



Education for Responsible Science

Middle East | North Africa | South and Southeast Asia

Sustained advances in the life sciences that produce enormous benefits for human and animal health, the economy, and the environment are accompanied by concerns that the same knowledge and tools could be misused to cause harm either deliberately or inadvertently (that is, dual use issues). Based on the actual experiences of scientific organizations working globally, building a framework of **Responsible Science** to sustain and enhance an existing culture of responsible and professional conduct in the life sciences is a powerful and effective approach to address dual use concerns.

Working in partnership with scientists and scientific organizations in the Middle East/North Africa (MENA) and South and Southeast Asia, the U.S. National Academy of Sciences has successfully adapted a model developed to transform the way biology is taught in U.S. colleges and universities to help scientists and students engage deeply with issues of Responsible Science. This model of **Education Institutes** has become a vehicle to create sustainable networks of researchers and university faculty who can teach about biosecurity and dual use issues (1) within the broader context of Responsible Science and (2) using the substantial body of research about how people learn and the implications of that research for effective teaching. These Education Institutes feature:

- Site visits or planning meetings to ensure engagement and buy-in from key stakeholders
- Weeklong residential programs to provide learning about both content and pedagogy
- Intensive and varied hands-on learning experiences, including work in teams
- Emphasis on active learning, with many options for use in varied educational settings
- Commitment from participants to apply what they learn in these institutes in their home institutions
- Follow-up to promote sustainability, including small implementation grants and reunions to share lessons and experiences.

The Educational Institutes are overseen by committees of subject matter experts and experts in active learning and supported by a team of U.S. National Academy of Sciences staff.

To date, the following activities have been implemented:

- ✓ A pilot Institute for the MENA region was held in Aqaba, Jordan in September 2012 in partnership with the Bibliotheca Alexandrina and The World Academy of Sciences (TWAS) with faculty from Algeria, Egypt, Jordan, Libya, and Yemen. Small, competitively awarded grants enabled faculty to implement what they learned in their own classrooms. A reunion meeting for grantees provided insights and lessons used in the design of subsequent institutes. A report of the Institute and lessons learned is available as a free pdf, along with a summary in both English and Arabic.*

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* The report is available at http://www.nap.edu/catalog.php?record_id=18356; the bilingual summary is also available at <http://dels.nas.edu/Materials/Special-Products/MENA?bname>.

- ✓ A second Institute was held in Kuala Lumpur, Malaysia, in partnership with the Academy of Sciences Malaysia for faculty from India, Malaysia, and Pakistan in August 2013. Competitive grants will be awarded and the reunion will be held in Spring 2014.
- ✓ A second Institute for the MENA is being planned for late Spring 2014, with faculty from Egypt, Morocco, Lebanon, and Yemen as well as observers from Iraq. Some participants from the first MENA Institute will serve as facilitators in the second.
- ✓ A collaborative effort with Algerian educators and scientists focused on the development of a national bioethics curriculum for the Algerian higher education, combining bioethics-specific content with essential pedagogical elements for effective education.

The forthcoming InterAcademy Council and IAP—The Global Network of Science Academies report ***Responsible Conduct in the Global Research Enterprise: An Educational Guide*** will be used in the Institutes as a genuinely international resource of key issues in *Responsible Science*, including dual use concerns. Additional institutes in other countries/regions and for different topics are also in development.

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