



ASSOCIATION OF AMERICAN UNIVERSITIES

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AAU ANNOUNCES MAJOR INITIATIVE TO IMPROVE UNDERGRADUATE STEM EDUCATION

The [Association of American Universities](#) (AAU), an association of leading U.S. public and private research universities, announced today a five-year initiative to improve the quality of undergraduate teaching and learning in science, technology, engineering and mathematics (STEM) fields at its member institutions.

“In recent years, researchers, many of them at our universities, have learned a great deal about the most effective methods of teaching specific STEM subjects,” said AAU President Hunter R. Rawlings. “We now need to disseminate these methods widely among universities so that more faculty members will adopt the best teaching practices in their classrooms. AAU is not conducting another study or research project on STEM education. We are moving to implement the results of the latest research into science and math pedagogy.”

“To be sure,” he added, “a number of our universities are already leading the way in developing and implementing these new ways of teaching. But there is a long way to go, and there is an urgent need to accelerate the process of reform.”

Rawlings said that AAU would work with experts in the field, AAU member universities, and scientific disciplinary societies to find ways to encourage faculty members and departments to employ new teaching techniques in the classroom.

“Our work will build on the research university model that has served our country so well,” he added. “A singular strength of U.S. research universities, one that has contributed to this nation’s global leadership in higher education and innovation, is the synergy between teaching and research,” he said. “Bringing these together in the classroom benefits education as well as research.”

In a [description of the plan](#), AAU noted the increasing importance of STEM education. “The STEM fields are critical to generating the new ideas, companies, and industries that drive our nation’s competitiveness, and will become even more important in the future. Improving undergraduate STEM education is both a national need and a long-term challenge.”

AAU cited research showing that of the entering college freshmen who declare that they plan to major in STEM-related fields, over 40 percent switch to non-STEM majors by the time they graduate; in addition, completion rates for STEM majors are lower than for non-STEM majors.

“Through this initiative,” Rawlings said, “AAU hopes to ensure that students taking STEM classes at research universities -- both STEM and non-STEM majors -- are taught in ways that have been proven to best ensure their ability to learn and retain the subject matter. Improved teaching and learning, we believe, will lead to increased retention of students in STEM fields and improved completion rates for STEM majors, as well as a more science-literate workforce.”

“This initiative is not only about STEM majors,” added Jared Cohon, President of Carnegie Mellon University and Chairman of AAU’s Executive Committee. “Knowledge of science is an important part of a student’s education, regardless of major. It is important that we improve STEM teaching and learning for the students who will pursue careers in business, teaching, and other fields, not just those who will become scientists and engineers.”

To help guide its efforts, AAU announced the creation of a technical advisory committee composed of experts in undergraduate STEM teaching and learning. Members of the committee will include:

- Peter Bruns, Vice President for Grants and Special Programs (retired), Howard Hughes Medical Institute (HHMI)
- Noah Finkelstein, Associate Professor of Physics Education Research, Department of Physics, University of Colorado at Boulder
- S. James Gates, Jr., John S. Toll Professor of Physics and Director, Center for String and Particle Theory, University of Maryland, College Park
- Jo Handelsman, Howard Hughes Medical Institute (HHMI) Professor, Frederick Phineas Rose Professor of Molecular, Cellular and Developmental Biology, Yale University
- Sylvia Hurtado, Professor and Director of the Higher Education Research Institute (HERI), University of California, Los Angeles
- Peter Lepage, Harold Tanner Dean of Arts and Sciences and Professor of Physics, Cornell University
- Kathy Mann Koepke, Director of Mathematics and Science Cognition and Learning, National Institutes of Health (NIH)
- Bassam Z. Shakhshiri, Professor of Chemistry, William T. Evjue Distinguished Chair for the Wisconsin Idea, University of Wisconsin-Madison, and 2011 President-Elect, American Chemical Society
- Candace Thille, Director, Open Learning Initiative (OLI), Carnegie Mellon University

Drawing upon the expertise of the advisory committee and working closely with its member institutions, AAU will:

- Develop an effective analytical framework for assessing and improving the quality of STEM teaching and learning;
- Create a demonstration program at a number of AAU universities to implement the framework; a demonstration program could develop tools to survey and assess: quality of teaching and learning in STEM classes, the extent to which effective teaching methods are being used by academic departments, and the effects improved teaching has on retention of STEM majors and completion of STEM degrees;

- Explore mechanisms that institutions and departments can use to train, recognize, and reward faculty members who want to improve the quality of their STEM teaching;
- Work with federal research agencies to develop mechanisms for recognizing, rewarding and promoting efforts to improve undergraduate learning; and
- Determine how best to evaluate and develop effective means for sharing information about promising and effective undergraduate STEM education programs, approaches, methods and pedagogies.

Rawlings said that AAU would work closely with other associations that are already engaged in efforts to improve STEM education, including the Association of Public and Land-grant Universities (APLU), which has undertaken major efforts to expand the number and quality of K-12 STEM teachers and to redesign gateway courses at universities and community colleges using online learning, and the Business-Higher Education Forum, which has launched major initiatives to improve college readiness, access, and success and to address issues relating to STEM workforce needs.

“This is a large, complex area of education, and our work is intended to complement the very significant work that APLU and others are already conducting,” Rawlings said. “We believe that teaching of undergraduates is the area where we can have the greatest impact. By working together in a coordinated fashion, higher education associations, individual universities, disciplinary societies, federal agencies, and the business community can bring about major improvements in STEM education and retention at all levels.”

A discussion draft of a longer paper on the STEM teaching issue and the AAU plan [can be found here](#).

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The [Association of American Universities](#) is an association of [59 U.S. and two Canadian research universities](#) organized to develop and implement effective national and institutional policies supporting research and scholarship, graduate and professional education, undergraduate education, and public service in research universities.