Successful Entrepreneurship for Microsystems

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Course presented at UCSD CSE 190, Fall Quarter 2015
CSE 190 - Outline for today

- Intro’s and Logistics
- Class Objectives
  - Microsystems
  - Entrepreneurship
  - Success
- Success Elements
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’s – Dharmil Chandarana

➢ Graduate student, UCSD Computer Science and Engineering
  (Major: Computer Science)
➢ Bachelors Degree in Computer Science and Engineering from Indian Institute of Technology Indore
➢ Background in Artificial Intelligence and Machine Learning
➢ Entrepreneurship: Participated in a 6-week course-cum-accelerator program on Technology Entrepreneurship offered by MIT and Google
➢ Was a part of Student Entrepreneurship Support Cell in my undergraduate college
➢ Aspiring to have my own startup a few years down the lane
Graduate student, UCSD Computer Science and Engineering

(Major: Computer Engineering)

Work Experience in embedded system design for automotive infotainment systems.

Bachelors Degree in Electrical Engineering – Gold Medalist.

Interest in Entrepreneurship – Inspiration from college seniors and light association with few startups. Also been a part of lot of organizing committees.

Positives: Highly motivated person willing to exceed expectations.
CSE 190 Logistics

- We will use [Piazza.com](http://piazza.com)
- **Office Hours:**
  - Kumar – Tuesdays and Thursdays 5:30pm – 6:45 pm, EBU3B 4124
  - Swetha – Wednesdays 5:00 – 5:50pm, EBU3B B260A
  - Dharmil - Wednesdays 1:00 – 1:50pm, EBU3B B275
- **Discussion Session:**
  - Dharmil & Swetha – Fridays - 2pm – 2:50pm, WLH 2209
- **Class Hours:**
  - T Th 7:00 – 8:20 pm, CENTR 222
  - Th (or F) December 3 (4), 5:00 – 9:00pm, EBU3B 1202
- **Finals week:**
  - None
CSE 190 - Reference Texts

- Ash Maurya, “Running Lean”, O’Reilly Media
- Giff Constable, “Talking to Humans”
- Kathleen Allen, “Entrepreneurship for Scientists and Engineers”
- Bill Aulet, “Disciplined Entrepreneurship”

- Sean Wise & Brad Feld, “Startup 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
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CSE 190 Grading

- We will be using GradeSource.com

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

- Bonus points 15%
  - Homework “extras”
  - Demonstrated interest in following thru with a Start-up, e.g.
    - Von Liebig Center, iCorps
    - External Incubators
CSE 190 Objectives – a “Foundation” course

- 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 5  19%
B. Have Ideas, Some thoughts 6  23%
C. Have Ideas, Don’t know how 5  19%
D. No Ideas, But some day 9  35%
E. No Ideas, Never 1  4%

Data from Spring 2014 class
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    $1 B
- Face.com June 2012 (2010, sA$1M, t$5M)    Face Recognition Program    $0.1 B
- 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 😞
Typical SU Focus ("The old way")

Let’s Build it!
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
The New Focus

SHOULD it be Built?

CAN it be Built?
One recipe

- Idea +
- Product +
- Team +
- Execution

Ref: Rahul Desai, “The First 30%”

Idea ∩ Product ∩ CUSTOMER ∩ Team ∩ Execution ∩ Luck = SUCCESS!
Towards a Successful Startup

…”Plan A” – an iterative process

Problem / Need

Customer

Your Company

Investors, $

Top Line

Bottom Line

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Entrepreneurial Checklist

Execution

Customer

Product Definition
Specs

Idea
Team
Biz Plan
Funding

Rev. A success

Patent / Publish

Differentiation

“Must-have”

Planning
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
CSE 190 Entrepreneur TEAM for “NewCo”

Idea \ Product \ CUSTOMER \ Team \ Execution \ Luck = SUCCESS!

- **CEO**, Chief Executive Officer
  - Promoter, “Top Boss”
  - Business, General Management, Investor engagements,

- **CTO**, Chief Technology Officer
  - Technical Idea, Implementation, Product definition and Specification,…

- **CMO**, Chief Marketing and Sales Officer
  - Strategy and execution to win the Business, Channel connections,…

- **Customer “Representative”**
  - Take the customer viewpoint to match the NewCo product to the customer need

- **COO**, Chief Operations Officer
  - Manufacturing, engaging with subcontractors, managing the employees,…

- **CFO**, Chief Financial Officer
  - Manage Cash Flow, the Income Statement, the Balance Sheet, Investor Relations,…

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CSE 190 Project – form your Teams

By 2-2, Thursday, October 1st
First presentation on 3-2, Thursday, October 8th

- 5 members per Team
  - CEO
  - CTO
  - CMO
  - COO
  - Customer representative
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 want to learn about Entrepreneurship
Pitch Contest

By Tuesday, September 29th:
Submit your IDEA for a Startup at https://goo.gl/3IYSDY

By Wednesday, September 30th
VOTE for the Ideas you Like the best [1, 2, 3]
Voting is MANDATORY!

Top 10-15 Idea originators will have an opportunity to present to the class on Thursday, October 1st
HW 1 – Individual Entrepreneurial Inventory

Due on Thursday, October 1st
EVERYONE submits the homework
Be prepared to make a 1 minute presentation...we will call on ~10-15 presenters...per your Voting!

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?

All submissions are to be in .pdf format, unless otherwise ok’d by TA
Please follow instructions for Filename, and submission details
HW 1 – Bonus (optional)

Due on Thursday, October 1st

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)

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   4. Who are their major customers?
White House Demo Day – select Projects

- BLUE OAK – find treasure in trashed Smartphones
- DECLARA – new kind of Search Engine
- OPEN HEALTH NETWORK – connect patients to improve healthcare delivery
- PRIVAIL – portable and low-cost HIV testing
- COCOON CAM – baby heart rate monitoring using computer vision and cloud-based analytics
- BASE DIRECTORY App – providing troops needed info when they arrive at a new base
- SWORD & PLOUGH – transform surplus military gear into stylish fashion pieces
- PARTPIC – using image recognition and machine learning to simplify finding parts replacements
- GO ELECTRIC – using a combination of solar, wind, battery power to provide stable grid power
- BOUNCE IMAGING – low-cost, dispensable sensors to detect/assess hazardous, unseen space
- EMERALD – using sensors and data analytics to make senior living safer
- DETROIT DIRT – convert food waste into rich soil
- SPARO LABS – pocket-sized sensor and app to measure lung function in asthma patients
- PIGEONLY – app allows prisoners stay in touch with family and friends
- DUOLINGO – app for learning Spanish
- SPROUTEL – Smart Teddy Bear provides kids education and helps administer drugs for chronic illnesses
- LOAN GENIUS – app for assessing solutions for student loans and debt
- The MUSE – app to familiarize new grads get familiar with the new job environment