

# INSIGHTS

## LETTERS

### NEXTGEN VOICES

## *Promoting human rights through science*

Inspired by the work of the AAAS Science and Human Rights Coalition (AAAS is the publisher of *Science*), we asked young scientists this question:

**Describe how applications of knowledge in your field (information, methodologies, services, and/or products) could support civil, political, economic, social, or cultural rights.** We received responses

from scientists around the world representing a variety of fields. From those protecting health and access to health care, to those working toward a safe and sustainable environment, to those concerned with citizens' rights to the best information available, respondents passionately described the benefits that their research can bring to vulnerable people. Excerpts of their responses are printed here. —**Jennifer Sills**

### Right to food

Plant pathology is an amalgamation of scientists—including diagnosticians, biochemists, and geneticists—working together to eliminate or treat destructive diseases caused by pathogens that destroy food sources. Plant pathologists ensure food security by uncovering novel pathways, understanding infection strategies, and quickly identifying and treating pathogens found in the field.

#### **Lauren Segal**

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Poor communities have limited access to nutritious foods, increasing their risk for obesity and cancer. Thus, access to nutritious food must not be viewed as a luxury for the wealthy, but instead a fundamental right for all. Our experiences with anti-tobacco and other public health campaigns provide insight into viable strategies for diminishing the





Vulnerable populations, such as these Afghan children in Kabul, have the right to food and health.

contribution of poor nutrition to cancer. Revamping nutritional requirements in school cafeterias, taxing unhealthy foods, regulating advertising, running informational campaigns, and subsidizing fresh food are just a handful of policies that can help ensure the human right to food and good health.

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Climate change and population increases have put a lot of pressure on agriculture. Crop failures have put farmers under severe economic stress, often leading to suicides. Genetically modified crops, with enhanced yield and abiotic stress tolerance, will reduce hunger and ensure economic prosperity of farmers.

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## Right to health

Although there is often a desire for clear-cut guidelines in medicine, harvesting the power of urban bioethics, social services, education, and community outreach can help physicians consider the various factors influencing each patient's care. By engaging with the community, one can learn to better appreciate an individual's culture, worldview, and health practices. This culturally compelling care promotes better outcomes and supports each patient's cultural, civil, and social rights to health.

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Conventional medical practices can unintentionally aggravate health disparity. Many medical guidelines are derived from clinical trials without adequate numbers of minority participants. Because people of

different racial backgrounds have different genetic compositions, resulting in different drug metabolism rates and treatment responses, the underrepresentation of minorities in clinical studies affects their well-being. Precision medicine identifies individual patients' genetic makeup and environmental exposure and tailors treatments to their individual characteristics, thereby reducing health disparity and promoting population health.

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Most vaccines are administered in multiple doses to promote robust, long-lasting protection; however, such a schedule can be inconvenient, or even prohibitive, for individuals without easy access to health care. By better understanding how antigen presentation is translated into long-term immunity, immunologists can inform the design of simpler vaccines. Promising avenues include stronger adjuvants, slow-release vaccines, and oral vaccines for nonmucosal pathogens. With such innovations, we may look forward to a day when everyone benefits equally from biomedical discovery.

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Millions of people are affected by common health problems due to late diagnosis or inconsistent medical care. Many of those people do not have any access to hospitals or costly medical tests. Providing them with a wearable health sensor that keeps track of vital health signs would be a great step forward for personal well-being and public health.

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During disasters, individuals with chronic diseases or those at risk of developing health complications are often neglected for patients acutely affected by the disaster. Pharmacists are highly qualified to assist patients with chronic diseases. Inclusion of pharmacists in disaster health management helps provide timely, accessible health care to all patients requiring care—a fundamental human right.

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The human right to health is often not accessible to the most socially vulnerable. Evidence suggests that low socioeconomic status is a fundamental cause of health inequalities, underlying “classic” risk factors for chronic pathologies. Policies to improve the material lives and capabilities of families include interventions promoting reading to children, encouraging positive socioemotional skills in childhood, and redressing educational inequalities. These actions can contribute to health literacy and prevent trajectories toward poor health.

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The pharmacy profession, whether practice or science, must be based on the principle that medicines should be made for people and not for profit. Although some use research and development processes to justify the high prices of medicines, there are numerous loopholes in policies that are leveraged to inhumanely raise medicine costs until they are unaffordable for the poor. Pharmacists should work to build resilient health systems that protect the poor and promote equity.

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## Right to be remembered

When genocide occurs, mass graves of individuals are left behind with limited evidence of who they were. Forensic anthropologists can assist with forming a biological profile (estimation of ancestry, sex, age, and height) for a set of skeletal remains. This biological profile can then be applied to a Missing Persons database and narrow down the result output. As research and technology continue to evolve, the identity of deceased skeletal individuals can be found, ensuring security of person.

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## Right to information

Because communication channels between officials and civilians are blocked in China, in recent years Chinese citizens have increasingly resorted to social media as a means for expressing interest in polemical issues and engaging with sociopolitical mobilization. Interconnections between people on social media enhance the process of information dissemination, making it difficult for the Chinese government to delete posts, control information, and conceal facts. Social computing scientists can help to truly safeguard and expand

freedom of speech and freedom of the press under the current legal framework.

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The requirement to have a subscription (institutional or personal) to access published scientific data in a journal presents a barrier to people interested in science and research. An international consensus on moving toward open-access publishing has gained momentum. However, various limitations still hinder the dissemination of scientific knowledge. We are connecting researchers in the field of vascular research in a digital academic networking platform ([www.vascularphysiology.com](http://www.vascularphysiology.com)) so that we can share data and findings easily and make scientific publications truly open access—readily accessible to all regardless of the ability to pay.

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## Right to education

In 1983, the National Commission on Excellence in Education published a report stating, “All, regardless of race or class or economic status, are entitled to a fair



An exhibit in Washington, DC's Hirshhorn Museum shows a pattern composed of images symbolizing Chinese citizens' struggle against Internet censorship.



chance and to the tools for developing their individual powers of mind and spirit to the utmost." The field of educational research endeavors to achieve this mission by producing both quantitative and qualitative research to identify what works in education to improve outcomes and drive policy.

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## **Right to privacy**

Computer science tools and methods help ensure privacy while still allowing information to be shared. When people have a reasonable expectation of privacy and security, they are free to explore new ideas without repercussions. Computer science can help make people aware that they have rights in the first place.

#### **Joshua Isaac James**

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Computational social scientists have shown that digital footprints such as Facebook likes, language samples, and credit card or Web-browsing histories can reveal an individual's sexual orientation, political and religious views, intelligence, and personality. We urgently need domestic and foreign policies protecting the privacy of vulnerable populations at home and abroad.

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## **Right to a healthy environment**

Ecological research has demonstrated the importance of systems thinking. Systems thinking aims to understand the interconnectedness between parts of a system. Manipulating one part of system can have unexpected consequences. In ecological systems, removing just one specific species from a food web can affect the whole ecosystem. Similarly, human rights issues cannot be viewed in isolation. For instance, there is a well-established link between access to high-quality education for women and slowing population growth. Systems thinking is also clear in the three pillars of sustainable development: economic, environmental, and social. These pillars are not independent and are instead intricately linked to one another.

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Behavior analysis can assess and decrease undesirable behaviors and increase



An African giant pouched rat sniffs for traces of landmine explosives, which can then be cleared by authorities.

socially desirable behaviors. The field promotes health and civic rights by ensuring that people with disabilities have the right to health, safety, and education; by teaching preventive breast cancer self-examination; and by reducing smoking behavior. It promotes cultural rights by facilitating proenvironmental behaviors and by understanding the contingencies of domestic violence. It promotes safety by reducing traffic risk behaviors and training pouched rats to identify landmines.

#### **Fernanda S. Oda**

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Energy access is a gateway to attaining many of the other rights that are commonly discussed (health, safe housing, education, and sharing of information that fosters a healthy government). However, energy should not further perpetuate the climate change that is taking away the land, food, and security of many people in the world. Renewable energy research aims to fuel education, health, communities, and economies, while reducing catastrophic climate change.

#### **Hope Bretscher**

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There is an increasing body of evidence on the effect of urban nature on human health. Some services provided by urban nature have been recognized for a long time, such as its ability to mitigate flooding. Others are just being discovered, such as the effect of vegetation on mental health. This scientific work will enable city

leaders and planners to support the right to health in cities.

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## **Right to culture**

In the field of forest governance, many international agreements and varied stakeholders have come into play amidst the emerging scene of climate change mitigation. This has helped bring the discourse on forest, land, and carbon rights of indigenous and local people to the negotiation table. Entrusting power to the local people has been a major paradigm shift in the forest governance regime and is an important step toward supporting their cultural rights.

#### **Swati Negi**

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Neuroscience studies indicate that racial prejudices involve altered signaling in brain regions involved in empathy, which can be restored by cultural interventions such as increased racial contact or virtual reality training. We can apply this knowledge to screen community leaders for racism, educate that racism implicates atypical signaling in the brain and may have detrimental effects on health, and promote interracial empathy and harmony.

#### **Ali Jawaid, on behalf of the European**

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