**Grand Challenges Scholars Program (GCSP)**

Undergraduate students at the College of Engineering PKU have the unique opportunity to compete in the National Academy of Engineering (NAE) Grand Challenges Scholars Program (GCSP). Grand Challenges Scholars drive their educational experiences towards discovering, exploring, and potentially solving one of the NAE Grand Challenges and earn recognition at graduation from PKU.

**Four Themes of the NAE Grand Challenges**

**--Sustainability**

* Making solar energy economical
* Providing energy from fusion
* Developing carbon sequestration methods
* Managing the nitrogen cycle
* Providing access to clean water

**--Health**

* Engineering better medicines
* Advancing health informatics
* Reverse engineering the brain

**--Security**

* Securing cyberspace
* Preventing nuclear terror
* Restoring and improving urban infrastructure

**--Joy of Living**

* Enhancing virtual reality
* Advancing personalize learning
* Engineering the tools of scientific discovery

Learn more about the NAE Grand Challenges at <http://www.engineeringchallenges.org/challenges.aspx>

**About PKU GCSP**

Established in 1898, Peking University (PKU) is a comprehensive and national key university which effectively combines research on important scientific subjects with the training of personnel with a high level of specialized knowledge and professional skill. By drawing upon PKU’s vast resources in fundamental and extensive research studies, the College of Engineering has successfully created programs that promote interdisciplinary research and training. It is our hope that the students are able to take different approaches in the pursuit of progress and development if provided with a broad spectrum of knowledge. We encourage students to be innovative in future engineering and technology exploration for the prospect of national socio-economic development. It is our greatest hope that our students will become future leaders and entrepreneurs.

The PKU Grand Challenge Scholars Program aims to cultivate scholars with broaden curriculum and innovative research experiences to address the Grand Challenges, and to educate future engineering leaders and entrepreneurs with global perspectives and social awareness. The College of Engineering at PKU offers strong opportunities and a variety of activities for pursuing and implementing the five major components of GCSP at PKU. In addition, the GCSP at PKU is the first program launched in mainland China. China is experiencing fast economic development with increasing population, which brings unprecedented challenges for engineering. To address the complex Grand Challenges in China will provide valuable experiences for other countries, and the GCSP at PKU will also provide example and experience for expanding it to more universities in China and other Asian countries.

**Program Requirements**

Current Undergraduates should be following the program outlined below. While our focus on your chosen Grand Challenge should be carried through across the 5 dimensions below, only one dimension requires in-depth focus. You will notice the 5 dimensions of a successful Grand Challenges Scholar have flexibility built in. While we list possible interpretations of the dimension, we encourage you to think of these areas broadly.

The GCSP Committee will accept applications from **graduating seniors**. Each application will be evaluated on the student’s focus on their chosen Grand Challenge and interpretation of their work and experiences across the 5 dimensions. The College of Engineering will name up to a total of **5 NAE Grand Challenges Scholars each year.** Prizes are awarded to Scholars and additional recognition is provided at graduation.

**The 5 Dimensions of GCSP**

Your application must reflect your focus across all of the five dimensions listed below. While we list some examples of how you may complete each dimension, please understand these lists are not exhaustive, and you are welcomed to have your own ideas and interpretations.

**1. Research/creative**: Mentored research or project experience related to a Grand Challenge to enhance technical competence and creativity.

a) PKU Makers Lab: An open platform that provides hands-on practice venues, hardware and software skills training, innovation and entrepreneurship courses and resource docking services for students and scholars. From the cultivation of innovative and entrepreneurial talents, to provide innovative business space and consultations to the entrepreneurial team, from providing innovative entrepreneurial tutors, to raise funds for innovation and entrepreneurship, PKU Makers Lab provides the whole industry chain support, so that real innovators and entrepreneur can succeed.

b) Capstone design program: The Capstone engineering design projects are directly connected with the industry customers. The program encourages students to give full play to the spirit of self-innovation. Students can freely choose design topics. Through the entire project students not only accept the technical guidance of enterprises, but also accept the cooperation of teachers’ guidance, to meet both the engineering theory standards and the needs of enterprises.

c)  Two semesters or more thesis research in an approved PKU and/or industry laboratory, and an approved intensive summer research project. This gives the scholar the chance to deeply address the identified challenge under the guidance of a faculty member. This component can be fulfilled in a research laboratory, off-campus in an industrial laboratory, or in one of the making and fabrication spaces on campus.

**2. Multidisciplinarity:** Understanding gained through experience of the multidisciplinary character of implementable and viable Grand Challenge solutions.

a) The GCSP Seminar: One-semester GCSP seminar organized by GCSP Director and jointly given by COE faculty members or invited speakers related to the Grand Challenges in engineering. GCSP scholars are required to take this seminar course in their first academic year to know more about GCSP program and to get ready for the formal application.

b) IPodium Program: COE has collaborated with University of Southern California and established i-Podium facilities so that students can take classes via video cameras, which foster interaction to bridge the gap between China and other nations.

**3. Business/entrepreneurship:** Understanding gained through experience that viable business models are necessary for successful implementation of Grand Challenge solutions.

a) Industrial Mentors Program: The Industrial Mentors Program is initiated and implemented by the Alumni Association and the Office of Development at COE, PKU. The well-known alumni, managers, senior experts and/or scholars of government, industry and research institutions are invited to serve as mentors for students. Both the first responsible mentor at COE and the industry mentor will guide the students in a "Dual Mentor" system. Through business visits, field research, project participation, salon and other ways, invited mentors share their professional experience and encourage and lead students’ career development.

b) Global Innovation and Entrepreneurship Center: Created by PKU with 4000 m2 area in total, among which 800 m2 are assigned to COE for innovative and entrepreneurial activities in engineering. Students can take full advantage of the space and facilities to conduct innovative research and entrepreneurial activities at this platform.

c) Internship related to 14 GCs: Securing an internship or other experience that explicitly involves innovation, invention or related activity. Students can use summer time to do internship in relevant industries.

**4. Multicultural/Global Perspective:** Understanding gained through experience that serious consideration of cultural issues is mandatory for all viable Grand Challenge solutions.

a) Global Innovation Master Project: The project will invite industry leaders from different countries to give series of lectures to students showing the innovative wisdom. The lectures include design, fashion, humanities, art, science and technology and other topic closely related to life. Inspire students think about "innovation" and guide students to discover and explore the "innovative" way of thinking and the law of action that suits each person.

b) [GLOBEX](http://globex.coe.pku.edu.cn/): The Globex Julmester (which means global exchange program at July semester) at PKU is a professional mobility program with a worldwide exchange of students from all disciplines of study. To enhance student’s global and professional experience, Globex offers courses that focus on the core elements of engineering & science, engineering finance & entrepreneurship, and society & globalization.

c) Summer and semester exchange: participate summer or semester exchange at universities overseas.

**5. Social consciousness/Service Learning:** Deepen social consciousness and motivation to address societal problems, often gained through service learning, because serving people is the vision served by the Grand Challenges

a) Summer social service: including tutoring activities (elementary, middle and high school) and poverty alleviation. Collaborated with the Love Community of PKU, COE has built up regular summer social services including tutoring and poverty alleviation activities in several remote and poor areas in China. Students can select one of the locations and go there to tutor elementary, middle and high schools for 1-2 weeks, and conduct social survey and investigation such as the feasibility of sharing PKU education resource with the supported areas through network platform.

b) Outreach practices: including designing courses related to grand challenges and offering the courses to publics especially primary and middle school students for them to better understand science and technologies.