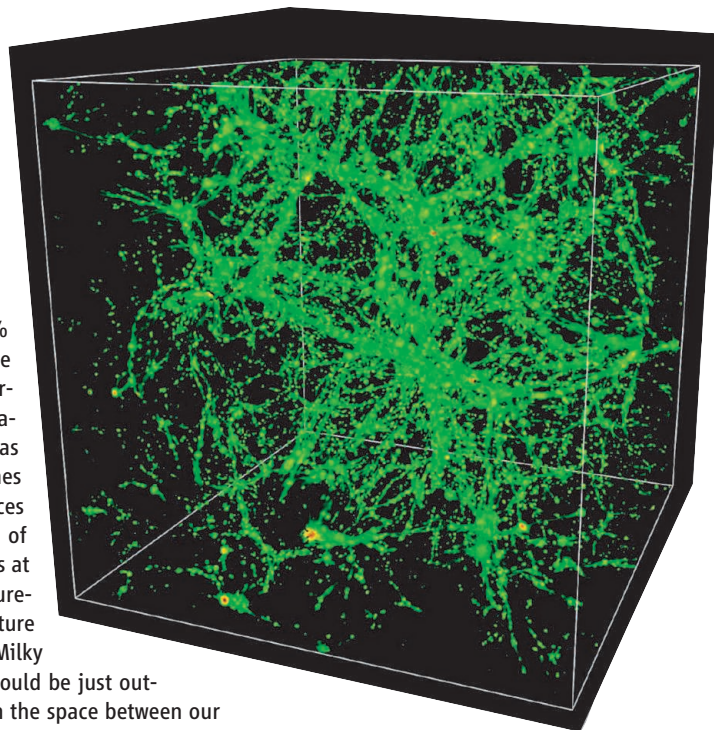


ASTRONOMY

## Looking for Missing Matter

In the present-day universe, galaxies account for only 10% of baryonic matter (the protons and neutrons that constitute ordinary matter). The rest is expected to be found in the intergalactic medium, mostly in the form of diffuse gas at temperatures ranging from 100,000 to 10 million K. To look for this gas around our galaxy, Gupta *et al.* searched for absorption lines from highly ionized gas in spectra of bright extragalactic sources obtained with the Chandra X-ray Observatory. The detection of both O<sub>vii</sub> and O<sub>viii</sub> absorption lines implies the presence of gas at temperatures around 1 million degrees. Column density measurements combined with emission measurements from the literature indicate that the gas extends over a large region around the Milky Way and is 10 billion times as massive as the Sun. This gas could be just outside the galaxy, in the circumgalactic medium, or anywhere in the space between our galaxy and its closest neighbors. — MJC

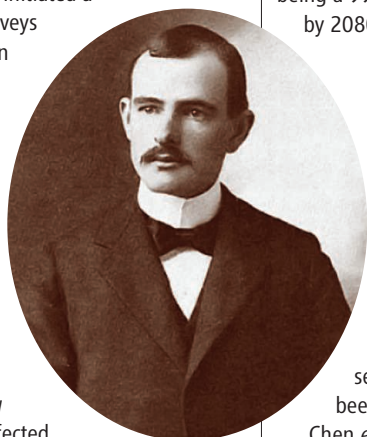
*Astrophys. J.* **756**, L8 (2012).



ECOLOGY

## Humans Mitigate Climate Change Effects

In the early 20th century, Joseph Grinnell, who cofounded the University of California's Museum of Vertebrate Zoology, initiated a series of biological surveys throughout the western United States. He and his colleagues could not have predicted the extent of climate change that we are experiencing in the 21st century, but their survey data have proven to be invaluable. Morelli *et al.* have used these data to determine how climate change has affected Belding's ground squirrel, a mountain meadow specialist. From resurveys of 74 of the same sites in California's Sierra Nevada Mountains, which were originally sampled between 1902 and 1966, they found that 31 of the ground squirrel populations have been extirpated; in addition, there was no evidence for their having colonized nearby suitable habitats. Next, the authors examined climate, landscape, and land-use data to identify causal factors for the observed range contraction and found that winter cold was the strongest positive predictor of population persistence: Both more frequent rain-snow events and a thinner insulating snow



pack are known to harm montane mammals. Interestingly, they found a buffering effect of human activity, such as camping and agriculture, which locally increase food and water availability. Models based on these causal factors predict a continuing contraction of Belding's ground squirrel populations, with the most extreme outcome being a 99% loss of suitable habitat in California by 2080. — SNV

*Proc. R. Soc. London Ser. B.* **279**, 10.1098/rspb.2012.1301 (2012).

PSYCHOLOGY

## Determinants of Success

As the election races in the United States enter the home stretch, candidates have begun to appear regularly on television broadcasts. Viewer judgments of competence, based on seeing the faces of candidates, have been shown to predict election outcomes. Chen *et al.* have extended this approach to ask whether judgments of candidates' social competence—defined as the capacity for effective functioning in social interactions—are related to outcomes in an individualistic society (the United States) and a collectivist society (Taiwan). They replicate the earlier result that a judgment of competence does predict winners in the United States, as it does in Taiwan, and they find that judgments of social competence are also predictive, though only for elections in Taiwan. Correlating measures of individualism and collectivism from these study participants along with their own voting choices demonstrated that competence was weighted more heavily by more

individualistic voters; similarly, social competence was linked to the choices that collectivist voters made. — GJC

*J. Exp. Soc. Psychol.* **48**, 10.1016/j.jesp.2012.07.006 (2012).

EDUCATION

## Sustaining Innovative Teaching

Recent emphasis on improving science education has led to the development of high-quality research-based instructional strategies (RBISs). Henderson *et al.* analyzed the results of a Web survey of U.S. physics faculty in order to better understand the impact of RBISs and to identify any barriers to their use. Results showed that 12% of faculty members are unaware of RBISs, 16% are aware of them but have not tried any, and 23% have tried RBISs but have since discontinued their use. Further analysis indicated that reading education journals, attending workshops focused on teaching, having an interest in RBISs, and being female significantly correlated with knowledge and/or use of RBISs, whereas faculty age, institutional type, percentage of job related to teaching, and large class sizes were not found to be barriers to the use of RBISs. Taken together, these results suggest that although general dissemination strategies and professional development efforts create awareness and motivation to try RBISs, more support, especially related to dealing with student complaints, inability to cover the appropriate amount of content, and weaker-than-promised student outcomes, may be needed for faculty to implement and continue to use RBISs. — MM

*Phys. Rev. ST Phys. Educ. Res.* **8**, 020104 (2012).