



**Capstone Design**  
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## Panel 2B: Recruiting and Scoping Projects

**Facilitator:** Keith Stanfill (UTK), Edwards Assistant Dean and Director, Integrated Engineering Design

**Panelists:** Ben Fong (Purdue), Stefano Foresti (UC Merced), Jim Hartman (UNC Charlotte)

Benjamin Fong  
Professor of Practice & Director, Professional Master's Program  
Purdue University  
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**Dr. Ben Fong** is the Professor of Practice and Director of Professional Master's Program in the Edwardson School of Industrial Engineering at Purdue University. He is an IISE Fellow and a senior global product leader with 30 years of diverse experience in R & D, IoT product strategy, operational excellence, and commercial growth. Prior to join Purdue in 2021, he reported directly to multiple VP of Global Product Management and was responsible for a variety of products Profit and Loss that are worth USD \$500M+. Ben managed Product Management and Technology Team to define agile design criteria for NPI and market launch. Ben was a former DFSS Master Black Belt at GE Healthcare, a Global Product Support Portfolio Manager at Caterpillar, and a Consulting Manager at Celerant Consulting. He worked over 20 industrial sectors from 100+ U.S. and global facilities. Achieved \$100M+ in savings for multiple LSS Enterprise CI programs.

Stefano Foresti  
Director of Innovation -> [i2g.ucmerced.edu](mailto:i2g.ucmerced.edu)  
University of California Merced

**Stefano Foresti** is Director of Innovation, at the University of California Merced. He cultivates industry partnerships to collaborate on projects and research involving students and faculty, and has coordinated the Innovate to Grow (I2G) program since 2013, involving the Engineering and Software Capstone classes, and the bi-yearly showcase and judged competition of the Capstone teams. Stefano has decades of multi-disciplinary research and business experience, and bridges a variety of industries of California, from technology in the Silicon Valley to Ag and Food in the Central Valley.

**Jim Hartman** | Director Industrial Solutions Lab | Professor of Practice  
UNC Charlotte | The William States Lee College of Engineering

Jim Hartman is a Professor of Practice in the William States Lee College of Engineering at UNC Charlotte. He has worked for 9 years as the Director of the Industrial Solutions Lab. In this role, he is responsible for developing senior design projects with our industry partners and running the Senior Design Lab, Senior Design Purchasing and the finance aspects of the program. Prior to UNC Charlotte, Jim worked for 34 years in various industries including satellite communications, wireless communications and the petrochemical industry. Jim has a Bachelor of Engineering degree from Wayne State University and a Masters from the University of Central Florida.

**Description:** How do you get enough projects that aren't too big or too small? Our capstone experts will give you ideas.

## **Potential Questions**

### ***Recruiting process***

- What is your project recruiting process? Are there any particular entities that assist in the process?
- Has it gotten harder or easier in the last few years to recruit projects?
- Some potential clients are shocked that we charge for projects. What strategies have you developed to share the value proposition for funding projects? (IP, NDA, talent acquisition, new ideas, low-cost R&D, brand recognition, etc.)
- Do you have any tips for making the ask?

### ***Scoping process***

- What are some techniques you use to make sure the scope of industry projects fit within the capabilities of your Program?
- What do you do to prevent project scopes from getting out of control once they have started?
- Scoping projects can include processes to filter out unworkable projects and refining the expectations to fit the capstone program's objectives. What do you do when the client doesn't have a clear idea about what they want or when the project is way beyond what the students can accomplish? How do you handle adding additional project content so that academic goals can be met?
- Not all clients are good at writing up a project description. How much assistance do you provide? Do you have a template for such? If so, what are the must have information on your template?
- How do you explain differences between disciplines, e.g. engineering and software to perspective clients—especially those who may not have those disciplines internally?
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## **Notes:**

### **1. Project Recruiting Process**

Question: What is your project recruiting process?

#### **Stefano Foresti:**

Building the network takes time. It is an incremental process, and I do not have much assistance. Some contacts may come through external relations, but most of the work comes from gradually building relationships. One challenge is that many project commitments come together at the last minute, right before the class starts.

#### **Jim Hartman:**

The first step is to keep current sponsors in the program because it takes about four years on average to bring a new sponsor in. Current sponsors are also the best source for warm introductions. Cold calling is inefficient.

The career center is another useful source because companies that come to campus already have interest in the students. Career fairs, industry advisory boards, department advisory boards, and professional societies can also help identify sponsors. At career fairs, HR can be useful for introductions, but the real goal is to reach technical decision makers, such as engineering directors or vice presidents.

**Ben Fong:**

My case is different because I teach graduate students. I started from scratch and used the Industrial Roundtable to introduce the program, show my website, and build contacts. The Purdue alumni network has been very important. You need someone to introduce you to the right person, and once you get one opportunity, you have to deliver.

There are also constraints. Many students are international, so not every company can work with them. Students also often prefer large companies over local companies. Maintaining relationships is a continuous challenge because contacts may retire or move to other companies.

**2. Access to Executives and University Support**

Question: How helpful are development officers or university offices in helping you access executives?

**Jim Hartman:**

When the dean meets industry visitors, I ask to be introduced. Senior design can be a way to start relationships through projects, judging, or professional development. One company first came through senior design and later made a million-dollar donation.

Experience indicates that development officers are often more interested in developing prospects from capstone contacts.

**Stefano Foresti:**

When building a program, you need to build your own network. Networking is the basis. Career centers and recruiting events can help, but I also find value in bottom-up contacts. Quality control, safety, and operations staff often know the real problems inside a company.

A successful way to find projects is to visit the site, tour the facility, and ask many questions. Problems often become clearer when you walk through the process with them. Executive support helps, but the project works best when the client mentor truly cares about it.

**Ben Fong:**

Even with an office of industrial partnerships, you still need to do your own homework. I treat the work like consulting. I go to the client site, help scope the project, and train students to act as engineering consultants and project managers. If we call companies “clients,” then we need to deliver real value to them.

**3. Value Proposition for Sponsors**

Question: When you sell your program, how do you formulate the value proposition?

**Jim Hartman:**

The goal should be **win-win-win**: a win for the university, students, and the sponsor. Some companies participate for altruistic reasons, but you cannot rely on that. Sponsors need to get value from the program.

One value is recruiting. When companies participate, all senior students read about the company and its project. This helps especially small and medium-sized companies become more visible to students. Sponsors should be encouraged to identify talent within the first month of the project—before career fairs start and students get offers.

Another value is helping companies move lower-priority projects forward. Companies often have more work than people available. Senior design can help with projects that are on the to-do list but unlikely to be addressed soon.

Scope is also part of the value. If the project can be explained in about 30 seconds, it is usually better than one that takes five or ten minutes. You also need to turn down bad projects. If a sponsor has money and projects, but no liaison support, then defer the project to the next cycle when support resources are available.

When sponsors request a brochure, it is a polite way of saying no. Instead of sending a brochure, I ask for 15 minutes and show examples, videos, and similar past projects.

**Stefano Foresti:**

The first step is to understand the company's motivation. Are they interested in recruiting talent, or do they need a project result? If they are exploring something, any meaningful progress can be valuable. If they need a solution, the outcome must be measurable.

I usually ask companies about projects on their wish list rather than mission-critical problems. Many organizations have projects they keep postponing, and those can become good capstone projects. AI, computer vision, and data tools have also created more software-related project opportunities, even in traditional engineering settings.

**Ben Fong:**

For graduate-level projects, the value proposition depends on delivery. If the project involves significant funding, the program must deliver meaningful value. I try to reach senior leaders first because they can align the project with corporate strategy, KPIs, and implementation priorities. If the project can save the company money and help them recruit students, it becomes a business conversation.

#### **4. Project Scoping and Student Time**

Question: Is there a scope of work or number of hours you use as a rule of thumb?

**Jim Hartman:**

Students are expected to work about 10 hours per week for two semesters, but that is not all design time. Some time goes to reports, meetings, lectures, project management, and communication. Sponsors should not expect 50 hours per week of pure design work. Managing this expectation is important when scoping projects.

**Keith Stanfill (Host):**

I use about **600 hours for an experienced engineer** as a rough guide. For a student team, that can be divided across two semesters. It breaks down to 50 hours of work content per student per semester. So for a team of 6 in 2 semesters, 600 hours is a good number (assuming 3-credit courses).

**Ben Fong:**

For my graduate projects, a typical project may involve 300 to 500 hours, though some projects can be larger.

**Stefano Foresti:**

The exact number of hours is usually less important than team dynamics and project management. Problems need to surface early. Rescoping is acceptable, but hidden problems are dangerous.

#### **5. Company Has Money and Ideas but No Staff Time**

Question: What should you do if a company has ideas and money but no staff time?

**Jim Hartman:**

I would tell them not to do the project. Time is more important than money. The person working with students

needs to care about the project. Students can quickly tell if the sponsor is not engaged. I ask sponsors to commit at least one hour per week. If they cannot do that, they should not do the project.

**Stefano Foresti:**

It depends on the project. Some projects require regular company expertise, but others can work if the scope is clear and the program can act as the proxy client. In those cases, the company may only need to provide access to materials, data, or a site.

**Ben Fong:**

Change management is important. A good technical solution is not enough if the company does not accept or implement it.

## **6. Scoping Projects for Students Without System Integration Experience**

Question: How do you scope projects when students lack system integration experience?

**Jim Hartman:**

Students need to understand that engineering education continues beyond college. Every project requires learning something new. If students lack a skill, we may add another student, delay the project, or provide access to a faculty expert. We try not to put students in a position where they are set up to fail.

**Stefano Foresti:**

Ask students about skills beyond the curriculum, such as software, tools, hands-on work, and prior experience. If a project requires installation or assembly, include students who are comfortable with tools. If it is a software project, balance the team based on coding experience.

**Jim Hartman:**

Staffing is critical. We spend several weeks assigning students to projects and use surveys about skills and interests to build stronger teams.

## **7. Best Practices for Scoping Undergraduate and Master's Projects**

Question: What are best practices for scoping projects?

**Ben Fong:**

For my program, everything is based on a project charter: in scope, out of scope, and deliverables. I usually spend about four weeks on initial business analysis. Students should not negotiate scope with clients alone; the instructor or project coach needs to be involved.

**Jim Hartman:**

At the undergraduate level, I first shape the scope with the sponsor, then the senior design committee reviews it. This gives the project more than one set of eyes. Students also create a statement of work and measurable specifications. Once the sponsor signs off, that becomes the agreed scope.

We also teach students about scope creep. Students should say no to added scope unless they are certain it will not hurt quality or schedule.

**Stefano Foresti:**

Startups can be challenging because they may treat students like a research team and keep adding new ideas. Any major scope change should be discussed with faculty or the program contact first.

**Keith Stanfill:** Entrepreneurs that have never managed engineering teams typically pivot far too frequently—students can't keep up with this instability.

## **8. Follow-Up with Sponsors and Faculty Mentors**

Question: How do you follow up with sponsors and faculty mentors?

### **Jim Hartman:**

Follow-up is part of quality control. I reach out to each industry supporter at least once per semester. Before that, I check with the faculty mentor so I understand the project status. The senior design committee also helps track projects and identify those in the danger zone.

### **Stefano Foresti:**

I first identify projects that may fit, then discuss them with faculty. Since companies provide different levels of detail, we use a form asking for the project summary, background, problem, and objectives. After the team starts, students gather more details and refine the scope.

### **Ben Fong:**

Attend client meetings with the students. If you want high-quality projects, you need to spend time with the client and the team.