EDITED BY KRISTEN MUELLER AND JAKE YESTON

ECOLOGY

The Power of Pollination

In the context of contemporary climate change, there has been a resurgence of interest in understanding the factors and processes that influence the geographical distribution of species. Most research on this question, not surprisingly, has focused on physical factors—particularly temperature and precipitation. The influence of biotic factors and species interactions such as mutualism on distributions has received less attention.

Moeller *et al*. examined how the strength of a mutualistic interaction varied across a species' range. The herbaceous plant *Clarkia xantiana*, which is endemic to California, is pollinated by a suite of insect species. A study over 4 years showed a consistent decline in the abundance of pollinators from the center to the edge of the plant's geographic range, and experimental manipulations of the plants confirmed that reproduction at the range limits was limited by pollen availability and was not compensated for by self-pollination. Although the ultimate cause may be climatic (the pollinators' abundance itself being influenced by precipitation), this study provides new insight into the multiple factors that control biogeographic patterns. — AMS

Ecology **93**, 1036 (2012).

EDUCATION

Automate to Educate

Science education reforms face a daunting challenge: How do we assess skills that cannot be easily automated or digitized? Nehm *et al.*, examined the capacity of the software package Summarization Integrated Development Environment (SIDE) to automatically analyze and score written explanations of evolutionary change. Using an online response system, 2260 writing samples from 565 undergraduates with varying levels of evolution knowledge were collected and graded by two human raters. Human-scored responses were used to train SIDE software, and human- and software-scored samples were compared. SIDE performance was found to be most effective when used at the individual item level; that is, SIDE was most effective when it was trained with the same type of items that it subsequently scored. SIDE was found to be advantageous over current commercial text analysis programs, because it required less time and financial investment. Because SIDE can be used in areas outside of biology, it has potential to become an important tool for educators as science education moves to include more authentic problem-solving tasks. — MM

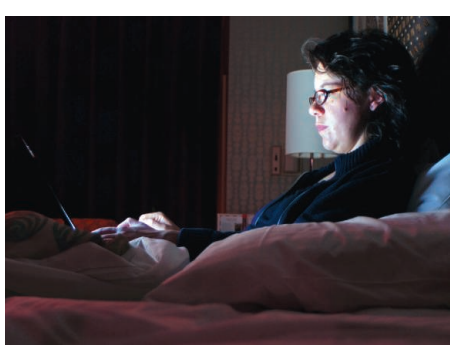
J. Sci. Educ. Technol. **21**, 183 (2012).

PHYSIOLOGY

Working on Borrowed Time

Many of us are sleeping less than we used to because of the demands of work and the enticements of the Internet, television, and digital social networking. It is also true that we are increasingly sleeping outside of the times normally dictated by our internal circadian clocks (our "chronotype"). This difference between circadian and social clocks has been termed "social jet lag."

Roenneberg *et al.* have analyzed data from the Munich ChronoType Questionnaire (MCTQ), which assesses sleep behavior on work and free days. They calculated that one-third of the 65,000 European participants in the MCTQ suffered from at least 2 hours of social jet lag, with teenagers suffering the largest deficiencies. Reduced amounts of sleep are known to be correlated with increased body mass index (BMI) and obesity—the results showed that social jet lag is an equally important predictor



of BMI. Furthermore, the average chronotype has shifted later into the night over the past decade, exacerbating social jet lag. This change in chronotype has probably been driven by a weakening of the external cues that normally entrain our circadian clocks—increasing numbers of people living and working in cities being exposed to less light during the day and more light during the night, and spending less time outdoors. People who regularly sleep outside of their circadian window can show an imbalance in glucose metabolism normally associated with type 2 diabetes. — GR

Curr Biol. **22**, 10.1016/j.cub.2012.03.038 (2012).

APPLIED PHYSICS

Graphene's Plasmon Prospects

The length scales pertaining in optics and nanoelectronic circuitry differ by orders of magnitude. Combining the two offers the potential of exploiting the ultimate in transmission speed (the speed of light) with the tens of nanometers scale available to state-of-the-art chip fabrication facilities. Plasmons are light-induced collective electronic excitations usually found confined to the near-surface region of metals, and it is this deep subwavelength confinement that is thought to offer the potential for providing that bridging capability. However, plasmons tend to suffer from short propagation lengths, making plasmon circuitry design a challenge. Thongrattanasiri *et al.* explore the possibility of using graphene as a platform to support the plasmonic excitations. Their numerical work shows that the longer lifetime of the plasmonic excitations in graphene, taken together with the ability to alter the transport properties via patterned electrostatic gating of the material, should provide a promising route toward realizing a viable plasmon circuit technology. — ISO

Appl. Phys. Lett. **100**, 201105 (2012).

CREDITS (TOP TO BOTTOM): JOE DECRUYENAERE; THINKSTOCK

Published by AAAS