Successful Entrepreneurship for Microsystems

Rakesh Kumar, Ph.D., Life Fellow IEEE
March 31, 2015
rakeshk@eng.ucsd.edu
rakesh@tcxinc.com
858.945.3758

Teaching Assistant – Sneha Venkatesh Yelimeli (“Sneha VY”) 
svyelime@eng.ucsd.edu

Tutor – Ashwin Raman
asraman@ucsd.edu

Course presented at UCSD CSE 190, Spring Quarter 2015
CSE 190 About the Instructor – Rakesh Kumar, Ph.D., IEEE Life Fellow

- President (2012-13) of the IEEE Solid-State Circuits Society with approximately 10,000 members
- TCX President and CEO (2001 - present)
- Ei2 President and CEO (2005 – 10)
- UCSD Entrepreneurism Center – Technology and Business Advisor (2012 – present)
- Workshops/courses on Semiconductor innovation, entrepreneurship and opportunities
  - Adjunct Professor, Yonsei University, Seoul, South Korea
- 41 years Semiconductor Industry Experience
  - TCX (14 years)
  - Cadence Design Systems (6 years)
  - Unisys (19 years)
  - Motorola (2 years)

  - A primer for entrepreneurs, as well as the experienced on the breadth of issues in the formation, and operation cycle of fabless semiconductor companies
- Author of numerous publications and presentations
- Distinguished Lecturer for the IEEE Solid-State Circuits, and Electron Devices Societies
CSE 190 About the TA – Sneha Venkatesh Yelimeli

- Graduate student, UCSD Computer Science and Engineering
- Background in web/mobile development and machine learning.
  - Part of the Calatrava core team (calatrava.github.com) – an open-source framework for cross platform mobile application development.
  - Worked with a start-up called BloomReach to build their online product recommendation system that will go live for 20 merchants like Staples etc.
  - Received Young Prodigy Award (sponsored by Amdocs Inc.) for the most Innovative Project in India
- TA for “Mobile Development and Entrepreneurship” SP14, W15
- TA for “Successful Entrepreneurship” FA14
CSE 190 About the Tutor – Ashwin Raman

- 4th year Undergraduate student (graduating Spring 2015), Computer Science & Business
- Background in databases/analytics and web development.
  - Worked on the Data Science team at Box, building a web application to analyze and visualize the results of user behavior (Hadoop, NodeJS, R).
  - Student researcher at the Qualcomm Institute, under Graphics Professor Jurgen Schulze
  - Interned at PARC Labs (Xerox), Cisco, and a 20-person startup called Wheelz (acquired)
- Tutor for CSE 8A/8AL and 8B (2012-2013)
CSE 190 Objectives

- Encourage **Innovation**…the opportunities are HUGE!
- Encourage **Entrepreneurship**
- Familiarize students with the “**How-To’s**” for setting up, and implementing a **Start-up company** related to the many facets of **Microsystems**
  - Many of these themes will be applicable to “**Intrapreneurship**” - setting up and implementation of Projects *within* large Corporations

**We will not** design any new Mobile Apps, Algorithms, Architectures, Integrated Circuits, etc.

**BROADEN your Horizons**
CSE 190  Broadening your Horizons

Biz  Customer  Marketing  Sales  Finance ……

μ Systems

……

SW
Architecture
Apps
Chip Design
Process
Packaging
Test
Reliability
Quality
### CSE 190 Piazza Signup Survey

A. Have Ideas, Serious  
   - Count: 5  
   - Percentage: 19%

B. Have Ideas, Some thoughts  
   - Count: 6  
   - Percentage: 23%

C. Have Ideas, Don’t know how  
   - Count: 5  
   - Percentage: 19%

D. No Ideas, But some day  
   - Count: 9  
   - Percentage: 35%

E. No Ideas, Never  
   - Count: 1  
   - Percentage: 4%

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Data from Spring 2014 class
<table>
<thead>
<tr>
<th>Topic</th>
<th>Notes/Activities</th>
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<tbody>
<tr>
<td>Intro, Logistics</td>
<td>Videos - Ohanian, Stanford Entrepreneur Traits Individual Presentations</td>
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<td>Entre Intro</td>
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<td>Reasons for Failure</td>
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<td>Entre Checklist</td>
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<td>Market Drivers</td>
<td>Presentation Example Case Studies - Sneha</td>
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<td>MicroSystems History</td>
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<td>Team Presentation 1</td>
<td>μSys Product Lifecycle, TRL Levels What's needed for &quot;must-have&quot;</td>
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<td>Vetting New Ideas Running Lean Intro, Biz Model Canvas</td>
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<td>μSys Opportunities</td>
<td>Running Lean</td>
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<td>Guest Lecturer - Greg Hoover</td>
<td>Presentation Example Case Studies - Sneha</td>
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<td>Mobile Apps SU experiences &amp; Guidelines</td>
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<td>Team Presentation 2</td>
<td>Financials</td>
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<tr>
<td>Guest Lecturer - Phil Kelly, Yapert</td>
<td>Case Studies TALKING to Customers</td>
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<td>Entre Traits (Risks), Pivot Points</td>
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<td>Investors invest in PEOPLE First Builders &amp; Maintainers, Trust</td>
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<td>Legal/IP/Administrative/Case Studies</td>
<td>Value Chain</td>
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<tr>
<td>Presentation Dry Runs</td>
<td>Team Presentation 3 (FINAL)</td>
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</table>

*Note – details are likely to be modified/adjusted*
CSE 190 - Reference Texts

- Ash Maurya, “Running Lean”, O’Reilly Media
- Giff Constable, “Talking to Humans”
- Bill Aulet, “Disciplined Entrepreneurship”

- Sean Wise & Brad Feld, “Start up Opportunities – Know when to quit your day job”
- Lucas Carlson, “Finding Success in Failure”

- Harvard Business Review articles online

- Rakesh Kumar, “Fabless Semiconductor Implementation”, McGraw Hill
CSE 190 Logistics

- We will use Piazza.com
- **Office Hours:**
  - Kumar – Tuesdays and Thursdays 5pm – 6:15pm, EBU3B 4204
  - Sneha YV – Fridays 10am – 11am, EBU3B B250A
- **Discussion Session:**
  - Sneha YV – Fridays 4pm – 4:50pm, Peterson 104
- **Class Hours:**
  - T Th 6:30 – 7:50pm, Peterson 104
  - Th (or F) June 4 (5), 5:00 – 9:00pm, EBU3B 1202
- **Finals week:**
  - None
CSE 190 Grading

- We will be using GradeSource.com

- Class Participation 20%
- Home Work / Reports 50%
- Presentations
  - TEAM 20%
  - Individual 10%

- Bonus points
  - Homework “extras”
  - Demonstrated interest in following thru with a Start-up
    - Moxie Center
    - Von Liebig Center
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The Age of Entrepreneurship

- High growth Startup companies are a major source of job growth in the US
- Many Innovators
- Many new Opportunities for Entrepreneurship
  - CloudComputing, Mobile Apps, Internet of Things,…
- “Easy” to start a new company!

After Ash Maurya, “Running Lean”
Small Business Statistics (USA)

- 28 M Small Businesses (< 500 employees)
  - 22 M with < 5 employees, < $50K Revenue
- > 50% of working population works for small Businesses
- > 65% of New Jobs created since 1995 by Small Businesses
- > 0.5M New businesses started every month…
  ……but more close down every month!

→ Poor Success Rate

**Opportunity:**
Create **Smart Start-up** Infrastructure to Improve Success Rate

Recent Acquisitions

Amazon
- Twitch Aug 2014 Gaming $1 B

Facebook:
- Instagram April 2012 (2011, sA $7M) Photo Sharing $ 1B
- Face.com June 2012 (2010, sA$1M, t$5M) Face Recognition Program $ 0.1B
- Oculus VR Mar 2014 (2012, KS, t$90M) Virtual Reality technology $ 2 B

Google
- Dropcam Jun 2014 (2009, $50M) Home Monitoring $ 0.5 B

Amazon, Facebook, Google…the New Conglomerates…or the New Platform owners…or ?
Changes are coming at an amazingly RAPID rate!
Entrepreneurship – some definitions

- In response to identified opportunities, the practice of
  - starting new organizations/businesses or
  - revitalizing mature organizations….Wikipedia

- Innovation applied to the creation of a new product, a new production method or a new market
  …..QuickMBA

- Entrepreneurship creates significant wealth, rapidly and involves significant risk taking
  …..QuickMBA

- Entrepreneurs BUILD BUSINESSES through INNOVATIVE SOLUTIONS to UNMET CUSTOMER NEEDS.

- “Above all, innovation is not invention. It is a term of economics not technology.” *

- Entrepreneurs create discontinuities – They obsolete accepted practices and change behavior.

  *StreetSmart Entrepreneuring  www.zeniegroup.com
Microsystems are omnipresent!

...Many Innovation and Entrepreneurial Opportunities

Architecture
Software
Hardware
Apps

...
So, What’s the Problem?

Most Startups are not successful!

Some Success criteria:
Be Profitable …before you run out of Resources/Funds
Get acquired
Go Public

Most Startups focus on the Solution, and Not the CUSTOMER 😞
Top reasons for failure – Fabless Startups

Create product that solves a **real** Customer Problem…
A “**must-have**” for the customer…
...a **Differentiated** solution

- No customer engagement until it’s too late
- Not understanding and meeting **customer expectations**
- Overly aggressive product specifications
- The “kitchen-sink syndrome”
- Poor management of the **Supply Chain**

A systematic approach to **planning and execution**
Entrepreneurial Checklist

Execution

Customer

Product Definition

Specs

Idea

Team

Biz Plan

Funding

Rev. A success

Patent / Publish

Differentiation

“Must-have”

Planning

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The New Focus

SHOULD it be Built?

CAN it be Built?
Two distinct types of Entrepreneurship

SME (Small Medium Enterprises)  IDE (Innovation Driven Enterprises)

Ref: Bill Aulet, “Disciplined Entrepreneurship”
Entrepreneur Traits Checklist

- Confidence
- Self-Motivation
- Tenacity
- Understand your Limits
- Healthy disrespect for Rules
- Willingness to Fail

Ref: Jenny Q.Ta, Founder and CEO of Sqeeqee
Startup Success Story…You can do it, too!

https://www.youtube.com/watch?v=mHVJF9VaWfo
Ref: Stanford Graduate School of Business
In-Class Quiz 1

Your top 2 reasons for taking CSE190D:

1. I have an IDEA now that I am PASSIONATE about implementing

2. I have an IDEA

3. I do not have an Idea, but would like to start a company some day

4. I just want to learn about Entrepreneurship

Please POST your Idea on Sneha’s spreadsheet asap

Everyone – Please select your “Like’s” by Thursday afternoon!
HW 1 – Individual Entrepreneurial Inventory

Due on Thursday, April 2nd
Be prepared to make a 1 minute presentation…we will call on ~10-15 presenters

1. Your Entrepreneurial IDEA?

2. What Customer problem does your idea solve?

3. Who are the potential Customers?

4. Who is your Competition? How will you DIFFERENTIATE your product?

5. Who will make it?

6. How big a company do you want to build? Revenue? # people?
HW 1 – Bonus (optional)

Due on Thursday, April 9th

1. Research one successful startup company (e.g., Face.com, Dropcam, Nest Labs, …)
2. Prepare a 1-page summary
   1. History – when founded, by who, …
   2. Funding – amount, major investors, …
   3. Product
   4. Who are their major customers?

HW 1 – Bonus (optional)

Due on Thursday, April 9th

1. Research one successful startup company (e.g., Face.com, Dropcam, Nest Labs, …)
2. Prepare a 1-page summary
   1. History – when founded, by who, …
   2. Funding – amount, major investors, …
   3. Product
   4. Who are their major customers?