Governance by the People

Real-world challenges in how to manage public resources have frequently been met by bottom-up collective action. One area in which researchers have yet to reach consensus is the relation of group size to collective action and resource outcomes. Yang et al. use data gathered over many years from the Wolong Nature Reserve in Sichuan Province, China. Within the reserve, the administrative bureau of the National Forest Conservation Program had assigned forest parcels to groups composed of 1 to 16 households. Each group decided on a strategy for monitoring illegal activity, such as logging, and the bureau conducted assessments of how much activity had occurred. Group size had a U-shaped relation to the monitoring efforts per household and on increasing forest cover. Intermediate group sizes of 8 or 9 households were optimal in balancing between two opposing factors: free-riding (the tendency to let others in the group do the work) and within-group enforcement. These findings, as well as the demonstration that stronger social relationships within the groups and with local leaders promoted collective action, suggest strategies for effective governance. — BJ

Compressively Sensing Ghosts

The storing and processing of images can place large overheads on the hardware and software required to identify targets within each frame. Compressive sensing exploits the fact that much of an image is redundant, or sparse, in terms of the information it contains. Specially designed lenses and filters can sift through the large pile of data and automatically pick out the targets the information it contains. Specially designed cameras can help guide in interdisciplinary task creation and revision. — MM

Interdisciplinary Check

Interdisciplinarity has been increasingly called for in U.S. science education, but it is not always clear how to best integrate it into the curricula. Gouvea et al. considered the learning objectives of interdisciplinary science courses and created a framework intended to aid in redesigning tasks to better align with these learning objectives. They tested the framework in an introductory physics course that connected with both biology and chemistry. Tasks were divided into those with an imbalance in the interaction between the disciplines, those applying a reasoning strategy or technique from one discipline to another, and those bringing ideas from two separate disciplines together. Using a theoretical analysis of interaction between disciplines, the authors asked a series of questions about the degree to which each of the disciplines was represented in the tasks included in their curriculum, in addition to examining students’ written performance on homework and exams and analyzing videos and transcripts of students’ reasoning in group problem-solving settings. The results showed that the value of the framework lay not in its ability to characterize tasks in an interdisciplinary context, but rather in its being a tool that can help guide interdisciplinary task creation and revision. — ISO