Partnering with Stanford’s ME Design Group gives companies an exclusive opportunity to plug into a worldwide community of researchers and innovators from industry and academia and offers direct access to Silicon Valley’s unique mind- and skill-set. Offerings include a variety of workshops, social gatherings and technical briefings that create opportunities to learn, network, exchange ideas, and to pick up the buzz on what’s hot on and off campus. Your financial support connects you with one of the world’s most highly-regarded engineering design education and research programs. Several options offer a wide range of possibilities for partnership.

**Project Courses**

Industry partners can become active participants in our classes. Most often, this is done by proposing a joint project to be undertaken by a team of 3-4 students working under faculty supervision, with a company liaison, and mentored by design coaches. Faculty work with the company to identify customer and client needs and define the right balance of technical challenge, discovery opportunity, and educational value. These engagements typically last 10 to 30 weeks (1 to 3 quarters) and focus either on engineering design or product design.

**Project Courses in Engineering Design**

- **ME113 - Senior-Level Mechanical Engineering Design** (pg. 3)
  April through June (undergraduate seniors)
- **ME218D - Smart Product Design** (pg. 3)
  October through December (graduate students)
- **ME310ABC – Product-Based Engineering Design, Innovation & Development** (pg. 3)
  September through June (graduate students, master’s thesis equivalent)
- **ME317AB – Design Methods: Product Definition & Quality by Design** (pg. 4)
  January through June (graduate students)

**Project Courses in Product Design**

- **ME115A – Introduction to Human Values in Design** (pg. 6)
  September through December
- **ME115B - Product Design Methods** (pg. 6)
  January through March
- **ME216A - Advanced Product Design: Needfinding** (pg. 7)
  September through December
- **ME216B/C - Advanced Product Design: Implementation** (pg. 7)
  January through June
ME277 – Graduate Design Research Techniques (pg. 8)
January through March
ME313 - Human Values and Innovation in Design (pg. 8)
September through December
ME316A/B/C - Product Design Master’s Project (pg. 8)
September through June

Research Collaborations

Industry partners are invited to participate in the research laboratories at Stanford’s Center for Design Research (CDR). Interaction with the labs is typically either through industry researchers who take a sabbatical on campus and work alongside Stanford researchers, or through lab visits arranged to inform corporate personnel regarding ongoing research and design practices. The Affiliate Membership fee helps support student research assistants who work under the supervision of faculty mentors on projects of academic and industry interest.

Collaboration Benefits

By supporting design education and research, partner companies create opportunities to develop their own personnel, learn from other companies and projects, and to interact directly with potential recruits and select Stanford faculty labs.

Our corporate partners receive facilitated access to the annual Stanford Design EXPERience (EXPE), a festival of student creativity and productivity held in early June. EXPE features project outcomes from ME310, ME317 and a half-dozen other project-based courses offered by the Mechanical Engineering Design Group, the Product Design Program and the Hasso Plattner Institute for Design at Stanford (a.k.a. the d.school). This meeting is the perfect time to gather information on past design experiences, create new ideas and make concrete plans for the coming academic year. EXPE emphasizes the value of constant involvement between all of us through workshops, student activities, research and personal contact.

Participation

For administrative information, to get involved, and to be informed about upcoming events, please contact:

Kristin Burns
Administrative Director, Industry Affiliate Program for Teaching Design Thinking
kristin.burns@stanford.edu phone: 650-723-4288 fax: 650-723-3521

For a deeper dive into the formulation of a course project proposal or line of research, you are welcome to contact individual faculty and their graduate students. Kristin may be your best point of entry to the community.
Project Courses in Engineering Design

ME113 - Senior-Level Mechanical Engineering Design

ME113 is the department’s capstone course in undergraduate mechanical design. With guidance from the course instructor and design coaches, student teams work on project challenges provided by companies or other organizations to devise solutions that typically involve development of working models.

Project time frame: spring quarter (April through June)
Proposals requested by: January 15
Fee: $5,000 PLUS a modest budget for prototyping materials and related expenses. Applies to academic year 2014-2015, subject to change in future years.

ME218D - Smart Product Design

The ME218ABCD sequence teaches students how to create mechanical designs that incorporate electronics, microprocessors and embedded software. The focus is on the integration of intelligence into mechanical systems, as opposed to simple computer control of machines. It is a laboratory-intensive experience, with structured laboratories and open-ended projects in addition to lectures. Team projects in the first three courses emphasize not only the technical content, but also the communications and interpersonal skills necessary to function as an effective team member. Students in ME218D (fourth course, autumn quarter, 10 weeks) undertake team projects in partnership with industry.

Project time frame: autumn quarter (October through December)
Proposals requested by: September 5
URL: http://spdl.stanford.edu
Fee: For one 10-week project team: $9,000 PLUS prototyping materials and related expenses (typically $2000). Applies to the university infrastructure charge, teaching team stipends, laboratory services, and computer resources for academic year 2014-2015. Fee subject to change in future years.

ME310A/B/C – Product-Based Engineering Design, Innovation & Development

ME310 students are among the very best engineering and design students in the world. Each year about 100 masters-level students participate in ME310-Global, including Stanford engineering students (30-40), and students (40-60) from eight to ten of the top global engineering and design universities in Europe, Latin America, China, Japan, and Australia (others pending).

The ME310 Design Process Tool Kit helps designers create breakthrough alternatives and make informed choices in context. Structured Divergence thinking is the process that creates choices,
while Systematic Convergence thinking makes the best choices given constraints. Engineering Design thinking requires cyclic interaction between Analysis and Synthesis to explore the problem and solution spaces iteratively. Often the breakthrough ideas come from the tension created by the co-evolution of design requirements and solutions.

The Design Paradigm in ME310 iterates through a cascade of structured abductive activities. Project work begins with problem (re)definition, followed by benefit finding (in contrast to need finding) and several divergent-convergent ideation exercises that help create design choices. The heart of the ME310 design process is rapid, hardware-software-experience prototyping, where students articulate their vision, test their design assumptions and transform their ideas into tangible products. Learning from failed prototypes and experiments is encouraged. Through this iterative protocol, broad problem statements are refined into concrete concepts that become fully functional “reference model” prototypes in June.

ME310-Global Industry Partners work with two teams of three to four graduate students each. One team is enrolled at Stanford and the other is at a partner university (most are outside the US). Corporate partner involvement provides the reality checks necessary for individuals and teams to develop real-world innovation skills and experience. These university-industry partnerships bring global diversity to the project teams and give students the opportunity to experience true global collaboration, a required skill in today’s connected world.

**Project time frame:** autumn, winter & spring quarters (September through June)

**Proposals requested by:** June 10

**More information:**

via the web: [http://tinyurl.com/ME310AY13](http://tinyurl.com/ME310AY13)

via email: Professor Larry Leifer
ME310-Global Academic Partner Coordinator
[leifer@cdr.stanford.edu](mailto:leifer@cdr.stanford.edu)

via telephone: Consulting Professor George Toye
ME310-Global Corporate Partner Coordinator
Mobile: +1 650 208-5171

**ME317A/B - Design Methods: Product Definition & Quality by Design**

ME317AB utilizes systematic methodologies to define, develop, and deliver competitive products/processes that contribute significant value to the partnering companies. The methods range from characterization of strategic objectives, societal needs, user scenarios and values, manufacturability to other life-cycle complexities such as reliability, sustainability, financial analysis, FMEA, and cost drivers. ME317A develops a comprehensive product definition while ME317B seeks “Quality by Design” to generate concepts and a development roadmap that co-optimize the product design and manufacturing process. Participating companies include domestic and international companies ranging from venture funded start-ups to Fortune 100 Companies. Recent project partners have included Toyota, Medtronic, Cisco, Ebara and Satiety. Many companies ask for a follow-up with student internships, further case study development
or additional project activity (requires a separate budget) after ME317AB, which we will be glad to discuss.

**Project time frame:**
winter & spring quarters (January through June)

**Proposals requested by:**
September 19

**More information:**
http://me317.stanford.edu or me317TAteam@lists.stanford.edu

**Fee:**
$17,000 for 317AB, one 20-week project team (includes the university infrastructure charge, teaching team stipends, laboratory services, and computer facilities). Approximately $6,000 of that fee covers project materials, documentation, and local travel. If the partner company wishes students or coaches to travel outside of California, we request an additional budget for extra travel costs (nominally $10,000, depending on location & number of trips). If the partner company requests any special purchases (e.g., specific CAD/CAE programs, etc.), the partner must provide additional funds to cover costs. This fee applies to academic year 2014-2015, and is subject to change in future years.

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**Project Courses in Product Design**

For over fifty years, Stanford University’s Department of Mechanical Engineering has offered a program in Product Design. The Program combines coursework in the fields of engineering, art, and the social sciences to create a powerful approach for developing innovative new products. There are many ways to participate in Product Design projects throughout the year including design workshops, undergraduate design courses, and quarter-long and year-long design programs. A few are described below.

There are two levels of participation in the Product Design arm of the Design Affiliates program: an annual membership ($125,000) and a project-based membership ($45,000).

**Annual Membership:** In addition to the benefits accrued to all Affiliates explained above, an annual membership allows the Affiliate access to classes and faculty.

- **Class projects:** Over the course of the year, the Affiliate may develop up to two (2) classroom-based projects with the consent of the instructors.

- **Symposia:** The Affiliate and the Design Program staff may design and host an event or experience that brings the Affiliate and Program faculty together for a symposium, the details of which will be worked out by the parties involved. The purpose of such an experience would be to exchange best practices, explore emerging technologies and design opportunities, and/or define new ways in which to derive benefits from the Stanford-Affiliate relationship.
Summer Research Projects: Summer research projects can be defined, which are either new or continue the developments begun during a classroom-based project. Additional stipends for graduate students may be necessary to fund their research activities.

The intention of a year-long Affiliate membership is to create a flexible list of possible projects and to pick projects to engage in together, while being responsive to changing priorities at the Affiliate and Stanford level as the relationship unfolds.

A project-based membership is described by class below.

**Participation**

For administrative information, to get involved, and to be informed about upcoming events, please contact:

**William Burnett**  
Design Program Executive Director  
wburnett@stanford.edu  
phone: 650-280-0098  
fax: 650-723-3521

**ME115A/B - Human Values in Design / Product Design Methods**

This is the entry-level Product Design sequence where undergraduate students have their first experience designing products, services, and experiences based on Stanford’s user-centered design philosophy. The quarter is broken into four or five projects, each highlighting a different aspect of design methodology. Affiliate projects typically require the students to redesign a physical product for better usability or ergonomics, improve the user interaction and experience with a piece of software, design a new service or experience (this may involve both physical design as well as UI design), or look at a class of users and, through direct observation and research, develop a point of view about latent needs and product opportunities that a corporate partner might want to investigate further. Corporate partners gain an introduction to the students (potential summer interns), a fresh look at products, and/or a round of new customer-focused insights in their target markets. A typical project lasts two to three weeks and a formal presentation of findings is offered at the end of the project. ME115a is offered in autumn quarter and ME115b is offered in winter.

**Project Time Frame:**  
autumn quarter (September through December)  
winter quarter (January through March)

**Proposal Timing:**  
contact William Burnett

**Fee:**  
$45,000 for one project, typically 2-3 weeks. This fee applies to academic year 2014-2015 and is subject to change in future years.
ME216A - Advanced Product Design: Needfinding

A cornerstone of the Product Design program is ME216A: Needfinding, a deep exploration of user-centered and ethnographic design research techniques. This quarter-long class is a required for senior undergraduates. Students in this class refine their skills in design research methods: watching and listening to people in the real world in an effort to reveal product needs that were previously unidentified. A major part of the class is devoted to a project, funded by a corporate affiliate. The students benefit from having to balance the needs of end users with the needs of the corporate "client". For its part, the corporate affiliate gets the benefit of forty or more Stanford students devoting time, effort and attention to uncovering new market insights, and consequent product ideas. Great Needfinding projects are broadly defined and ask students to uncover latent needs and then articulate how to address them. Students step outside their comfort zone, experience product and "needs" in very different markets and use their ethnographic research techniques to develop a unique point of view about customers. Corporate partners spend a meaningful amount of time with the students (a tremendous advantage in later recruiting) and are often rewarded with compelling, provocative, and potentially profitable customer-focused insights. A typical project lasts three to five weeks and a formal presentation of findings is offered at the end of the project.

Project Time Frame: fall quarter (September through December)
Proposal Timing: contact William Burnett
Fee: $45,000 for one project, typically 2-3 weeks. This fee applies to academic year 2014-2015 and is subject to change in future years.

ME216B/C - Advanced Product Design: Implementation I & II

Another core class in the Product Design program is ME216B/ME216C: Implementation I & II. This two-quarter-long class is required for senior undergraduates and takes each student through all the steps required to take a product or service to the market. Students go through the following steps toward implementing their concept: product brainstorming, writing a Market Requirements Document (MRD), multiple prototyping (including a Beta prototype and user testing using web-based survey tools), developing the appropriate engineering documentation including a layout, bill of materials, request for quotation, and cost model, final user validation, marketing and channel strategy, and end with a final presentation to a jury of professionals from the product development world. Corporate partners working with this class often pose a general market or product category to explore and work closely with the students to provide access to the relevant data and their customers to accelerate the development of concepts. Corporate partners spend a meaningful amount of time coaching the students (a tremendous advantage in later recruiting) and are often rewarded with compelling, provocative, and potentially profitable product concepts in fully developed form. Projects last two quarters (twenty weeks). A formal presentation of findings is offered at the end of the project.

Project Time Frame: winter/spring quarter (January through June)
Proposal Timing: contact William Burnett
ME277 - Graduate Design Research Techniques

This class brings together students from different backgrounds to work on real-world design challenges. We explore the Design Thinking process with a particular emphasis on ethnographic techniques, needfinding, framing and concept generation. We use the Design Thinking process as a lens to explore ways to better understand people and their culture. We use cultural differences as a source of design inspiration, with the understanding that design itself is a “culturally embedded practice.” Great needfinding projects for this class are broadly defined and ask students to uncover latent needs and then articulate how to address them. Corporate partners spend a meaningful amount of time with the students (a tremendous advantage in later recruiting) and are often rewarded with compelling, provocative, and potentially profitable customer-focused insights. A typical project lasts three to five weeks and a formal presentation of findings is offered at the end of the project.

Project time frame: winter quarter (January through March)
Proposal Timing: contact William Burnett
Fee: $45,000 for one project, typically 3-5 weeks. This fee applies to academic year 2014-2015 and is subject to change in future years.

ME313 - Human Values and Innovation in Design

This class serves as the introduction at the Graduate level to the philosophy, spirit, and tradition of the design program at Stanford. Hands-on design projects are used as vehicles for design thinking, visualization, and methodology. The relationships among technical, human, aesthetic, and business concerns are explored. Drawing, prototyping, and design skills emphasize Stanford’s “build-to-think” process. The focus is on the tenets of design philosophy, the designer’s point of view, user-centered design, design methodology, and iterative design.

Project time frame: winter quarter (January through March)
Proposal Timing: contact William Burnett
Fee: $45,000 for one project, typically 2-3 weeks. This fee applies to academic year 2014-2015 and is subject to change in future years.

ME316A/B/C - Product Design Master’s Project / Design Garage

In this thirty-week, graduate-level-depth sequence, you’ll work with Stanford faculty and students in the Joint Program in Design, one of Stanford’s oldest interdisciplinary graduate degrees, on significant projects spanning a variety of industries. The students in this program come from traditional mechanical or electrical engineering undergraduate programs and/or industrial design backgrounds, and also sometimes have degrees in mathematics, the social sciences, the hard sciences (physics, geology, and chemistry) or more eclectic backgrounds in
philosophy, symbolic systems, or art history. All of the students have at least one year of professional experience before being admitted to the program (the average is 3.5 years). The open-ended nature of the project, the diversity of the student backgrounds, their prior professional experience, the outstanding support of the Design faculty, and an adjunct staff from many of the leading Silicon Valley Design consultants (IDEO, frog design, Jump Associates, Point Forward, D2M Inc, etc.) create an exceptional team that differentiates this experience for the student and leads to surprising outcomes for the Affiliate companies.

The students work individually or on two-person multi-disciplinary teams in the Fall quarter. Then they recruit a team of graduate students from all over the University, with emphasis on the Graduate School of Business, for the Remaining Winter and Spring quarters. This team then completes the project. Students use their training in ethnography, market research, and observation to define a big problem and develop an insight into a framework that could yield a “big solution”. There is an opportunity to spend a significant amount of time working with the industry affiliate in a needfinding and subsequent project phases. As in other Stanford design classes, students examine the challenge from many perspectives, including cultural factors, business factors, market potential, and technical feasibility. They produce multiple prototypes over the three quarter sequence to test their solutions. A deep engagement with the customer/user group is a must. These teams reduce their solutions to practice within nine months and present their results in June to a jury of affiliates, venture capitalists, educators and industry professionals.

**Project Time Frame:** autumn, winter, spring quarters (September through June)

**General Information URL:** http://designprogram.stanford.edu/

**Fee:** $125,000 for a one-year project at Stanford. The fee covers most costs, including university infrastructure charges, teaching team time, laboratory services, telecommunication services, and in-house prototyping, but DOES NOT cover travel, market research costs (if any) and prototypes that need to be professionally fabricated. Research and professional prototype costs are always agreed to prior to the project start, and run, on average, an additional $15,000-30,000. Travel is by agreement only. This fee applies to academic year 2014-2015 and is subject to change in future years.

**Affiliation Opportunities at Stanford’s Center for Design Research (CDR)**

Several opportunities for research cooperation are offered as part of the CDR Industry Affiliate Program, in conformance with Stanford University Policies: http://stanford.io/13yN9pI
CDR Industry Affiliates Program

The Center for Design Research (CDR) Industry Affiliates Program provides a unique relationship between academic research and industry. Members are entitled to a full range of benefits including an annual meeting; the opportunity to support PhD student research; access to research reports associated with the Program; and facilitated access to faculty and graduate students. Projects typically involve a combination of engineering design synthesis, design tool development, and design thinking studies.

The CDR Affiliates fee is $85,000 per year of membership, and companies can join the program at any time for a 12-month period.

For more information about participating faculty and related Stanford research, visit our web site
https://me.stanford.edu/research/labs-and-centers/center-design-research

CDR Academic Affiliates Program

Stanford offers two classifications for visitors from other academic institutions. In both cases, the visitor is given work space at CDR near the center of the campus and open access to the laboratory of a CDR Principal Investigator with whom a joint-research program has been defined. This is an immersive experience within one of Stanford's premier innovation labs.

**Visiting Student Researcher Defined:**
Visiting Student Researchers are persons who have not yet obtained a Ph.D. (or its foreign equivalent), and wish to engage in research on the Stanford campus using Stanford research facilities. The visa used by Visiting Student Researchers at Stanford is J-1.

**Visiting Scholar Defined:**
Scholars who have a doctoral degree, or who are recognized experts in their field, and who wish to visit Stanford from an outside institution or organization, may be recommended by a Group Chair for the courtesy designation of Visiting Scholar. Visiting Scholar appointments are usually made for one year and may be renewed for a second year. An extension beyond two years will be granted only for extraordinary and compelling reasons.

Visiting Scholars are not employees of the University and the title may not be used for personnel or payroll purposes. Visiting Scholars may not receive regular compensation from the University. Visiting Scholars are funded from external or personal sources. Visitor positions at CDR are in great demand. Priority will be given to Visiting Scholars & advanced Visiting Student Researchers from key institutions. Longer visits are encouraged to promote full engagement and immersion in the work and the
community: preferred minimum stay is 6 months (which is two quarters).

In order to inscribe the visitor, Stanford University and CDR require Visiting Student Researchers and Visiting Scholars to pay a fee, currently set at $1,857 per month. This fee includes their SUnet account and email, internet and physical access, library service, access to athletic facilities etc. Additionally, access to CDR and desk space is provided as well as CDR administrative services such as printing and copying. Visiting Student Researchers pay this fee to two entities: 1) to the central University, via the University bill (PSO, see below) and 2) to CDR. Visiting Scholars pay a lump sum directly to CDR.

a) CDR Visiting Student Researchers will pay  
- $957/month PSO (Permit for Services Only tuition AY14) to the University, and  
- $932/month to CDR: lump sum, invoiced and payable at start of visit.  
b) CDR Visiting Scholars will pay  
- $1,889 per month to CDR. (This is the equivalent of the PSO tuition plus the CDR Visiting Student Researcher fee.)

In 2010, the University set the minimum visit length for Visiting Scholars at three months. CDR requests a minimum of six months, and prefers a one-year visit.

CDR affiliates can, at any time, make arrangements for a special collaboration project or other special event that takes us beyond the framework of our basic CDR Affiliateship options. If you have specific questions regarding visiting opportunities at the Center for Design Research, please contact:

**Anneliese Tunison**  
Center for Design Research  
Building 560, 424 Panama Mall  
Stanford, CA 94305-2232  
**Phone:** (650) 723-9233  
**Fax:** (650) 725-8475  
**Email:** arogers4@stanford.edu

If you are interested in a special purpose research project, or visiting arrangements with our four labs, or other special events that take us beyond the existing framework of our basic CDR Affiliateship options please contact the Center's Director, Professor Larry Leifer, PhD (leifer@cdr.stanford.edu).

**Biomimetics and Dexterous Manipulation Lab** ~ Prof. Mark Cutkosky, PI  
**Collaborative Haptics & Robotics in Medicine Lab (CHARM Lab)** ~ Prof. Allison Okamura, PI  
**Designing Education Lab** ~ Prof. Sheri Sheppard, PI  
**DesignX Lab** ~ Prof. Larry Leifer, PI