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Innovation, International Collaboration Go Hand in Hand

By Stephen J. Toope and Alan I. Leshner

The global population explosion of the past century, unprecedented in human history, poses a thorny tangle of interconnected challenges. With the population expected to reach 9.3 billion by 2050, meeting human needs and addressing climate change will require science-based answers to urgent questions about food, energy, water, disease prevention and many other issues.

Increasingly, innovation will hinge upon international research collaborations as modern science becomes an ever-more global enterprise, transcending national boundaries. At the same time, strong, consistent support for basic as well as applied research will underpin scientific progress to improve human welfare.

By selecting Vancouver as the setting for the world's largest general scientific conference, the American Association for the Advancement of Science (AAAS) sought to celebrate multi-national collaboration as a critical ingredient for innovation. The meeting's theme, "Flattening the World: Building a Global Knowledge Society," set forth by AAAS President Nina Fedoroff, further highlights the importance of international research.

Knowledge flows across borders. Key advances—from wireless telegraphy and the discovery of life's genetic blueprint, to the development of penicillin and vaccines—take place all over the globe, often resulting from the collective brain power of many scientists working cooperatively. The late Michael Smith, a renowned University of British Columbia researcher, was born in England, moved to Vancouver in the 1950s, collaborated with U.S. colleagues to co-found a biotechnology company, and received the Nobel Prize in Chemistry in 1993. His development of a crucial genetic-engineering technique called site-directed mutagenesis made it possible to alter the DNA sequence of any gene.

Current Vancouver-based examples of international research abound: Simon Fraser University physicist Michael Vetterli, a TRIUMF scientist, will soon head to Geneva to chair an influential committee related to the ATLAS particle detector, which is probing the forces that have shaped the universe. Similarly, the work of the Perimeter Institute for Theoretical Physics is inherently global, involving researchers worldwide in the quest for a deeper understanding of the natural world. Special student training and international scholars programs at the Perimeter Institute help to encourage collaboration across disciplines and regions.

UBC faculty member Karen Bakker, whose AAAS presentation will take place February 17, exemplifies the current generation of scientists. An expert on a wide range of water issues, she is fluent in French and Spanish and has conducted research in Southeast Asia, southern Africa, Latin America and Europe.

Much of the responsibility for building and maintaining international research connections falls to research institutions and scientists. We must expand our international perspective whenever possible, join in multi-national projects, and serve as mentors when colleagues in developing nations ask for our help. One outstanding response to this challenge has been from Mitacs, the non-profit Canadian research consortium, whose Globalink program enables students from India, China, Brazil and Mexico to

conduct research at a Canadian university and meet leaders of Canadian industries. Through our universities, an array of mobility programs facilitates the loan of talented Canadian researchers and students to international markets, returning savvy global citizen-scientists. Mobility programs also enhance the country's status as a desirable proving ground for graduates from nations such as China and India.

Government, too, has a critical role, and in particular, by providing adequate, consistent support for basic science. Viewing innovation exclusively through the narrow lens of short-term economic outputs can close the door on crucial breakthroughs from basic research. Michael Smith's research was a prime example of the value of basic science: His fundamental investigations yielded practical results only after being paired with the applied research of Kary Mullis, who shared the 1993 Nobel Prize in Chemistry. The invention of polymerase chain reaction technology by Mullis let researchers exploit Smith's technique to unravel the structure and function of genes and proteins.

In the United States, further progress is needed to untangle red tape related to visa restrictions that impede international research. Globally, our support for basic science and international collaborations must not waiver. If we are to combat emerging diseases and climate change, and provide food and clean drinking water for a growing global population, we must effectively tap the powerful, combined talents of scientists and engineers worldwide. As Subra Suresh, the director of the U.S. National Science Foundation has said: "Good science anywhere is good for science everywhere."

What do *you* think about these issues? Please join us February 16-20 for the Annual Meeting of the American Association for the Advancement of Science (AAAS) as it convenes in Vancouver for the first time ever.

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