I-Corps™ for Learning

I-Corps™ L Course Syllabus

Days and Times:	January–February 2015
Kick-off Workshop	January 8−10 (with a reception on January 7)
Online Classes	Fridays, January 16, 23, 30, February 6, 13
	10:00am–1:00 pm PST via Adobe Connect
Final Workshop	February 26−27, 2015
Core Instructors:	Russell Korte, Colorado State University; Ann McKenna, Arizona State University; Karl Smith, University of Minnesota & Purdue University; Christopher Swan, Tufts University
Adjunct Instructors:	Steve Canfield, Tennessee Tech University; Jennifer Carolan, NewSchools Venture Fund; Heidi Olinger, Founder of Pretty Brainy; Bharani Rajakumar, Founder at LearnBop; Brent Sebold, Arizona State University
Node Instructors:	Dean Chang, University of Maryland; Todd Morrill, Venture Management Group
Consultants:	Steve Blank, Lean LaunchPad® Developer; Jerry Engel, National Faculty Director, I-Corps™
Teaching Assistant:	Lindsey Mitchell, DC I-Corps Program Manager
Course Evaluation:	Quality Evaluation Designs (QED): Gary Lichtenstein, Cathleen Simons, Sheri Sheppard
Logistics:	Rocio Chavela, ASEE; Tengiz Sydykov, ASEE
Texts:	*The Startup Owner's Manual (SOM),* Steve Blank and Bob Dorf; *Business Model Generation (BMG),* Alexander Osterwalder and Yves Pigneur; [Note: SOM and BMG will be sent to teams]; *Talking to Humans*, Giff Constable and Frank Rimalovski – Download from http://www.talkingtohumans.com/
Online Lectures:	On LaunchPad Central: https://launchpadcentral.com
Project Software:	LaunchPad Central: https://launchpadcentral.com
Program Website	American Society for Engineering Education: http://www.asee.org/i-corps-l

Contents

Introduction

Requirements for Enrollment

1. Attend as a NSF-selected team consisting of a Principal Investigator (PI), Entrepreneurial Lead (EL), and Mentor (M). The I-Corps™ L course is open to pre-approved I-Corps™ L teams only.
2. Each team member must commit to class time plus at least 15 additional hours a week for Customer Discovery.

Course Goals

1. Give the I-Corps™ L team an experiential learning opportunity to help determine the readiness of their innovation for sustainable scalability. Sustainable scalability involves a self-supported entity that is sustainable and systematically promotes the adoption of the educational innovation and enables and facilitates its use.
2. Enable the team to develop a clear go/no go decision regarding sustainable scalability of the innovation.
3. Develop a transition plan and actionable tasks to move the innovation forward to sustainable scalability, if the team decides to do so.

This course requires in-depth preparation and significant effort outside of the class sessions.
Your feedback is very important. You will be asked to complete four brief surveys. The Teaching Team relies on this feedback during and after the course.

Why Participate in this Important Course?

Your ideas and innovations are important and this course will help you get those ideas to more learners in more schools, thus improving STEM education across the country. That is the goal of the I-Corps™ L course and it is modeled after the successful NSF I-Corps™ program focused on scaling and sustaining technical innovations. Getting new innovations to a wider audience is difficult and an important part of this process is to develop an entrepreneurial mindset and strategy for success.

The NSF I-Corps™ program has taught hundreds of teams how to scale and sustain their research innovations. The process is successful to help startups increase their odds for success. We model our efforts after the business-oriented, start-up processes that have proven to be effective in scaling up the audience for innovations and increasing their sustainability beyond the end of research funding. We use the terminology used in the world of entrepreneurs who successfully scale and sustain their innovations. Last year, a pilot I-Corps™ L course demonstrated the effectiveness of this model for moving educational innovations to broader and sustainable audience.

This program provides real world, hands-on learning designed to reduce the risks and obstacles inherent in developing successful, sustainable, and scalable new ventures. We do this by helping innovative teams *rapidly*:

- define the utility of their ideas before spending more time and money
- understand who their core and tertiary customers are, and the marketing processes required for initial adoption and downstream sustainability
- assess intellectual property and risk before they design and build
- know what data will be required by future partnerships/collaboration/users before getting too far down the road
- identify financing and other important resources early

Program Strategy

This is a practical workshop – essentially a lab, not a theory or "textbook" class. Our goal, within the constraints of a classroom and a limited amount of time, is to *help you find a repeatable and scalable model that will launch your innovation to the widest possible audience. This will allow you to pursue your goals with substantially less resources and in a shorter amount of time than using traditional methods*.

The program uses the **Lean Startup** method. Rather than engaging in months of business planning, the method assumes that all you have is a series of untested hypotheses—basically, good guesses about the utility of your idea, who the customer/adopter/user is, payers, regulation, intellectual property, implementation requirements and objectives, etc. And that regardless of how elegant your plan, the reality is that most of it is wrong. You need to *get out of your school and into the world or your potential users* to search for the facts that validate or invalidate your hypotheses, and ultimately enable you to pursue strategies that will accelerate the launch, development, and scaling of your innovation.

This program formalizes this *search for a viable business model* in three main phases*.*
First, we start with a process of hypothesis testing familiar to every researcher. In this program you will learn how to use a **business-modeling** tool that helps focus and organize your entrepreneurial thinking and articulate your hypotheses for testing.

Second, you'll "*get out of the building*" using an approach called **customer development** to test your hypotheses. You will interview at least 100 potential users and collect evidence about whether your business hypotheses are valid or not. That means that every week you'll be talking to customers, partners, regulators, payers and competitors outside the classroom testing your assumptions about utility, partners, IP, regulatory issues, product features, pricing, distribution channels.

Third, based on the customer feedback you gathered, you will use **agile development** to rapidly iterate your innovation (product or concept) to design/build something users would adopt. This program requires you to be nimble and fast; you'll iterate on hypotheses and rapidly assemble minimum viable products (MVPs) and immediately elicit customer feedback. Then, using those customers' input to revise your assumptions and hypotheses, you'll start the cycle over again, testing redesigned offerings and making further refinements or more substantive changes (pivots) to improve your innovation.
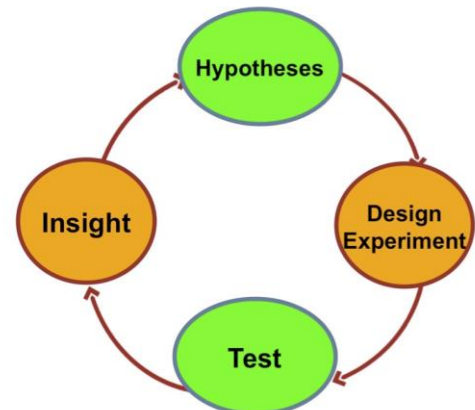
This process of making substantive changes to one or more of your hypotheses – called pivots – before you get too far into a plan helps you avoid huge future costs and potentially unforeseen dead-ends farther down the road of development.

Some teams may make even more radical changes. For example when one team in a pilot I-Corps™ L course discovered the "*right*" customer, they changed the core technology of their initial idea to better serve those customers. Another team reconfigured their set of educational services to better meet users' needs.

Instructional Methods

The course uses eight teaching methods. These include: 1. experiential learning, 2. team-based development, 3. a "flipped" classroom, 4. domain specific presentations, 5. weekly team presentations, 6. team teaching, 7. observing other teams and providing constructive feedback, and 8. *LaunchPad Central*—a learning and development management system.

1. Experiential Learning

This course is not about the presentations. The learning occurs outside of the classroom through conversations with potential users. Each week your team will conduct a *minimum* of 10 user interviews focused on a specific part of the business model canvas. This class is a simulation of what startups and entrepreneurs experience in the real world: chaos, uncertainty, impossible deadlines, insufficient time for development, conflicting input, etc.

2. Team-based development

This course is team-based. Working and studying will be done in teams of three; a Principal Investigator, Entrepreneurial Lead, and Mentor. The commitment of the entire team to the effort and necessary hours is a key admission criterion. Each and every team member *should participate in customer discovery activities* (*out of the building hypotheses testing)* talking with customers and users. You cannot delegate customer discovery. Teams will self-organize and establish individual roles and tasks on their own. There are no formal CEO/VP's, just the constant parsing and allocating of the tasks that need to be done.

3. The Flipped Classroom

During the online sessions, you'll watch weekly lectures on your own time. These lectures contain the information you will need to complete that week's customer interviews. What is traditional homework, (summarizing your weekly team progress updates) is now done in class, with the teaching team offering personalized guidance to each team. Note: The work you will be presenting weekly will be based on the on-line presentation you watched the prior week.

4. Domain Specific Lectures

Online presentations are supplemented by interactive, in-class presentations and discussions tailored to your specific market.

5. You Present Your Progress Weekly

Each week all teams will present a brief summary of what was learned testing specific hypotheses. The teaching team and your peers will provide feedback, advice, and guidance.

6. Team Teaching and the Inverted Lecture Hall

Sitting in the *back* of the classroom are experienced instructors and Industry Experts who've built and/or funded world-class startups and have worked with hundreds of entrepreneurial teams who will be commenting and critiquing each team's progress. While the comments may be specific to each team, the insights are almost always applicable to all teams.

7. Actively Observing Other Teams and Providing Written Constructive Feedback

The participant teams form a learning cohort. It is your responsibility to help each other and learn from one another's experiences. This form of collaborative learning will accelerate your team's progress. Each week, when other teams are presenting, you will be logged into the class on-line management tool, *LaunchPad Central,* where you will provide feedback, ideas, helpful critiques and suggestions for each team as they present. You will also assign a rating solely on your individual assessment of their performance. This feedback is viewable by all members of the class, and may – at the discretion of the instructors – be shared for class discussion.

8. Keeping Track of Your Progress: LaunchPad Central

Each week as you get of the building and talk to customers you will summarize what you learned using an online tool called LaunchPad Central. The tool automatically collects and displays your current hypotheses and the ones you've invalidated. This allows you to share what you've learned with the teaching team and your peers. This, along with your weekly presentations is how you monitor your progress.

Course Culture

Startups communicate much differently from the university or company culture you may be familiar with. At times it may feel relentlessly direct, but in reality it is focused and designed to create *immediate action* in time-, resource-, and cash-constrained environments. We have limited time and we push, challenge, and question you in the hope that you'll learn quickly. The pace and the uncertainty accelerate as the course proceeds.

We will be direct, open, and tough – just like the real world. This approach may seem harsh or abrupt, but it is a direct reflection of our desire for you to learn to challenge yourselves quickly and objectively, and to appreciate that as entrepreneurs you need to learn and evolve faster than you ever imagined possible. This class pushes many people out of their comfort zone.

Amount of Work

Teams that have completed this course report spending up to 20 hours or more each week on course activities. Getting out of the classroom and interviewing customers is a majority of the effort. Teams are expected to complete at least 12 in-person or Skype video interviews each week focused on the business model canvas area of emphasis for that week. This means that in total you will have completed 100 or more interviews by the end of the course. These interviews are valuable sources of information and cannot be delegated.

Course Organization

Three-Day I-Corps™ Workshop
The course starts with your entire NSF I-Corps™ L team in the Bay Area on Jan 7th -10th 2015 for the initial lectures and workshops. In these three days your team will present what you are learning to the entire class of 24-teams. At the end of each team's presentation the teaching team will offer observations and guidance. In addition, we'll learn and practice the art of customer discovery and in any remaining time make customer calls.

Post Workshop, Out of the Building Effort
As NSF I-Corps™ L teams return to their institutions, they are required to get out of the lab/building to test business model assumptions. This is a team effort. The curriculum will then continue weekly online via Adobe Connect.

Online Curriculum: Weekly Presentations and Progress Tracking
The 24 teams will be divided into three groups. Each team will present an 8-minute weekly progress report to members of the teaching team via Adobe Connect. At the end of each team's presentation we will offer observations and suggestions. This is how we monitor your progress and give you guidance. When your team is not presenting, each member of your team will be providing feedback to your peers on their presentations/ideas/progress.

Online Curriculum: Weekly Advanced Interactive Discussions
Immediately following the team presentations, the instructors will facilitate an interactive session via Adobe Connect on the next portion of the business model canvas. The instructors will run five weekly on-line lectures, Jan 16th, 23rd, 30th, Feb 6th, and 13th that will step through each of the 9 sections of the business model canvas.

I-Corps™ "Lessons Learned" Presentations
The entire I-Corps™ L team (Principal Investigator, Entrepreneurial Lead, Mentor) will return to the Bay Area on Feb 26th and 27th. There teams will present to the teaching team and guests the Lessons Learned in their exploration of sustainable scalability.

Deliverables

Meaningful customer discovery requires the development of a minimum viable product (MVP). Therefore, depending on whether the MVP is a product, process, service, etc., each team should have an applicable goal, such as one of the following:

1. Devices: teams building a device are expected to build a prototype or some key elements of the device, and a costed bill of materials.
2. Learning/Diagnostics/Assessments: teams developing learning, diagnostic or assessment products are expected to develop a graphic outlining how the learning/diagnostic/assessment product would be used.
3. Research/Learning Tools: teams developing physical research or learning tools are expected to develop a breadboard of the instrument and/or tool, a graphic demonstrating its anticipated use in research or learning, and an explicit description of the anticipated change to current work and/or data flows.
4. Your weekly LaunchPad Central narrative is an integral part of your deliverables. It's how we all measure our progress and it's required that you maintain and update it at least once per week, if not after every customer insight.
   a. Your LaunchPad Central narrative is to be updated no later than Thursday morning of each week so the teaching team has time to review prior to the presentations on Friday.
5. Each week your team will present a PowerPoint summary of progress.
6. As the final deliverable, your team will present:
   a. a 10-minute PowerPoint summary of Lessons Learned, and
   b. a 2-minute YouTube video of your technology

Logistics

Class meets in the Bay Area January 8th, 9th, 10th -- these are full days.
Class meets remotely every Friday Jan16th – Feb 13th for 3 hours.
Class meets again in the Bay Area Feb 26th and 27th -- these are full days.

Class Design

Teams have weekly activities inside and outside the classroom.

Outside the classroom testing your business model hypotheses by doing the following each week.
- Talking to 10-15 customers in-person or via video Skype
- Capturing your customer discovery progress by using the LaunchPad Central software and updating your business model canvas
- Taking what you have learned and assembling a Lessons Learned Presentation
- Engaging with your mentors
- Attending office hours as needed
- Watching the on-line lecture for the week and preparing questions for discussion

In the classroom:
- We meet together and engage in Q&A about what happened during the past week's Customer Discovery
- Teams split into separate groups
- All teams present what they learned during the week and receive instructor comments and critiques
- Group instructors facilitate a domain specific discussion on one of the 9 business model canvas building blocks to help teams prepare for the next week's Customer Discovery (see diagram below, taken from *Business Model Generation*).

Note: The work you will be presenting will be based on the online lesson you watched the prior week. The online lesson you watched before class and the in-class discussion will cover the upcoming week's business model topic to prepare you for the discovery tasks for the following week.

For example, when you participate in Class 4, you will be presenting your work on Customer Segments (BMC-2), you are expected to have watched the online lessons about Distribution Channels (BMC-3). The discussion (which will occur after the team presentations that were focused on Customer Segments), will address Distribution Channels.

Each week you present your updated version of your entire business model canvas, but your customer discovery should focus especially on the topic discussed in the prior week's class. Your presentation will primarily focus on the results of, and insights gained from, Customer Discovery.

Program At-A-Glance

Day	Topics	Team Deliverables
0 Jan. 7	• Opening reception	• Readings • Watch online lessons • Brief introduction of team
1 Jan. 8	• Business Model • Customer Discovery & Development • Get out of the building	• Readings • Watch online lessons • Team Presentation (Business Model Canvas, BMC)
2 Jan. 9	• Team Feedback • Value Propositions (BMC-1) • Get out of the building	• Readings • Watch online lessons • Team Presentation (Revised BMC)
3 Jan. 10	• Team Feedback • Customer Segments (BMC-2) • Web Conference training • Send off	• Readings • Watch online lessons • Team Presentation (Value Propositions BMC-1 and Value Proposition Canvas)
4 Jan. 16	• Team Feedback • Distribution Channels (BMC-3)	• Readings • Watch online lessons • Team Presentation (Customer Segments BMC-2)
5 Jan. 23	• Team Feedback • Customer Relationships (BMC-4)	• Readings • Watch online lessons • Team Presentation (Distribution Channels BMC-3)
6 Jan. 30	• Team Feedback • Key Resources (BMC-6)	• Readings • Watch online lessons • Team Presentation (Customer Relationships BMC-4)
7 Feb. 6	• Team Feedback • Key Partners (BMC-7)	• Readings • Watch online lessons • Team Presentation (Key Resources BMC-6)
8 Feb. 13	• Team Feedback • Revenue Streams (BMC-8) & Cost Structures (BMC-9)	• Readings • Watch online lessons • Team Presentation (Key Partners BMC-7)
9 Feb. 26	• Practice Presentations • What's Next?	• Watch online lessons – video preparation • Practice Presentations – Lessons Learned Slides and Video • Lessons Learned Presentation and Video – Refine and Finalize
10 Feb. 27	• Team Presentations	• Team Presentation (Final)

Pre-Class Assignments

Pre-Class Preparation for Day 1 of the Class

Teams are expected to hit the ground running. We assume you and your team have come prepared having read the assigned materials, watched the online lectures, and prepared a set of at least 10 customer contacts to call on in the Bay Area that you can interview during the workshop (January 8, 9, 10). And we expect you to have scheduled appointments with **5 potential customers/users before the start of the class.**

WEBINAR: Participate in the LaunchPad Central webinar.

Information on date, time and URL will be sent via email by the course TA, Lindsey Mitchell.

READ: Business Models, Customer Development, Value Proposition

Remember that these readings and presentations came out of the world of start-ups, and even though the language is business oriented, the concepts apply to sustaining and scaling your innovations.

- Read: *Business Model Generation (BMG)*: pp. 14-49 The 9 Building Blocks of the Canvas. pp 77-87 multisided platforms, pp 134-142 Ideation, pp 200-211 business model environment
- Read: *Startup Owner's Manual (SOM)*: pp. 1-75 intro to customer development and discovery, market size, pp. 76-84 value proposition and MVP, pp 112-122 market type, pp. 123-124 competitors, pp 189-199 getting out of the building/experiments/contacts, pp 472 market size, pp. 473-475 product features checklist pp. 487 Contacts checklist
- *Read*: Giff Constable, "Talking to Humans"
- Steve Blank, "What's a Startup? First Principles," http://steveblank.com/2010/01/25/whats-a-startup-first-principles/
- Steve Blank, "Make No Little Plans – Defining the Scalable Startup," http://steveblank.com/2010/01/04/make-no-little-plans-–-defining-the-scalable-startup/
- Steve Blank, "A Startup is Not a Smaller Version of a Large Company", http://steveblank.com/2010/01/14/a-startup-is-not-a-smaller-version-of-a-large-company/

WATCH:
- Online lessons 1, 1.5a, 1.5b and 2: What We Now Know, Business Models, Customer Development and Value Proposition Online lessons start here: https://www.udacity.com/course/viewer#!/c-ep245/l-48743167/m-48750057
- The "How to Do Customer Discovery" Videos on LaunchPad Central
    - o CD41 Pre-Planning: Contacts
    - o CD42 Customer Interview Dry Runs
    - o CD44 Pass/Fail Experiments
    - o CD46 Conducting a Customer Interview
    - o CD50 Looking for Insights
    - o CD01 Death By PowerPoint
    - o CD04 Understanding the Problem

REMEMBER:

- Talk to at least 3 customers and use what you learn to complete your initial business model canvas
- Record what you learned from the customer interviews in LaunchPad Central
- **Come prepared with a list of 10 additional individuals you will call on while you're in the Bay Area.** Set up and schedule these interviews before you come to the Kick-Off on January 7th.

All Teams: Come Prepared to answer the following questions:

- What's the difference between search and execution regarding business models?
- What is a business model versus a business plan?
- What is the Business Model Canvas?
- What are the 9 components of the Business Model Canvas?
- What is a hypothesis in this context?
- What do we mean by "experiments"?
- What is Customer Development?
- What are the key tenets of Customer Development?

Prepare a Presentation for January 8th Class Business Model

Prepare a presentation to present your business model to the class:
Slide 1: Title Slide
Slide 2: Tell us what you have learned from customers so far. What did you expect, what did you learn, and what are you going to do next?
Slide 3: Show us your Business Model Canvas – for 30 seconds

<p style="text-align:center">Upload your presentation to Dropbox by 7:00 am PST</p>

NOTE: Save your presentations to Dropbox using this naming convention:
TeamNumber_TeamName_Date (e.g., 234_Aqua-Lung_11062013)

Slide 1: Title Slide (see example on the right)
- Team name
- University/Organization logo
- Product picture/product description (1 sentence)
- Pictures/names of your team members

Slide 2: Customer Discovery. What you learned from customers. What did you expect, what did you learn, and what are you going to do next?

Slide 3: Populated Business Model Canvas

TEAM NAME HERE   FILL OUT ALL 9 BOXES OF THE CANVAS IN ORDER 1 THUR 9

Key Partners **7**	Key Activities **5**	Value Propositions **1**	Customer Relationships **4**	Customer Segments **2**
	What Key Activities do our Value Propositions require?	Which one of our customer's *problems* are we helping to solve? Which customer *needs* are we satisfying? What is the specific product/service? What are the *features* that match customer needs?	How will we Keep and Grow customers?	For who are we solving a problem or fulfilling a need? Who are the customers? Does the value proposition match their needs? Is this a single-sided or multi-sided market?
Who are our Key Partners?	**Key Resources 6** What Key Resources (suppliers, etc.) do our Value Propositions require?		**Channels 3** Through which Channels do our Customer Segments want to be reached?	

Cost Structure **9**	Revenue Streams **8**
What are the most important costs in our business model?	What is the revenue model? What are the pricing tactics? For what vale are our customers willing to pay?

Detailed Course Schedule

Wednesday January 7th – Reception

 7:00 - 9:00pm Location: Savoy Room, Marriot Union Square

Thursday, January 8th – Class 1 – Business Model/Customer Discovery & Development

Time	Session
8:30 - 9:00 am	**Introduction** • Teaching Team Introductions • Class Goals • Teaching Philosophy • Expectations of You
9:00 - 9:30 am	**Discussion: Overview of Business Model/Customer Discovery & Development, Part 1** What's a business model? What are the 9 parts of a business model? What are hypotheses? What is the Minimum Feature Set? What experiments are needed to test business model hypotheses? What's "getting out of the building?" What is market size? How to determine whether a business model is worth doing?
9:30 – 12:00 pm	**Team Presentations** Teams present their business model canvas to the entire classroom. Each team is allotted 5 minutes total, to include 3 minutes presentation and 2 minutes for teaching team comment. • **Slide 1:** Title Slide • **Slide 2:** Tell us about your customer interviews. What did you expect, what do you learn, what are you going to do next? • **Slide 3:** Show us your Business Model Canvas – for 30 seconds
12:00 – 12:30 pm	**Q&A LaunchPad Central (Lunch)**
12:30 – 1:00 pm	**Discussion: Overview of Business Model/Customer Discovery & Development/Market Type, Part 2** • Intro to the Business Model Canvas and customer development a. Mapping the canvas to learning innovations b. Discovery versus selling versus focus groups • Definition of hypotheses • Definition of Minimum Viable Product (MVP) in educational settings • Constructing experiments • Explanation of "getting out of the building" • Definition of market type (existing, re-segmented, new, or clone) • How market size/exit strategy differ for educational innovations a. How do you determine whether a business model is worth doing
1:00 - 1:30 pm	**Best Practices for Customer Discovery & Development** • How to call on people you don't know. How to get the most out of the people

	you do. • Expectations, speed, tempo, logistics, commitments. • How do I protect my IP when I speak to partners? • Does Lean work for education efforts? • How do I interview? • How is an interview different than a sales call?
1:30 - 5:00 pm	**Customer Discovery & Development – Get out of the building!** • Using the contacts you've already prepared and the interviews you've previously scheduled, interview at least 3-5 potential customers to generate findings about your value proposition hypotheses. We encourage you to set up meetings to talk to potential customers in the Bay Area or via Skype before you arrive at the workshop. • Getting a good start and maintaining a good pace of discovery interviews has proven to be a key success factor for the best performing teams. • You will be presenting your results tomorrow morning in your updated business model canvas.
5:00 – 6:00 pm	**Office Hour***
6:00 - 7:30 pm	**Panel: How to Succeed in the Innovation Corps for Learning (Working Dinner)** A panel discussion with prior participants in the I-Corps™ program
7:30 - 8:30 pm	**Mentor Workshop** (Mentors only) The role of Mentors in the Lean LaunchPad® process

*A schedule of **Office Hours** throughout course will be made available. You are expected to use these opportunities to seek teaching team support.

Assignment for Class 2 – Friday, January 9th – Value Propositions BMC-1

READ: evening of Jan 8th for Class 2 – Value Propositions BMC-1
- *BMG*, pp. 22—25
- *SOM*: pp. 76-84 value proposition and MVP, pp. 473-475 product features checklist
- Osterwalder Value Proposition Canvas at http://businessmodelalchemist.com/blog/2012/08/achieve-product-market-fit-with-our-brand-new-value-proposition-designer.html and http://businessmodelalchemist.com/blog/2012/09/test-your-value-proposition-supercharge-lean-startup-and-custdev-principles.html

WATCH:
- Online lesson 2 Value Proposition
  https://www.udacity.com/course/viewer#!/c-ep245/l-48745133/m-48299905
  (or access through LPC)

PREPARE: Presentation for tomorrows Jan 9th Class: Customer Discovery & Development
Talk to at least 3-5 potential customers to generate findings about your innovation

PRESENTATION FORMAT:
- **Slide 1:** Cover slide (Team member names, Team name, Team number, 1 to 2 sentence description of your product and the number of customer contacts you've made)
- **Slide 2:** Current business model canvas with any changes marked
- **Slide 3:** What are your proposed experiments to test customer segment, value proposition, channel and revenue model of the hypotheses: What constitutes a pass/fail signal for each test (e.g. at what point would you say that your hypotheses weren't even close to correct)? What did you learn from talking to your first customers?
  - Hypothesis: Here's What We Thought
  - Experiments: So Here's What We Did
  - Results: So Here's What We Found
  - Iterate: So Here's What We're Going to do Next

  Slide 4: So Here's What We Are Going To Do Next Week

REMEMBER:
- Get out of the building and talk to as many people as you can
- Record what you learned from the customer interviews in LaunchPad Central

Upload your presentation to Dropbox by 7:00 am PST

Friday, January 9th – Class 2 – Value Proposition (BMC-1)

Time	Session
8:30 – 8:45 am	**Day 2 Introduction** A brief introduction by NSF Q&A Customer Discovery & Development, Value Proposition
8:45 – 11:15 am	**Team Presentations – Customer Discovery & Development** Teams present their business model canvas in two concurrent tracks (break-out groups). Each team is allotted 10 minutes total (6 minutes for presentation and 4 minutes for teaching team comments).
11:15 – 12:15 pm	**Discussion: Value Proposition** What is your product or service? How does it differ from an idea? Why will people want it? Who's the competition and how does your customer view these competitive offerings? Where's the market? What's the *minimum feature set*? What's the Market Type? What was your inspiration or impetus? What assumptions drove you to this? What unique insight do you have into the market dynamics or into a technological shift that makes this a fresh opportunity?
12:15 – 7:30 pm	**Customer Discovery – Get out of the building!** • Interview at least 3-5 more potential customers to generate findings about your value proposition Hypothesis. We encourage you to you set up meetings to talk to potential customers in the Bay Area or via Skype before you arrive. Getting a good start and maintaining a good pace of discovery interviews has proven to be a key success factor for the best performing teams. You will be presenting your results tomorrow morning in your updated business model canvas.
7:30 – 8:00 pm	**PI Workshop** (PI's only)
8:00 – 8:30 pm	**EL Workshop** (EL's only)

Assignment for Class 3 – Saturday, January 10ᵗʰ – Customer Segments (BMC-2)

READ: the evening of Jan 9ᵗʰ for Class 3 – Customer Segments (BMC-2)

▪ Read *BMG:* pp 127-133 customer insights, pp 161-168 prototyping

▪ Read *SOM:* pp 85-92 customer segments, pp. 203-214 problem understanding, pp. 218- 219 gain customer understanding, pp. 222-224 Market Knowledge, pp. 260-266 product/market fit pp. 476-477 customer segment checklist

WATCH:

▪ Online lesson 3 customer segments: https://www.udacity.com/course/viewer#!/c-ep245/l-48632907/m-48739211

PREPARE: presentation for tomorrow's Jan 10ᵗʰ class: Customer Segments
Talk to at least 3-5 new potential customers to generate findings

- Slide 1: Title slide
- Slide 2-n: What did you learn about your customers?
  - Hypothesis: Here's What We Thought
  - Experiments: So Here's What We Did
  - Results: So Here's What We Found
  - Iterate: So Here's What We Are Going To Do Next?
- Slide 3: business model canvas with any changes marked in red, Multi-sided markets shown in different colors
- Slide 4: Value Proposition/Customer Segment Canvas see: http://www.businessmodelgeneration.com/downloads/value_proposition_canvas.pdf
  - What are the Gains, Pain, Customer Jobs?
  - What's the MVP you'll test?
- Slide 5: How do they solve this problem(s) today? Does your value proposition solve it? How?

<div align="center">

Upload your presentation to Dropbox by 7:00 am PST

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REMEMBER:

- Get out of the building and talk to as many people as you can
- Ask potential customers what they think about your value proposition. You may consider online survey tools* as a secondary means by which to generate more data.
- Update your business model canvas based on your findings
- Record what you learned from the customer interviews in LaunchPad Central

* *Survey tools are not a means to conduct customer interviews, and survey responses may not be counted as unique customer contacts. Surveys are most useful for collecting quantitative data on subjects for which responses are finite and follow-up minimal. Surveys cannot, however, compare with live interviews, wherein respondents' answers to open-ended questions can drive follow up that digs deeper and ascertains a deeper understanding of respondent pain-points, needs, priorities, etc.*

Saturday, January 10th – Class 3 – Customer Segments (BMC-2)

Time	Session
8:30 – 8:45 am	**Day 3 Introduction** A brief introduction by NSF Q&A – How did the discovery go? Surprises?
8:45 – 11:00 am	**Team Presentations** Teams present their business model canvas in three concurrent tracks. Each team is allotted 15 minutes total to include 10 minutes for presentation and 5 minutes for teaching team comments.
11:00 – 12:00 am	**Discussion: Customers Segments BMC-2** Who's the customer? User? Payer? How are they different? Why do they buy? How can you reach them? How is a business customer different from a consumer? What's a multi-sided market? What's segmentation? What's an archetype?
12:00 – 1:00 pm	**Adobe Connect Training and Send off (Working Lunch)** Receive your headset. Learn the expectations and protocol for the 5 online classes. Preflight and checkout of your computer and headset for use in remote lectures. Configuration support for hardware and software

See you online next week, Friday, Jan 16th
10:00am - 1:00pm PST

Assignment for Class 4 – Friday, January 16 – Channels (BMC-3)

READ:

- *The Startup Owner's Manual,* pages 98–105 Channels, 242-244 meet the channel, 332-337 Channel Roadmap, 406–411distribution channels, 478 channels checklist
- See Mark Leslie *Value Chain* slides at http://www.slideshare.net/markleslie01/070801-value-chain-and-sales-model
- Review Startup Tools: http://steveblank.com/tools-and-blogs-for-entrepreneurs/

WATCH:

- Watch: online lesson 4 –*Distribution Channels*:
  http://www.udacity.com/view#Course/nsfllp/CourseRev/1/Unit/1001/Nugget/3001
  (The link will also be available on LaunchPad Central)

PRESENTATION FORMAT:

Slide 1:   Cover slide
Slide 2-n: What did you learn about your customers?
- o   Hypothesis: Here's What We Thought
- o   Experiments: So Here's What We Did
- o   Results: So Here's What We Found
- o   Iterate: So Here's What We Are Going To Do Next?

Slide 3: Business model canvas with any changes marked in red,
Slide 4: Value Proposition/Customer Segment Canvas see:
http://www.businessmodelgeneration.com/downloads/value_proposition_canvas.pdf
- o   What are the Gains, Pain, Customer Jobs?
- o   What's the MVP you'll test?

Slide 5: Diagram of Customer workflow

Slide 6: What is the resulting Customer Archetype? Draw a diagram

<p align="center">Upload your presentation to Dropbox by 8:00 am PST</p>

REMEMBER:

- Talk to ~15 potential customers face to face.
- Record what you learned from the customer interviews in LaunchPad Central

Friday, January 16th – Class 4 – Channels (BMC-3)

Location: Adobe Connect

Time	Session
9:00 – 10:00 am PST	**Test Adobe Connect** The online classrooms will be open for one hour prior to Team Presentation time begins. Log on during this time to test video, sound and troubleshoot technical issues.
10:00 – 12:00 pm PST	**Team Presentations** Teams present their business model canvas in three concurrent tracks. Each team is allotted 12 minutes total to include 10 minutes for presentation, 2 minutes for teaching team comments.
12:00 – 1:00 pm PST	**Discussion: Distribution Channels (BMC-3)** Teams will join a single Adobe Connect classroom for a discussion. What's a channel? Physical versus virtual channels. Direct channels, indirect channels, OEM. Multi-sided markets. Different channels and sales in the education ecosystem.

Assignment for Class 5 – Friday, January 23 – Customer Relationships (BMC-4)

READ:
- *SOM* pp. 126-143 customer relationships hypotheses, pp. 296-303 Get/Keep/Grow, pp. 480-482 Relationships checklist, pp. 489 Test the Problem and its importance

WATCH:
- Online lesson *5 – Customer Relationships*:
  http://www.udacity.com/view#Course/nsfllp/CourseRev/1/Unit/50001/Nugget/52001
  (The link will also be available on LaunchPad Central)

FOR WEB TEAMS:
- Get a low-fidelity web site up and running. (Relevant reading: See *The Startup Owner's Manual* page 211–217)

PRESENTATION FORMAT:
Slide 1: Title slide
Slide 2: Channels
- o   What is the distribution channel? Are there alternatives?
- o   What was it that made channel partners interested? excited?
- o   Draw the channel diagram - Annotate it with the channel economics
Slide 3: What did you learn about your Channel?
- o   Hypothesis: Here's What We Thought
- o   Experiments: So Here's What We Did
- o   Results: So Here's What We Found
- o   Iterate: So Here's What We Are Going To Do Next
Slide 4: Business model canvas with any changes marked in red, Multi-sided markets shown in different colors
Slide 5: Draw the channel diagram - Annotate it with the channel economics
Slide 6: So Here's What We Are Going To Do Next Week

Upload your presentation to Dropbox by 8:00 am PST

REMEMBER:
- Talk to ~15 channel partners and/or customers.
- Record what you learned from the customer interviews in LaunchPad Central

Friday, January 23rd – Class 5 – Customer Relationships (BMC-4)

Location: Adobe Connect

Time	Session
9:00 – 10:00 am PST	**Test Adobe Connect** The online classrooms will be open for one hour prior to Team Presentation time begins. Log on during this time to test video, sound and troubleshoot technical issues.
10:00 – 12:00 pm PST	**Team Presentations** Teams present their business model canvas in three concurrent tracks. Each team is allotted 12 minutes total to include 10 minutes for presentation, 2 minutes for teaching team comments.
12:00 – 1:00 pm PST	**Discussion: Customer Relationships: Get/Keep/Grow (BMC-4)** How do you create end user demand? How does it differ on the web versus other channels? Evangelism vs. existing need or category? General Marketing, Sales Funnel, etc. How does demand creation differ in a multi-sided market?

Assignment for Class 6 – Friday, January 30 – Key Resources (BMC-6)

READ:
- *SOM* pp. 169-175 resources, pp 267-269

WATCH:

- Online lesson *8 – Key Resources*:
  http://www.udacity.com/view#Course/nsfllp/CourseRev/1/Unit/194002/Nugget/208001
  (The link will also be available on LaunchPad Central)

PRESENTATION FORMAT:
Slide 1: Title slide

Slide 2: What were your objective pass/fail metrics for each "Get" test/methodology

- What is your customer acquisition cost?, How will you create demand?
- Who are the Key Opinion Leaders (KOL's)?
- Who will be on your Advisory Board? What conferences do you need to present at?
- What journals, conferences, etc. do you need to be in? If any, who are the Bus Dev people you need to target? Build demand creation budget and forecast.

Slide 3: What did you learn about your Customer Relationships (Get/Keep/Grow)?
- Hypothesis: Here's What We Thought
- Experiments: So Here's What We Did
- Results: So Here's What We Found
- Iterate: So Here's What We Are Going To Do Next

Slide 4: business model canvas with any changes marked in red, Multi-sided markets shown in different colors

Slide 5: Draw the Get/Keep/Grow diagram - Annotate it with the key metrics Slide 6: So Here's What We Are Going To Do Next Week

Upload your presentation to Dropbox by 8:00 am PST

REMEMBER:
- Talk to customers
- Record what you learned from the customer interviews in LaunchPad Central

Friday, January 30th – Class 6 – Key Resources (BMC-6)

Location: Adobe Connect

Time	Session
9:00 – 10:00 am PST	**Test Adobe Connect** The online classrooms will be open for one hour prior to Team Presentation time begins. Log on during this time to test video, sound and troubleshoot technical issues.
10:00 – 12:00 pm PST	**Team Presentations** Teams present their business model canvas in three concurrent tracks. Each team is allotted 12 minutes total to include 10 minutes for presentation, 2 minutes for teaching team comments.
12:00 – 12:30 pm PST	**Discussion: Key Resources (BMC-6)** What resources do you need to scale and sustain your innovation? How many people are needed to be considered at-scale? Who are they? Any hardware or software you need to buy? Any IP you need to license? How much money do you need to raise? When? Why? Importance of cash flows? When do you get paid vs. when do you pay others?
12:30 – 1:00 pm PST	**Mentor Meeting (Mentors only)** This is an opportunity for mentors and the Teaching Team to check in. How is your Team progressing? How can we support one another?

Assignment for Class 7 – Friday, February 6th – Key Partners (BMC 7)

READ:

▪ BMG 109-113 open business models

▪ SOM pp. 176-179 partners, pp. 484 partner's checklist. pp. 484 partner's checklist.

WATCH:

- Sign in and watch *Lecture 7 – Partners*:
  http://www.udacity.com/view#Course/nsfllp/CourseRev/1/Unit/167001/Nugget/169001
  (The link will also be made available on LaunchPad Central)

PRESENTATION FORMAT:

▪ Slide 1: Title slide

▪ Slide 2: What are your *critical* Resources? Resources should match your critical Activities
  - Are they resources you already have?
  - Do you need to acquire or partner with others to get them?
  - How much will they cost?
  - What human resources will you need?
  - What equipment resources will you need?
  - What financial resources will you need to acquire all these resources?

▪ Slide 3: What did you learn about your resources?
  - Hypothesis: Here's What We Thought
  - Experiments: So Here's What We Did
  - Results: So Here's What We Found
  - Iterate: So Here's What We Are Going To Do Next

▪ Slide 3: What experiments did you run to validate that these resources can be acquired?

▪ Slide 4: business model canvas with any changes marked in red, Multi-sided markets shown in different colors (Is this a multi-sided market?)

▪ Slide 5: Rough diagram of activities and resources/partners needed to accomplish them

▪ Slide 6: Iterate: So Here's What We Are Going To Do Next Week

Upload your presentation to Dropbox by 8:00 am PST

REMEMBER:

- Talk to customers
- Record what you learned from the customer interviews in LaunchPad Central

Friday, February 6th – Class 7 – Key Partners (BMC-7)

Location: Adobe Connect

Time	Session
9:00 – 10:00 am PST	**Test Adobe Connect** The online classrooms will be open for one hour prior to Team Presentation time begins. Log on during this time to test video, sound and troubleshoot technical issues.
10:00 – 12:00 pm PST	**Team Presentations** Teams present their business model canvas in three concurrent tracks. Each team is allotted 12 minutes total to include 10 minutes for presentation, 2 minutes for teaching team comments.
12:00 – 1:00 pm PST	**Discussion: Key Partners (BMC-7)** Who are partners? Strategic alliances, competition, joint ventures, buyer supplier, licensees.

Assignment for Class 8 – Friday, February 13th Revenue Streams (BMC-8) & Cost Structure (BMC-9)

READ:

- *SOM* pp. 180-188 revenue and pricing hypotheses, pp. 260-269 verify business model, pp. 438 metrics that matter, pp. 437-456 Pivot or Proceed?,pp. 457-459 financial model, Pp. 526-527 assemble data, pp. 528 Validate Financial Model

WATCH:

- Sign in and watch *Lecture 6 – Revenue Models*:
  http://www.udacity.com/view#Course/nsfllp/CourseRev/1/Unit/131001/Nugget/132001
  (The link will also be made available on LaunchPad Central)

PRESENTATION FORMAT:

- Slide 1: Title slide

- Slide 2: What were your hypotheses about what partners will you need? Partners should match your critical Resources (and Activities, if you've considered them)
  - Why do you need these partners and what are risks?
  - Why will they partner with you?
  - What's the cost of the partnership?
  - Diagram the partner relationships with any dollar or other sharing of resources flows
  - What are the incentives and impediments for the partners?

- Slide 3: What did you learn about your Partners?
  - Hypothesis: Here's What We Thought
  - Experiments: So Here's What We Did
  - Results: So Here's What We Found
  - Iterate: So Here's What We Are Going To Do Next
- Slide 4: business model canvas with any changes marked in red, Multi-sided markets shown in different colors (Is this a multi-sided market?)

- Slide 5: Final diagram of activities and resources/partners needed to accomplish them Slide 6: Iterate: So Here's What We Are Going To Do Next

  Upload your presentation to Dropbox by 8:00 am PST

Remember:
- Talk to customers
- Record what you learned from the customer interviews in LaunchPad Central

Friday, February 13th – Class 8 – Revenue Streams (BMC-8) & Cost Structure (BMC-9)

Location: Adobe Connect

Time	Session
9:00 – 10:00 am PST	**Test Adobe Connect** The online classrooms will be open for one hour prior to Team Presentation time begins. Log on during this time to test video, sound and troubleshoot technical issues.
10:00 – 12:00 pm PST	**Team Presentations** Teams present their business model canvas in three concurrent tracks. Each team is allotted 12 minutes total to include 10 minutes for presentation, 2 minutes for teaching team comments.
12:00 – 1:00 pm PST	**Discussion: Revenue Streams (BMC-8) & Cost Structure (BMC-9)** What revenues and resources are necessary to sustain your innovation? What are the expenses? How do you generate revenue streams? What is your revenue model to reach scale?

Assignment for Class 9 – Thursday, February 26th

WATCH:
- **Before your team starts working on your videos**, please watch *Getting Started with Video Production for I-Corps™ L* by Craig Protzel: http://youtu.be/M8oCqrH2nhI
- Watch Ira Glass' *Storytelling (Part 1 of 4)* video: http://www.youtube.com/watch?v=loxJ3FtCJJA

PRESENTATIONS

10-minute Lessons-Learned Presentation

Slide 1:   Team Name & a few lines of what your initial idea was and the size of the opportunity
Slide 2:   Team members – name, background, expertise and your role for the team
Slide 3:   Business Model Canvas, Initial. Here was our original idea.
Slide 4:   So here's what we did (explain how you got out of the building)
Slide 5:   So here's what we found (what was reality) so then, …
Slide 6:   Business Model Canvas, Mid-point We iterated or pivoted… explain why and what you found.
Slide 7:   So here's what we did (explain how you got out of the building)
Slide 8:   So here's what we found (what was reality) so then…
Slide 9:   Business Model Canvas Final. We iterated or pivoted… explain why and what you found. "So here's where we ended up."
Slide 10:   Talk about:
- what did you learn
- whether you think your innovation is viable to scale and be sustained, Go or No Go.
- whether you want to pursue it after the course, etc.
- include links to your Story and Technology videos on YouTube.

Somewhere in your slide deck, you need to touch on the following:
- Market Size diagram (i.e. what is your definition of what scale means for your innovation)
- Customer Archetypes diagram
- Customer Workflow diagram
- Distribution Channel diagram
- Competitive Players
- Revenue Model diagram (i.e. what do you need in order to sustain your innovation)

Your presentation should also contain links to your videos (*Lessons Learned* and *Technical*) on YouTube

Sample presentations from previous cohorts will be made available to you for reference at http://www.asee.org/i-corps-l/resources.

VIDEO PREPARATION ASSIGNMENTS (See next pages for video specifications)

A 2-minute Lessons Learned Video

A 1-minute Technical Video

See next page for video specifications and production tips
*Sharing***:**

- Final videos should be < 50 MB each (sizes can be reduced in editing software)
- Upload your presentation and videos to Dropbox
- As back-up, please also upload your videos to YouTube, and include links to the videos in your PowerPoint, and e-mail links to your TA Lindsey Mitchell at: lnm@vt.edu

REMEMBER:
- Talk to customers
- Record what you learned from the customer interviews in LaunchPad Central

2-Minute Lessons Learned / Story Video

Create a two-minute video that tells a story. This is not a demonstration of scientific prowess. We want to hear about your journey through the NSF I-Corps™ L as it relates to your innovation. The more specific you can make it, the more specific details you can include, the more specifically you can describe answers to the question below, the better. Here's a quick outline that should point you in the right direction:

- What are your names and what is your teams' name? Introduce yourselves. Pan the camera around your office so we can see where you work.
- What scientific discipline are you working in?
- When you started the class, what was the most important thing you thought you would have to do to successfully launch a scalable startup? How do you feel about that now?
- Thinking back across the class, who was the most interesting customer you met and where did you meet them? What happened?
- Now that the class is over, what was the most surprising thing you learned in the class?

Please do not spend any time thanking the instructor team or the NSF. This video is about your team and about you. Time limit is 2 minutes, so keep it short and to the point. And no need to get high tech. Grab an iPhone and shoot with the camera.

Note that **everyone should have video editing software on their laptops so that we can make edits and adjustments to your video during our day together**, and so you can work on this in the evening too.

Sample presentations from previous cohorts will be made available to you for reference at http://www.asee.org/i-corps-l/resources.

1-Minute Technical Video

NSF and the I-Corps™ L teaching team would also like you to produce a short video focused on the details of your educational innovation. This assignment challenges you to use what you have learned to concisely describe the educational and innovative aspects of your project with the value proposition and customer archetype in mind. The ability to do this effectively will be critical when making future pitches.

This will *not* be part of your final presentation, but you will make them publicly available for viewing. NSF will also retain this video as a record of where your innovation stands today.

Consider the audience for this video to be people who are well-versed enough to understand your project, your process, your lab, your equipment, and your approach at a general level; perhaps like someone you might meet at a conference focused on your general area of expertise. This video is a great place to include hero shots of your learning apparatus, your lab filled with bubbling students and chemistry experiments, or awesome shots of students creating computer simulations of their experiments running

on the International Space Station in zero gravity.

Sample presentations from previous cohorts are available to you for reference at http://www.asee.org/i-corps-l/resources.

Basic Video Production Tips:
Your videos do not require high production value. You need not purchase fancy recording equipment or expensive editing software. You *DO* need to adequately convey your message. Here are a few things you can do – for free – to improve the quality of your video.

Audio:
- Find a quiet space or reduce competing noise before recording (listen for ventilation systems, machinery humming, wind, background activity)
- Get the microphone as close to your subject as possible
- Have subjects speak toward the camera as much as possible
- If you add background music, make sure that it complements, not distracts from, your presentation (and if it's too loud, it will definitely distract!)

Lighting:
- Make sure there is adequate light where you are recording. When in doubt, go brighter.
- For interview subjects, alter the lighting, or identify an interview location, where the subject will be lighted equally on both sides (otherwise one side of the subject will be in shadow and the contrast enhances the perception of darkness)
- If you shoot outdoors, make sure that the sun doesn't shine directly in your subject's eyes or directly into the camera

Presentation:
- Smile and show your enthusiasm for your subject
- Before you start talking, take a deep breath, pause and smile – this not only will prepare you for recording but will provide a natural spot to trim off any excess video during editing
- Speak slowly and clearly.
- Use hand gestures if you like, but not too wildly.

Other production tips:
- Use a tripod, or rest the camera on a stable platform to ensure that the video is steady and not crooked
- Consider recording some segments twice – once close up and once farther away, so in the "editing room" later, you may cut together the shots to provide some variety, or you can select the version for which picture and audio turned out best

Looking to use free editing software?
- iMovie comes free with Apple hardware
- PC users can download a free, 30-day trial of Camtasia: www.camtasiasoftware.com

Thursday, February 26th – Class 9 – Prepare and Practice Final Presentations

Time	Session
9:00 – 9:30 am	**Welcome Back**
9:30 – 12:00 pm	**Practice Presentations** Teams practice their Lessons Learned presentations in three concurrent tracks to get ready for their final presentation. Each team is allotted 15 minutes total to include 10 minutes for presentation and 5 minutes for teaching team comments.
12:00 – 1:30 pm	**NSF Session (Working Lunch)**
1:30 – 4:30 pm	**Working Session: Refine and Finalize Your Presentation** Teams work on their presentations. The teaching team will be available to provide feedback.
4:30 – 5:30 pm	*What's Next?* **Panel**
5:30 – 7:00 pm	**Networking Dinner**

Friday, February 27th – Final Presentations

Time	Session
8:00 – 8:15 am	**ASEE Presentation**
8:15 – 12:00 pm	**Team Presentations, Part 1** Teams present to the entire class. Each team is allotted 15 minutes total, to include their 2-minute Lessons Learned Video, 10-minute Lesson Learned Presentation and 3 minutes of teaching team comments.
12:00 – 12:30 pm	**Lunch**
12:30 – 4:00 pm	**Team Presentations, Part 2**
4:00 – 4:30 pm	**Closing Session**

Teaching Team

Core Instructors

Karl Smith

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Karl Smith is Emeritus Professor of Civil Engineering, Morse-Alumni Distinguished Teaching Professor, Executive Co-Director STEM Education Center, and Faculty Member, Technological Leadership Institute at the University of Minnesota. He also is the Cooperative Learning Professor, School of Engineering Education, College of Engineering, Purdue University

Dr. Smith's research and development interests include building research and innovation capabilities in engineering education; faculty and graduate student professional development; the role of cooperation in learning and design; problem formulation, modeling, and knowledge engineering; and project and knowledge management. Karl has over 30 years of experience working with faculty to redesign their courses and programs to enhance student learning. He adapted the cooperative learning model to engineering education, and in the past 15 years has focused on high-performance teamwork through his workshops and book *Teamwork and Project Management* (2014). His bachelor's and master's degrees are in metallurgical engineering from Michigan Technological University and his Ph.D. is in educational psychology from the University of Minnesota.

Ann McKenna

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Ann McKenna is Professor and Director of The Polytechnic School in the Ira A. Fulton Schools of Engineering at Arizona State University. Dr. McKenna's research focuses on understanding the cognitive and social processes of design, design teaching and learning, the role of adaptive expertise in design and innovation, the impact and diffusion of education innovations, and teaching approaches of engineering faculty. She has been an active participant in creating and teaching educational innovations for over 15 years, and has experience in working with faculty in professional development activities. Dr. McKenna received her B.S. and M.S. degrees in Mechanical Engineering from Drexel University and Ph.D. from the University of California at Berkeley. She is also a Senior Associate Editor for the Journal of Engineering Education.

Christopher Swan

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Christopher Swan is Associate Dean for Undergraduate Curriculum Development in the School of Engineering and an Associate Professor of Civil and Environmental Engineering at Tufts University. Dr. Swan holds additional appointments in the Department of Education, Jonathan M. Tisch College of Citizenship and Public Service and Center for Engineering Education and Outreach at Tufts. Active in the American Society for Engineering Education, he has served at various officer posts for the Environmental Engineering Division (2003-7) and the Community Engagement Division (2011 – present). His current research interests in engineering education focus on project-based learning and service-based pedagogies. He has B.S. and M.S. degrees in Civil Engineering from the University of Texas – Austin and Sc.D. from MIT.

Russell Korte

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Russell Korte is Associate Professor, Organization Learning, Performance, and Change, School of Education, Colorado State University. Dr. Korte's research focuses on understanding the socio-cultural processes affecting the learning and performance of engineering students, graduates, and faculty. Recent work included developing innovative educational experiences for engineering students as a Fellow with the Illinois Foundry for Innovation in Engineering Education and a member of the Academy for Excellence in Engineering Education (faculty development program) at the University of Illinois. He has been active for over 20 years in designing and delivering educational programs across a range of industries and educational institutions. He also has experience working with professionals in activities similar to this program. Dr. Korte received his B.S. in Education, an M.B.A. in Marketing, and a Ph.D. in Human Resource Development, with a doctoral minor in Business Administration and a Graduate Certificate in Adult Education from the University of Minnesota.

Adjunct Instructors

Heidi Olinger

Founder and CEO
Pretty Brainy

Heidi Olinger is an educator and the author of *Fashionably Mashed: The STEM of Fashion Design.* For teaching excellence, she has been honored by the Boettcher Foundation and others. She is the founder

and CEO of Pretty Brainy, a nonprofit organization that designs STEAM (science, technology, engineering art, and math) curricula and materials to support teachers in exciting students about learning and in preparing them, especially girls, to pursue the broadest of career options. Her work in apparel design has won the highest honor from the Mom's Choice Awards® and was featured in an international showcase by the World Trade Center-Denver. In 2012 *InnovatioNews* named Pretty Brainy "An educational leader for STEM education."

Brent Sebold

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Brent Sebold is the Director of the Fulton Engineering Student Startup Center within the Ira A. Fulton Schools of Engineering at Arizona State University. Dr. Sebold is responsible for the development and operation of the Startup Center and the delivery of its signature entrepreneurship and innovation courses, workshops, mentoring programs, new venture competitions, and other extra-curricular startup advancement events. Prior to directing the Startup Center, Brent was the Director of Acceleration Curriculum within ASU's Office of the Vice President for Entrepreneurship and Innovation. Additionally, he led the regional ecosystem development efforts for the U.S. Department of Defense's implementation of ASU's Furnace Technology Transfer Accelerator and operated Arizona Furnace 2.0 in partnership with several research and funding organizations throughout the state. Brent also ran ASU's Edson Student Entrepreneur Initiative and the inaugural ASU Student Startup Bowl. During his tenure, he managed 40 Edson client companies who raised over $1.2 million in external funding and featured 10 grand prize winners in several global student startup competitions, including Entrepreneur magazine's 2011 Collegiate Entrepreneur of the Year. Brent earned a Business Administration degree from Ohio University and his Master and Doctor of Education degrees at ASU. He is also a co-founder of MakersTour.com.

Stephen L. Canfield

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Dr. Stephen Canfield is a professor in the Department of Mechanical Engineering at Tennessee Technological University. He received his Ph.D. in mechanical engineering at Virginia Tech in the field of parallel architecture robotics. His research interests include robot kinematics and dynamics, topological optimization of compliant manipulators and in-space mechanisms. His current research is in robot modeling, control and development with a focus on climbing mobile robots for autonomous welding and NDE inspection in hazardous, unstructured environments. Dr. Canfield's robots are being used by companies including TVA, General Dynamics, Northrop Grumman, Newport News and NASSCO. Dr. Canfield is the co-founder of Robotic Technologies of Tennessee, commercializing mobile, and has commercialized two mobile welding robots and is in the process of transitioning licensing to the Weld Tool Corporation. He participated in NSF's I-Corps program (GT 2013 cohort) and the I-Corps-L program (DC 2014 cohort) as a student which led to a startup with industry partnership and investment to develop miniature climbing robots for inspecting hazardous waste containers.

Jennifer Carolan

Managing Director, Seed Fund
NewSchools

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Jennifer Carolan is Managing Director of the NewShools Seed Fund, which she co-founded to make investments in early-stage education technology companies with potential for big impact in K-12 education. Jennifer began her career as a teacher in traditional district schools where she became interested in differentiated learning. After studying master teachers at Stanford School of Education, she published her research on differentiation in Education Leadership. Jennifer is most interested in the intersection of technology, differentiated instruction and access. Jennifer is on the Boards of: BetterLesson, Education Elements, EdSurge, Equal Opportunity Schools and FreshGrade. She still teaches sometimes, most recently Innovations in Teaching 338 at Stanford's School of Education/d.school and a home math camp for her kids and their friends. Jennifer has three children who attend a charter school in Los Altos California.

Bharanidharan Rajakumar

bharani@learnbop.com

Bharani Rajakumar is currently CEO and Founder of LearnBop Inc, an automated tutoring software that helps students learn mathematics. Inspired by his K-12 educational experience, he attended Carnegie Mellon to get his MBA and launch LearnBop. LearnBop is now used by schools in 17 states to help implement the common core math standards. Immediately after undergrad, Bharani worked as an Operations Analyst at Lehman Brothers. Bharani is a graduate of the University of Florida where he earned a B.S in Finance. He currently resides in New York City where the start-up continues to grow. In his spare time, you can find him hanging out with his wife and watching The Tonight Show with Jimmy Fallon.

Node Instructors

Dean Chang

Associate Vice President for Innovation & Entrepreneurship
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Dean Chang is committed to helping students and researchers discover and cultivate the innovator and entrepreneurial mindset inside of them. He is the University of Maryland's (UMD) founding Associate

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VP for the Academy for Innovation & Entrepreneurship (AIE), reporting to the President and Provost and tasked with engaging every student in all 12 colleges in innovation. He is also a lead PI and instructor in the National Science Foundation's (NSF) I-Corps Node program.

Prior to UMD, Dean spent 15 years in Silicon Valley where he served dual roles as the Chief Technology Officer and Vice President, Gaming Business of Immersion Corporation. He joined Immersion as employee #4 and helped transform the venture-backed, Stanford University robotics lab spinout into a publicly traded (NASDAQ: IMMR), world-leading licensor of haptics technology embedded in hundreds of millions of products from companies like Microsoft, Apple, BMW, Samsung, and Electronic Arts. Dean holds over 40 patents, a B.S. degree from MIT and M.S. and Ph.D. degrees from Stanford, and an MBA from Wharton.

Todd Morrill

Managing Director
Venture Management Group
Todd.morrill@gmail.com

Bay Area NSF Innovation Corps

Todd Morrill has been building and leading bioscience companies since the first biotech boom in the early 1980s. He has been employee number 500, number 10 and number 2 (several times) of venture-backed startups, as well as a founder of three companies. He spent seven years in investment banking for pharma and biotech, and has worked at multinational pharma, diagnostics and tools companies. His roles have included sales, product management, marketing, R&D, business development and CEO. He has been an independent Board member of three companies.

Todd taught at the Haas School of Business, UC Berkeley from 2001 to 2009, where he is a Richard C. Holton Teaching Fellow. His courses included Entrepreneurship in Biotechnology; Mergers and Acquisitions; and Entrepreneurship. He has taught in the Intel Program in China and Japan, the Malaysia/UCSF program, and in biotech programs in Estonia, Australia and Abu Dhabi. Todd received an MBA from Haas and his BA in Biology, with Highest Honors, from Dartmouth College. He returned to teaching in 2013 because of his excitement with the NSF Innovation Corps (I-Corps) program.

Consultants

Steve Blank

Lean LaunchPad® Developer

Steve Blank has had a 33-year career as a successful businessman, conservationist and teacher. As a Silicon Valley entrepreneur, Steve was part of or founded eight venture-backed companies. Four of his eight startup companies went public. After he retired, he started new careers in conservation, public service, and teaching. After retiring, Steve moved from being an entrepreneur to teaching entrepreneurship to both undergraduate and graduate students at U.C. Berkeley, Stanford University and the Columbia University/Berkeley Joint Executive MBA program. Steve wrote a book about building early stage companies called Four Steps to the Epiphany. The "Customer Development" model that he developed in his book is one of the core themes for his classes at Stanford University, U.C. Berkeley,

Columbia University and the National Science Foundation. In March 2012, he published The Startup Owner's Manual, a step-by-step guide to building a successful company.

In 2010, he was awarded the Earl F. Cheit Outstanding Teaching Award at U.C. Berkeley Haas School of Business. In 2009 Steve was awarded the Stanford University Undergraduate Teaching Award in the department of Management Science and Engineering. In 2007 Governor Arnold Schwarzenegger appointed Steve to serve on the California Coastal Commission, the public body which regulates land use and public access on the California coast.

Jerry Engel

Adjunct Professor Emeritus
University of California Berkeley

National Faculty Director
I-Corps™

Jerome Engel is a leader in entrepreneurship education, venture capital, corporate innovation and regional economic development. A veteran of Silicon Valley, Engel joined the University of California at Berkeley in 1991 to found the Lester Center for Entrepreneurship. As an adjunct professor at the Haas School of Business he has instructed in both the School's MBA and Executive Education programs specializing in Entrepreneurship, New Venture Finance, Corporate Innovation, and Venture Capital.

Prof. Engel is co-founder and General Partner of Monitor Ventures, a venture capital firm investing in early stage technology ventures. He currently serves on the Boards of Directors of several high potential venture capital-backed and privately held firms. Prior to joining the University he was the Managing Partner of Entrepreneurial Services for EY, in the San Francisco Bay Area, and the firm's National Director of Capital Resources, a practice specializing in new venture financing. Engel's most recent research and publications focus on the nature of innovation processes in firms, communities and global networks, capstoned by the publication of his book Global Clusters of Innovation. Professor Engel is a graduate of the Wharton School at the University of Pennsylvania and the 2010 recipient of the NCIIA - Olympus Corporation Lifetime of Educational Innovation Award.

Teaching Assistant

Lindsey Mitchell

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In addition to serving as the Teaching Assistant for the I-Corps™ L program, Lindsey also manages the logistics of coordinating and conducting the I-Corps™ programs for the DC regional node. She oversees the region's social media and outreach efforts and assists in the behind-the-scenes work in screening teams, organizing venues, training teaching assistants and planning several regional cohorts per year. Lindsey received her M.Ed in College Student Personnel Administration and has over a decade of experience in event and conference planning.

Evaluation Team

Gary Lichtenstein

Principal
Quality Evaluation Designs

Dr. Gary Lichtenstein, QED Principal, is an expert in mixed-methods research and has participated in research and evaluation studies in STEM education for over a decade. Clients have included the Carnegie Foundation for the Advancement of Learning, and the Center for Advancement of Engineering Education, an NSF funded, a four-year, longitudinal study of cohorts of engineering undergraduates. Dr. Lichtenstein is lead author on a chapter in the Handbook on Engineering Education Research that summarizes national policies and practices related to retention and persistence of underrepresented minorities and women in STEM.

Cathleen Simons

Senior Research Associate
Quality Evaluation Designs

Dr. Cathleen Simons, QED Senior Research Associate, earned her doctorate in biophysics at the University of California, Berkeley. She has extensive experience in higher education policy, analysis, and pedagogy as an accreditation coordinator, institutional researcher, program evaluator, corporate trainer, and adjunct faculty. She has also worked in K-12 education as an assessment specialist. Dr. Simons was the evaluation lead on the I-Corps™ L Pilot.

Sheri Sheppard

Professor
Stanford University

Dr. Sheri Sheppard is a nationally recognized expert on engineering education. She led a three-year study of engineering education, "Educating Engineers," in the United States at the Carnegie Foundation for the Advancement of Teaching. For the last decade, she has been the faculty adviser to the Mechanical Engineering Women's Group at Stanford, which holds an annual seminar series and a welcome program for all female engineers. In 2010, she received the Stanford Gores Award, the university's highest award for excellence in teaching, and in 2014 was selected as a fellow in the prestigious Minerva Project. Dr. Sheppard is a PI of the EpiCenter, an NSF initiative to teach entrepreneurship to engineering students. Dr. Sheppard was instrumental in framing recommendations in the I-Corps™ L Pilot report.

Logistics Team

Rocio C. Chavela Guerra

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Rocio Chavela is Manager of Faculty Development at the American Society for Engineering Education (ASEE). She holds a Ph.D. in Engineering Education from Purdue University, a B.S. and a M.S. in Chemical Engineering from Universidad de las Americas, Puebla in Mexico. Rocio's current efforts focus on engineering faculty and graduate student development, with particular emphasis on the adoption of evidence-based instructional practices.

Tengiz Sydykov

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Tengiz Sydykov is the Assistant Manager of Outreach and Special Projects at the American Society for Engineering Education (ASEE). He holds a B.A. in Economics from George Mason University. Tengiz provides financial, logistical, and event management support for multiple projects funded by the National Science Foundation, Department of Energy, and Intel. He has been involved with I-Corps™ L since the pilot cohort in 2013.