

Entrepreneurship Using Physics

Welcome – we'll get started soon

- Dial in or use your computer's microphone and speakers.
- Submit questions via the Questions panel on the right.
- **This session is being recorded.**
- **The recording will be sent to you via a follow up email.**

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www.aps.org/careers/guidance/webinars

Scientist & Entrepreneur: Lab to Business Basics

Jeff Bargiel

Founder/CEO of EntoBio

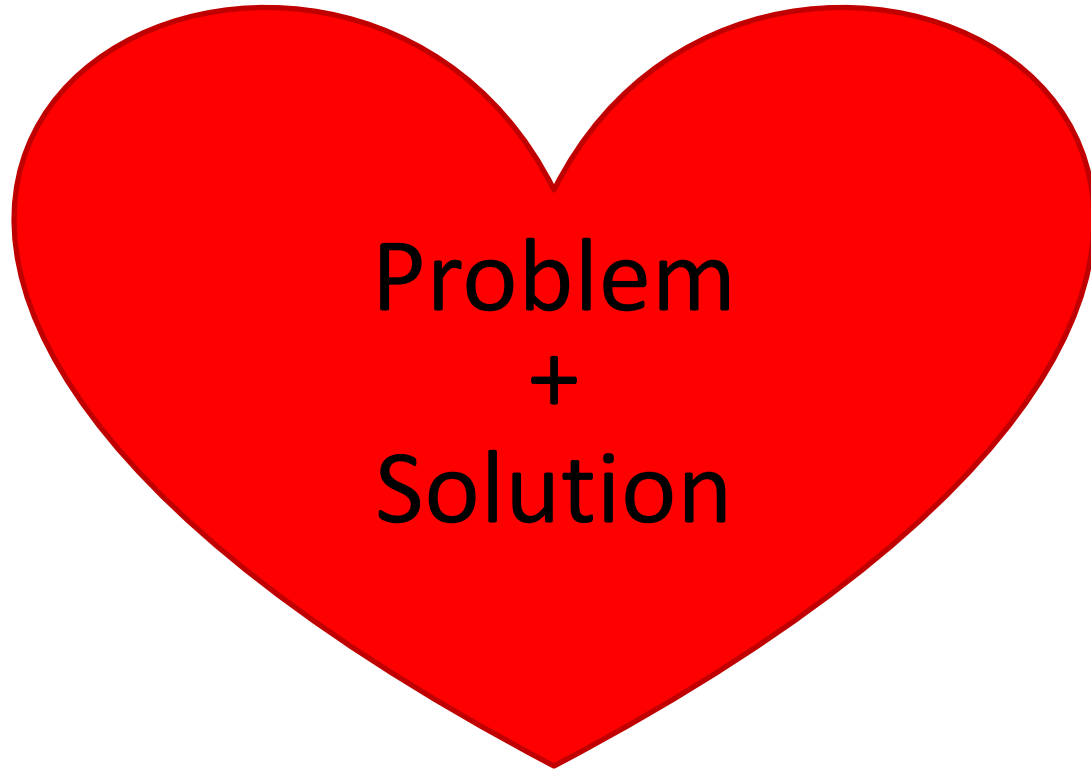
Scientist/Entrepreneur

Both use the scientific method to gain knowledge and resolve uncertainty.

Just do this, but for commercialization.

Piece of cake, right?

Ideation



Ideation

Thought Experiments

Mind & Mine Complaints

Opportunity Redefinition

Extreme It

Biomimicry

**Break Fixedness, Be Mindful
& Make Connections**

Wishing

Think INSIDE the Box

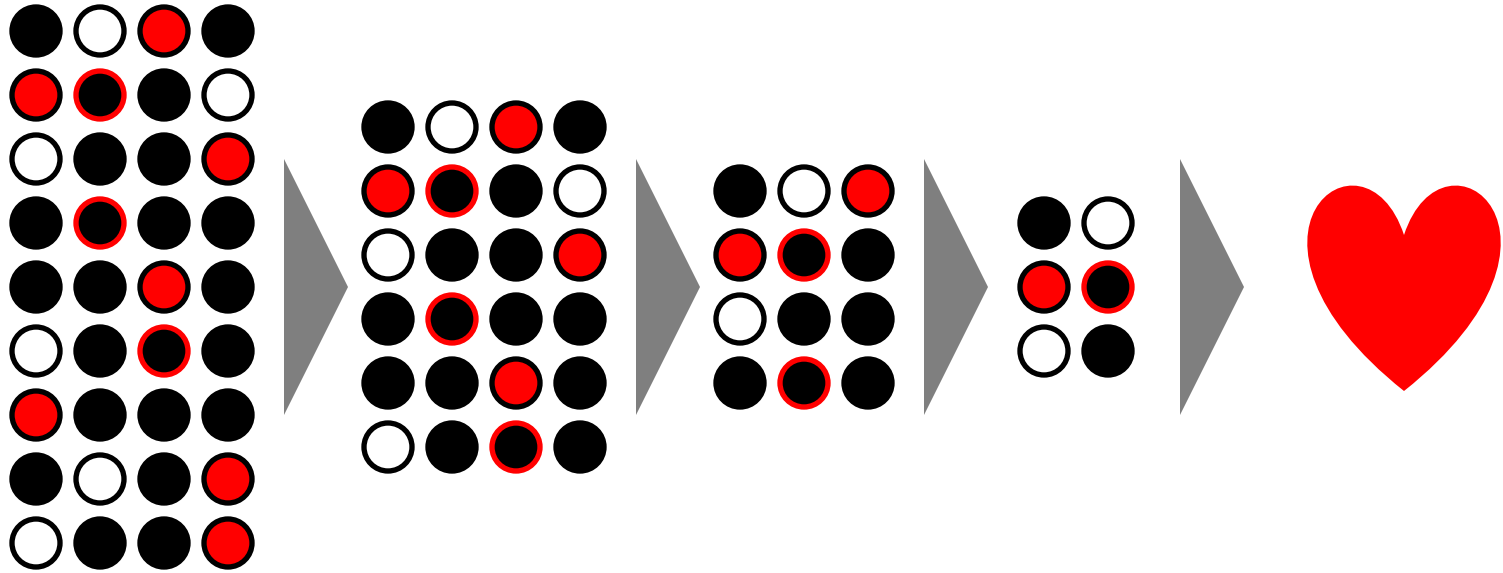
What If...

Mindmapping

Brainstorming

Challenge Assumptions

Evaluation



“The first principle is that you must not fool yourself and you are the easiest person to fool.”

- Richard Feynman



Evaluation

Can
we do
it?

Should
we do it?

Evaluation

Hypothesize → Test → Adjust → Repeat

**Talk...to...customers.
Do it now. Do it often.
Or the market will kill you later.**

Evaluation

~~Business Plan~~

Value Proposition Canvas

Business Model Canvas

BASE Board

Lean Canvas

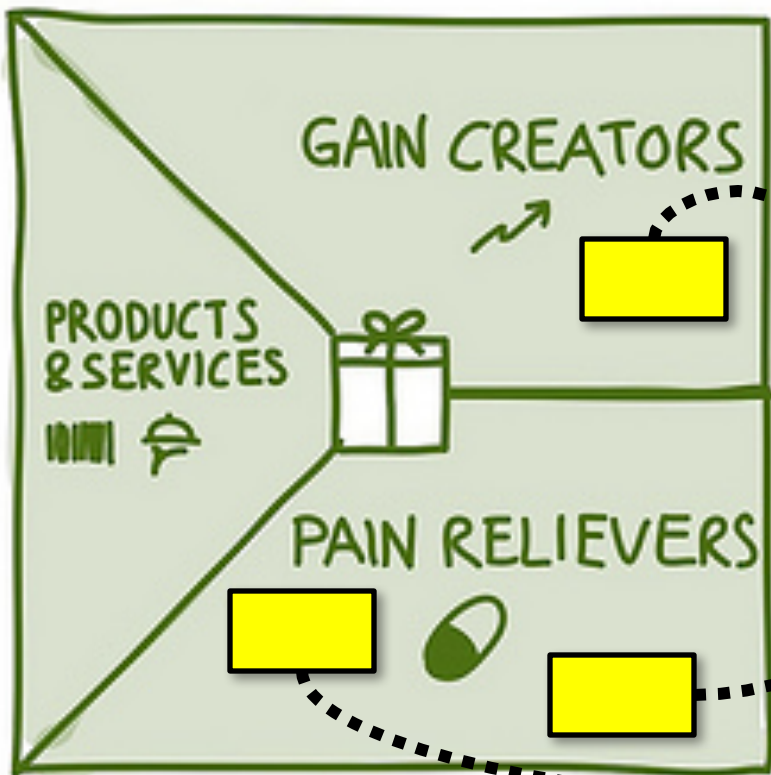
Evaluation

Value Proposition

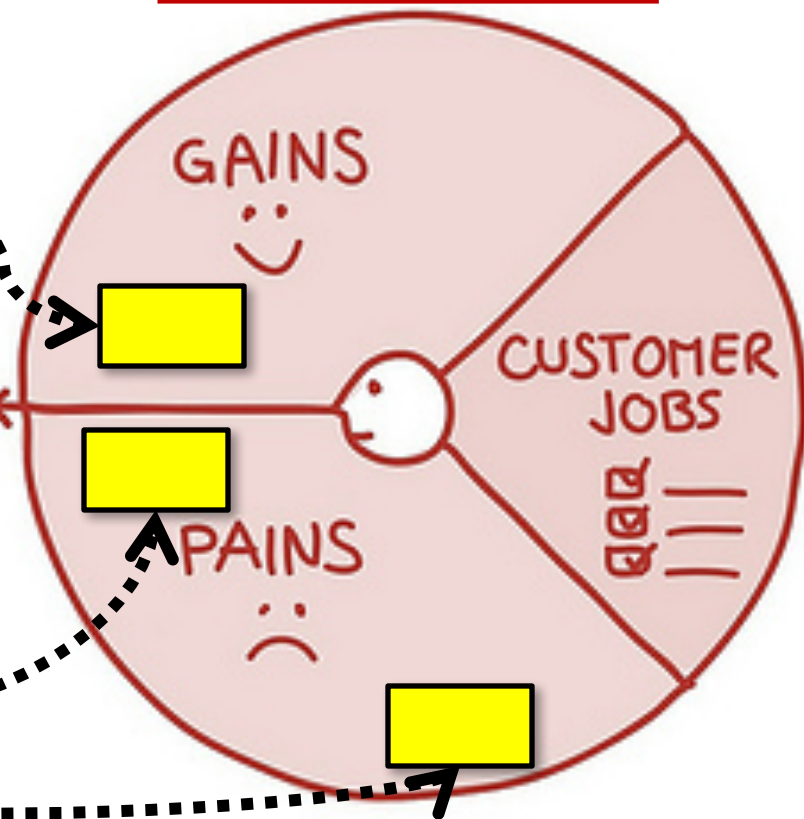
- A promise of value to be delivered.
- The reason a customer buys. Benefits, not features!
- A *clear* statement that:
 - Is **relevant** (explains how your product solves customers' problems or improves their situation),
 - Is **quantified** (delivers specific benefits),
 - Conveys your **unique differentiator** (tells the ideal customer why they should buy from you and not from the competition).

Value Proposition Canvas

Value Map



Customer Profile



Technology Push

Market Pull

Business Model Canvas

KEY PARTNERS Who are our key partners? Who are our key suppliers? Which key resources are we acquiring from our partners? Which key activities do partners perform?	KEY ACTIVITIES What key activities do our value propositions require? Our distribution channels? Customer relationships? Revenue streams?	VALUE PROPOSITIONS What value do we deliver to the customer? Which one of our customers' problems are we helping to solve? What bundles of products and services are we offering to each segment? Which customer needs are we satisfying? What is the minimum viable product?	CUSTOMER RELATIONSHIPS How do we get, keep, and grow customers? Which customer relationships have we established? How are they integrated with the rest of our business model? How costly are they?	CUSTOMER SEGMENTS For whom are we creating value? Who are our most important customers? What are the customer archetypes?
	KEY RESOURCES What key resources do our value propositions require? Our distribution channels? Customer relationships? Revenue streams?		CHANNELS Through which channels do our customer segments want to be reached? How do other companies reach them now? Which ones work best? Which ones are most cost-efficient? How are we integrating them with customer routines?	
COST STRUCTURE What are the most important costs inherent to our business model? Which key resources are most expensive? Which key activities are most expensive?		REVENUE STREAMS For what value are our customers really willing to pay? For what do they currently pay? What is the revenue model? What are the pricing tactics?		

Business Approach & Structure Elements (BASE) Board

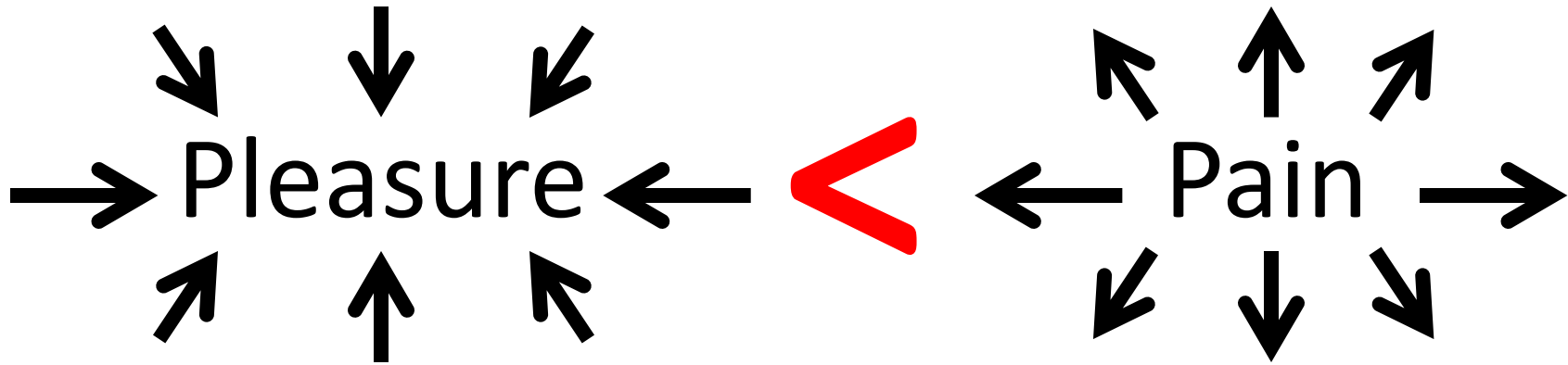


Evaluation

Seriously, talk to customers.

And, stakeholders, decision makers, purchasers,
executives, users, etc.

Evaluation (A bit more advice.)



Evaluation (A bit more advice.)

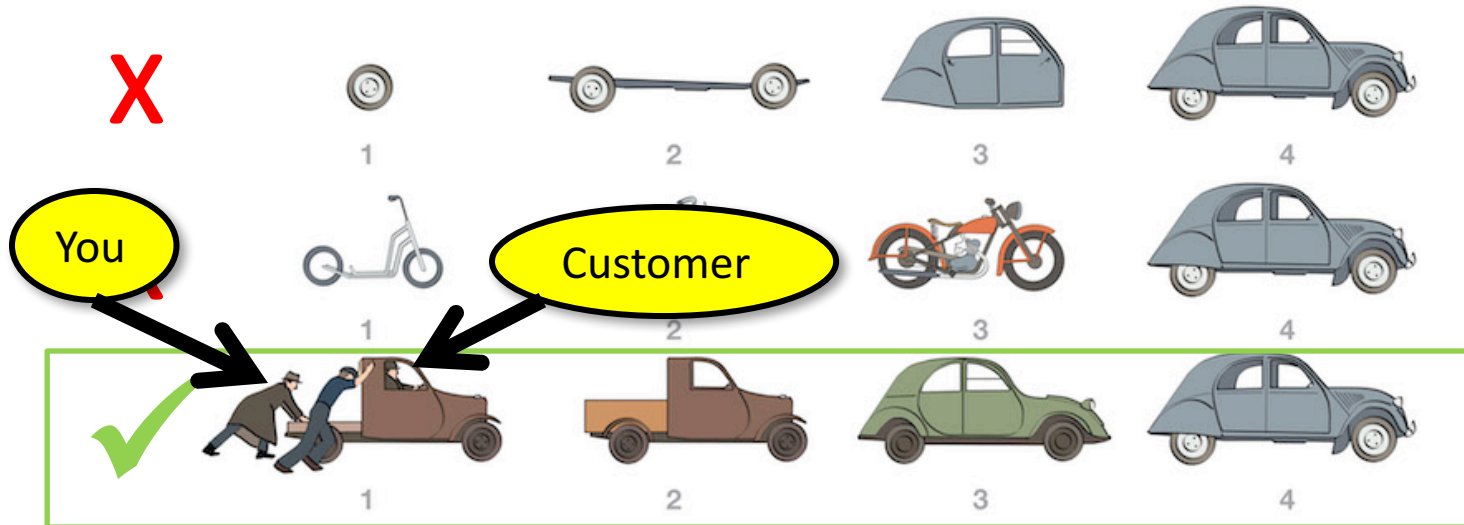
Big Problem, Big Market

But can you start (selling) small and fast?

Evaluation (A bit more advice.)

Minimum Viable Product

Minimum product that *delivers customer value*.
Prove the market, then improve the product.



Funding

- Yourself
- SBIR/STTR
- FFF: Friends, Family (and Fools)
- Pitch Competitions
- Local, County, State
- Angels & VCs (Venture Capitalists)
- Your Customers

Pitching is Selling

20 Seconds

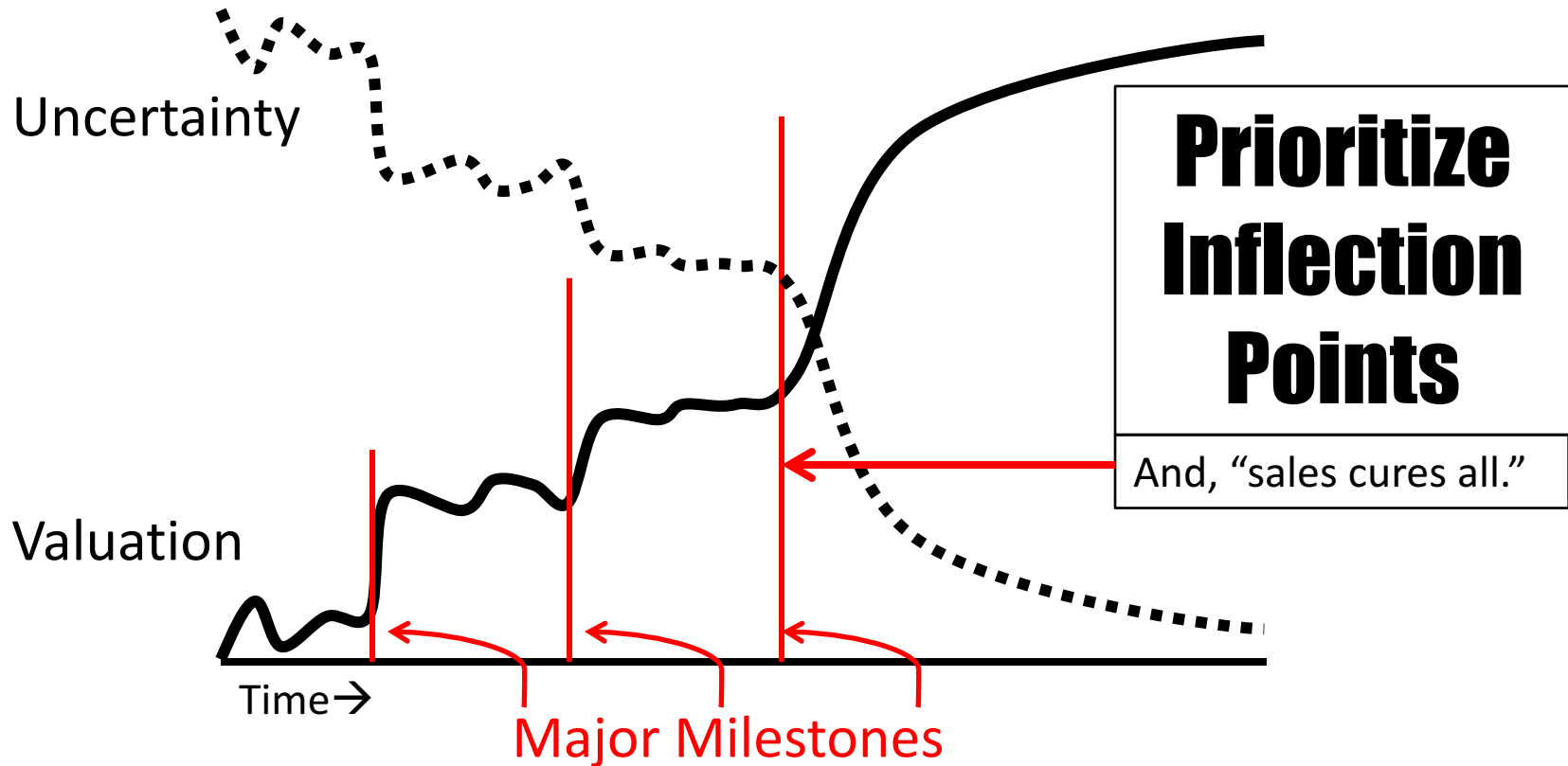
Be compelling.

The tech probably doesn't matter.

Common language.

PRACTICE, PRACTICE, PRACTICE.

Making Progress



Pitfalls/Advice

- Startups are NOT small versions of big companies.
- Products are not businesses.
- Solution is not at least 10X better.
- Be smart about protection. Most people are too busy to care about stealing your idea. But don't disclose publically. Get a patent attorney to write.

Pitfalls/Advice

- Starting too late. Waiting until it is perfect.
- Do not let the perfect be the enemy of the good.

Pitfalls/Advice

- Be humble but decisive.
- Be coachable.
- Find mentors.
- Don't ask for crazy valuations.

Where I Struggle(d)

- Analysis Paralysis
- Clear, concrete, down-to-earth communication
- Oooh, shiny!
- Cold calling anxiety
- Ignoring the unimportant

Resources

APS PIPELINE Undergrad Physics Entrepreneurship

www.aps.org/programs/education/innovation

Science and Technology Entrepreneurship Program (STEP)
at Case Western Reserve University, MS Physics
Entrepreneurship

Inside the Box by Drew Boyd and Jacob Goldenberg

Financial Intelligence for Entrepreneurs by Karen Berman
and Joe Knight

Scrappy Project Management by Kimberly Wiefling

Business Model Canvas (Udacity Course) by Steve Blank

Writing a Compelling Executive Summary (Blog Post) by
Garage Technology Ventures

Perfecting Your Pitch (Blog Post) by Garage Technology
Ventures

Zero-to-One by Peter Thiel

Everybody Writes by Ann Handley

The Lean Startup by Eric Ries

Art of the Start by Guy Kawasaki

Pitch Anything by Oren Klaff

Grit by Angela Duckworth

Start with Why (TED Talk) by Simon Sinek

The Four Hour Work Week by Tim Ferris

The Wave Theory of Startups (Blog Post) by
Guy Turner

How to Measure Anything by Douglas
Hubbard

Don't Fool Yourself