



The Tau Beta Pi Association was founded at Lehigh University in 1885 by Edward Higginson Williams Jr. to mark in a fitting manner those who have conferred honor upon their Alma Mater by distinguished scholarship and exemplary character as students in engineering, or by their attainments as alumni in the field of engineering, and to foster a spirit of liberal culture in engineering colleges.
—Preamble to the Constitution

TBPI National K-12 Math & Science Initiative

A significantly large percentage of our high-school graduates lags behind their peers in many developed countries, with respect to performance in mathematics and science. In many cases, these countries are our competitors in the global marketplace, and hence this situation has a direct impact on our economy in the long term.

In its search for opportunities to assist the nation in the area of preparedness for this technological age and beyond, the Tau Beta Pi Executive Council has suggested that within our membership lie the required brainpower and human resources to provide significant leadership geared toward strengthening the math and science skills of our K-12 students. This would enhance their possibility of pursuing careers in the fields of science, technology, engineering, and mathematics (STEM).

Success of a national initiative of this type requires establishment and maintenance of a sustainable operation that is embedded into Tau Beta Pi operations. This initiative must be configured to capture and incorporate the creativity and ideas of our members.

For this to be accomplished, it is essential that we start by establishing a solid foundation and creating a program design to ensure that all constituencies within the Society are given opportunities to participate in the development and implementation of the initiative. The Council is pursuing every opportunity to involve and engage the membership of our collegiate and alumnus chapters and Districts in the process. We want to establish a program that is dynamic, effective, and sustainable and incorporates assessment tools for program evaluation.

Program Thrust & Outcomes

Research shows that there have been significant changes in classroom instructional modes in recent years. However, it is quite clear that instructional modes being used in math and science are still inadequate for reaching and exciting a large proportion of our K-12 students. Most math instruction is done somewhat abstractly, with limited indication of application to the real world. The net result is that students are rejecting math before beginning their college careers.

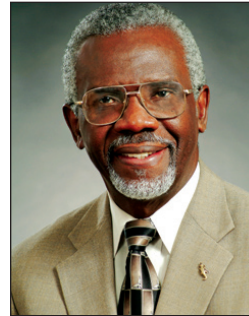
THE TBPI NATIONAL K-12 MATH & SCIENCE INITIATIVE will seek to address this problem by using hands-on, minds-on engineering-based techniques to deliver mathematics and engineering activities to demonstrate and reinforce concept applications. The initial focus will be on students in grades 6-12, with an elementary component being added later.

Program effectiveness will be measured by improvement in the number of students completing Algebra 1 in the eighth grade and calculus in the twelfth grade. In addition, any standardized test being used in a particular school district or state will be benchmarked and used as an assessment tool for the initiative.

Mission, Goal, & Objectives

A highly flexible program design has been accepted, and the Council has developed and approved statements on the mission, goal, and objectives of the National K-12 Initiative. In addition, a management and operating structure has been prepared as the basis of discussions

among our members. The mission, goal, and objectives were approved by the Executive Council in December 2006. These are as follows.



Mission:

The mission of **THE TBPI NATIONAL K-12 MATH & SCIENCE INITIATIVE** is to establish and support math and science intervention programs that contribute to enhanced preparation

of students in the K-12 system, thus enabling them to qualify for the pursuit of careers in the science, technology, engineering, and mathematics disciplines, preparing them for competitive success in the global marketplace, and equipping them for driving the nation's economy.

Goal:

To increase the number of students in the K-12 system who successfully complete higher-level math and science courses prior to graduation from high school. Specifically, more eighth graders must complete Algebra I, and more twelfth graders must complete calculus.

Objectives:

- Support the teams drawn from individual or multiple chapters in implementing projects targeted at K-12 students;
- Provide training and support for K-12 math and science teachers;
- Develop and provide programs to assist parents in improving their understanding of student needs and educational system issues; and
- Obtain funds to support the initiative.

Operating Structure

The Association comprises 440,000 alumni and 232 collegiate chapters distributed among 16 Districts across the U.S. and Puerto Rico, which are led by District Directors. A successful operating structure must embody all of our constituencies, each being given a voice and being provided with opportunities to contribute to the initiative.

The structure will comprise: the Executive Council, the K-12 National Management Committee, the K-12 District Management Committee, and K-12 Chapter Implementation Teams. Volunteers are currently being sought for the National Management and the District Management Committees.

The Council will actively promote the initiative, develop and establish operational guidelines, decide on operating protocol, obtain and budget funding, and approve the operating structure and recommended projects.

The *K-12 National Management Committee* comprises one Councillor, four District Directors, and four alumni. This group will work with Directors and Chapters in formulating and implementing projects, review projects and make recommendations to the Council, track progress and results of approved projects, and identify and cultivate national program partners.

The *K-12 District Management Committee* comprises eight Directors and eight alumni. It will formulate regional operating plans, assist in identifying local business partners, and support chapters in their project implementation.

K-12 Chapter Implementation Teams (single or multiple chapters) will work with engineering schools

and school districts, define projects for implementation, challenge and involve members to become involved in projects, and actively monitor progress with respect to the matrices being used.

Laying the Foundation

Numerous K-12 projects have been implemented or are currently being conducted throughout the nation. While many have been quite successful, most of these have been offered as individual, disconnected programs with varying expectations. The Society is in a position to establish a K-12 initiative with nationwide impact through our 16 Districts and 232 campus chapters.

In establishing our national initiative, one of our first responsibilities is to determine the types of programs and projects already being offered by our harboring institutions. The Council created a K-12 survey that was launched in January and made available online to our chapters. Feedback obtained from this survey will be analyzed and used to help us move forward with program design and implementation.

This is the start of an exciting journey for Tau Beta Pi and its members. There will be many challenges as we seek to accomplish our mission. Success will depend upon our ability to rise to these challenges and on the degree of commitment that we are prepared to bring to this initiative. There is no doubt that there is a need. The question is: "Are we prepared to respond?"

—**Dr. Jonathan F.K. Earle**, P.E., *Florida Alpha '65*, Councillor