

## *Chapter 5C: International Research, Development and Training*

### **Background**

The profession of engineering is being transformed by the globalization of the world economy. Globalization also has affected the practice of engineering in the U.S. Many engineering companies have become global enterprises. Engineers need different skills than what were required just ten to fifteen years ago to be successful in this emerging environment. For example, engineering teams often are multi-national in composition. This means that teamwork has become even more important and now demands the ability to work with engineering colleagues from different cultures, requiring knowledge and sensitivity of multicultural issues.

The University Strategic Plan specifically addresses the international emphasis of our education system (Goal 13). More than ever in the past, we need to: “**provide our students with distinctive international experiences and broaden their exposure to today’s global challenges.**” We must dramatically transform our international emphasis to prepare students in an increasingly interdependent world. This can be accomplished through an enhanced curriculum, international research, and scholarship, institutional partnerships, the presence of more international scholars on campus, greater participation of Study Abroad programs, expanded area studies programs, and events with global themes.

The College of Engineering at Colorado State University has a long tradition of international activities, including teaching, research, service and outreach. Faculty members from all departments have long benefited from national and international recognition. The College of Engineering also made significant contributions to international programs over the years. The Peace Corps and the Asian Institute of Technology may not have existed without the support of faculty members from the College of Engineering. Several large-scale international projects in the field of water and irrigation have been developed in Egypt, Pakistan, and other countries around the world. The reputation of the College of Engineering has greatly increased as a result of the direct involvement of faculty members in the pursuit of international projects. Former graduate students of the College of Engineering currently hold top positions in their respective countries. The training of engineers from all countries around the world has been a trademark of our international reputation and recognition. Our future success depends largely on our ability to interact effectively at the international level. There is considerable opportunity to expand existing programs and develop new international activities on problems of global significance.

### **Objectives and Goals**

The vision of the College of Engineering is to be nationally and internationally recognized for excellence and innovation in education, research, professional services and outreach. We will serve society by solving problems of global importance and through contributions to national and international economic development. CSU has the basic infrastructure

necessary to further the development of international research and training programs. The challenge is to continue to build on our strength and reach out to developing countries around the world. Among other things, we can continue to make significant contributions in the areas of water resources and engineering, environmental sciences, information science and technology, climate and weather forecasts, food and nutrition, and many others. Our continued collaboration with other Colleges is essential. This includes the foreign language and political science departments, the Office of International Programs, and other colleges.

The following goals and objectives describe areas for development of international activities in the college.

**Objective: Seek international recognition for excellence and innovation in education, research, professional services and outreach. Serve society by solving problems on global importance and through contributions to national and international economic development.**

The College of Engineering must continue to be very active at the international level to seek recognition of its academic programs. Solving problems of global importance also requires direct involvement of its faculty at the international level. To infuse international aspects into the teaching, research, service, and economic development missions of the college requires faculty to have the knowledge and interest in international activities and the support of the department, college and university.

**Goal: Increase faculty and administration awareness of the importance and role of global engineering practice.**

**Strategies:**

- ✘ Recognize and reward faculty for their successes at the international level,
- ✘ Support international faculty sabbaticals, serving on international committees, on international advisory boards, participating in international conferences, seminars, workshops and short courses,
- ✘ Value faculty involvement in international engineering activities during annual reviews, tenure, and promotion,
- ✘ Develop a visiting international scholars/researcher program,
- ✘ Support faculty international travel,
- ✘ Support faculty in the development of global-focused course materials and curriculum development projects with a global focus,
- ✘ Identify strategic partnerships for global development and training opportunities, and
- ✘ Align our partnerships with University targeted regions of the world.

**Objective:** Develop partnership with peer institutions around the world through bilateral agreements that will stimulate the exchange of graduate students, faculty and researchers.

**Goal:** Develop new International Memoranda of Understanding in Science, Technology and Engineering with peer international institutions.

This will provide opportunities for faculty and researchers to work in collaboration with peers at the international level. It will also give the students a better exposure to problems of global significance and will prepare them to possibly have long-term careers in a global engineering profession. Nowadays, engineering graduates need to compete at the global scale. Their education needs to reflect the strengths of the U.S. that continue to be unique and valued globally.

**Strategies:**

- ✘ Identify a faculty/administrative champion to act as the coordinator for international programs within the College of Engineering,
- ✘ Provide opportunities for faculty to develop new contacts at peer institutions around the globe,
- ✘ Facilitate the preparation of IMOU's in collaboration with International Programs,
- ✘ Develop international internship opportunities through partnerships with other schools and international funding agencies,
- ✘ Encourage faculty to write international proposals for work in developing countries,
- ✘ Increase study abroad participation through renewed agreements and by creating new agreements,
- ✘ Expand and modify existing professional development and field trip programs to include significant international content, and
- ✘ Sponsor an international engineering speaker series.

**Goal:** Stimulate the exchange of international information in the College of Engineering

The skills necessary to practice engineering must accommodate the global nature of many engineering firms. U.S. based engineers will need to engage in engineering design, planning, maintenance activities with partners across the globe. This requires greater understanding and sensitivity to multi-cultural problems.

**Strategies:**

- ✘ Expose our graduate students to projects and problems of global significance,
- ✘ Infuse international components into courses in each of the engineering departments,
- ✘ Share the results of faculty international experience in the classrooms,
- ✘ Stimulate exchange of information with students, faculty and researchers through international seminars,

- ✘ Disseminate information on international study tours,
- ✘ Promote international service learning, e.g. Engineers Without Borders,
- ✘ Increase awareness of international issues in newsletters,
- ✘ Mention international activities and have students/faculty prepare brief reviews of their international experience in the newsletters of the Departments and College.
- ✘ Disseminate the information on international opportunities for faculty and students,
- ✘ Provide international student exchange opportunities and joint degree programs at both the undergraduate and graduate levels through partnerships with universities and external organizations such as the German Academic Exchange Service,
- ✘ Provide curricula resulting in a degree program (such as engineering for globally sustainable development),
- ✘ Strengthen and expand the existing international engineering degree program,
- ✘ Develop joint graduate research projects with international institutions,
- ✘ Encourage/require students to take foreign language courses,
- ✘ Provide an international field experience through opportunities with groups such as Engineers Without Borders and Engineers for a Sustainable World,
- ✘ Attract international students for short-term study visits,
- ✘ Support short-term study visits to international engineering sites,
- ✘ Develop a strategic plan for China and Taiwan,
- ✘ Develop reciprocal exchanges of faculty and students, e.g. U. Canterbury in New Zealand and many others, and
- ✘ Increase the number of international students studying at Colorado State University.

#### **Metrics:**

- ✘ Number of international students,
- ✘ Volume of research associated with international sponsors,
- ✘ Number of international faculty sabbaticals,
- ✘ Number of international scholars in the College of Engineering - on sabbaticals, visiting, or involved with global outreach projects,
- ✘ Number of graduate students with international scholarships, and
- ✘ Number of IMOU's and agreements signed with other International Universities and Agencies.