

# Invitations to Entrepreneurship: Capnion

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# Who is the speaker?

30 second resume:

- an ancient metro Saint Louis townie
- Ph.D. University of Michigan 2013 (math)
- a few years of data science
- founded data privacy tech company Capnion, Inc.

You might find it worthwhile to download the deck...

[https://github.com/capnion/random/blob/master/acm\\_capnion\\_sept2022\\_erdos.pdf](https://github.com/capnion/random/blob/master/acm_capnion_sept2022_erdos.pdf)

...to use these links to my Email, LinkedIn, or GitHub.



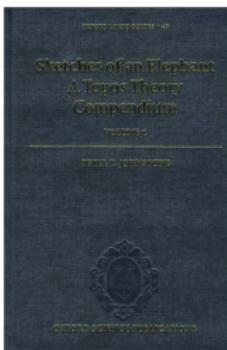
# Agenda

Goal: semi-ironically scare you away from entrepreneurship

- Deconstructing “entrepreneurship”
- How did I end up here?
- What Capnion does
- What I do at Capnion
- Good and Bad
- Recommendations and Advice

# A Re-Stolen Metaphor

A group of blind people encountering an elephant might each describe it differently depending on what part they encountered.



I will begin by doing my aggressive best to deconstruct  
“entrepreneurship” (whatever that means). “Datascience” is  
worth deconstructing if we have time at the end...



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# What is Entrepreneurship?

Defintion: An *entrepreneur* (from the French, of course) is an unemployed megalomaniac that tells people their life story all day (particularly including telling people that are not interested).



## Entreprenurial Fantasy

The dominant system of discourse is for helping people unhappy at their job pretend in their mind not to be there.



This ridiculous article (first in my Google search) compares entrepreneurship to picking a fantasy football team.



# Venture Capital Bigwigs vs. Hooters Hostesses

Radically different people claim the word “entrepreneurship” as theirs alone and people are often sensitive about the issue.



Also, what is a “startup”? Similarly, you get very different stories from different people and some feel very strongly about them.



# Some Questions To Answer



Why do you want to do this?

Why can't you just get a regular job?

To some degree the reason has to be about you and not something objective about the outside world. An answer that is true for you is correct, running away from the question or trying to make it about everyone else is usually not.

# A Boundary Case



Joining a small, young company that someone else started is a sensible choice if you like to hedge your bets. (Marissa Mayer was the 20th employee hired by Google.)



GhostPPI

# Datascience in Healthcare



I'd been out of school a few years and I had a data science job working for a health insurance company. I felt like my employer spent a zillion dollars a year paying people to sit around being denied access to data, yet we had WAY too much access to data.



# Down the Rabbit Hole Debunking Scams



There was a lot of totally confused and empty hype around blockchain circulating in those days. Long story short, it sent me down a rabbit hole that made me realize the interesting questions were really data privacy questions, and that I had left some of the answers behind in academia.



HOST PPI

## Even Weirder Personal Stories



I was financially secure, I accepted that I needed more adventure in my life to be happy, and I thought important technology was rotting on the shelves. Why shouldn't I be the guy to convince people to make a change?



GhostPPI

# What Capnion Does

I stole this from my own LinkedIn...

We help companies adopt private computation technologies like homomorphic encryption, zero-knowledge proof, and federated learning. You might want to improve your data privacy profile in this way for regulatory compliance, data loss prevention, and differentiating your product in the marketplace. Capnion provides consulting services and maintains the Ghost PII private computation SDK.

...but what does it really mean?



HOST PII

## What Capnion Does

“Cool words! I want people to think I am cool... help?”

“I know I need HE for this but I am overwhelmed by the details.”

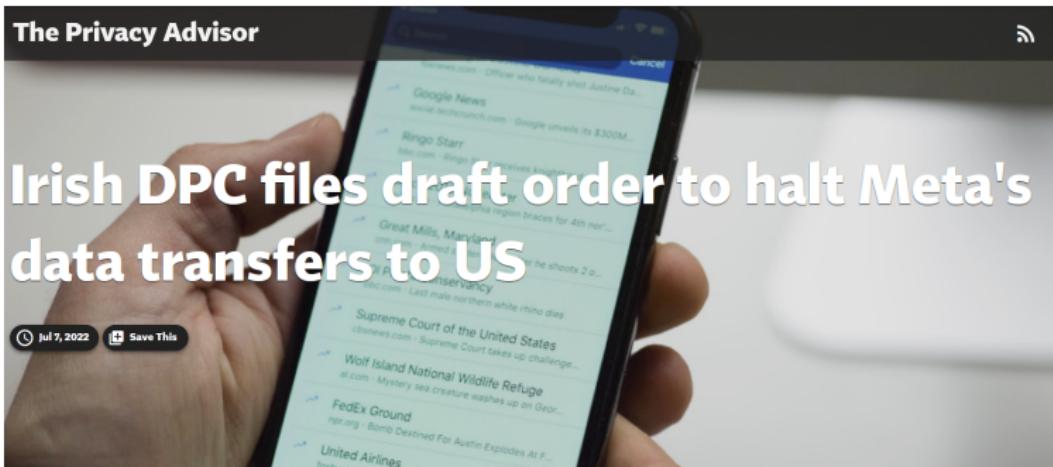
“We’re mostly OK but we’re struggling to read these papers.”

“I need xyz prototype in a hurry.”

(unspoken) “It’s a mess over here and I need to look busy.”



# Current Events



View the article via this [link](#).



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# Big Idea: Computation without Decryption

Does “**as5ga4dsg**” decrypt the same as “**p44hdfj3jdk**”? Y/N?



The big idea is that you might be interested in

- a high-level insight which is not sensitive, or
- preparing something sensitive for someone else that you yourself do not need to see, and

These techniques allow you to get that insight without learning more about the underlying data.



## For those who learn by doing...

We recently open-sourced our Python encrypted data-in-use tool. You can tinker with it in **Jupyter notebooks via the Binder link below** if you like. Please avoid the notebooks about distance calculations as Binder uses an older version of Python that gives them trouble.

[https://mybinder.org/v2/gh/capnion/ghostpii\\_demos/main](https://mybinder.org/v2/gh/capnion/ghostpii_demos/main)



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# What I do all day 1

## A. Small Business Basics:

- 1. Anxiety
- 2. Paperwork (broadly considered)
- 3. Chase lawyer and accountant

## B. Sales and Marketing

- 1. Chase bigwigs around LinkedIn
- 2. Scam people into listening to my life story
- 3. Random meetings, as many as I can get
- 4. Create content - brochures, videos, etc.



# What I do all day 2

## C. Building Ghost PII:

- 1. Supervise engineers
- 2. Refine algorithms (bizarro post-doc)
- 3. Market research

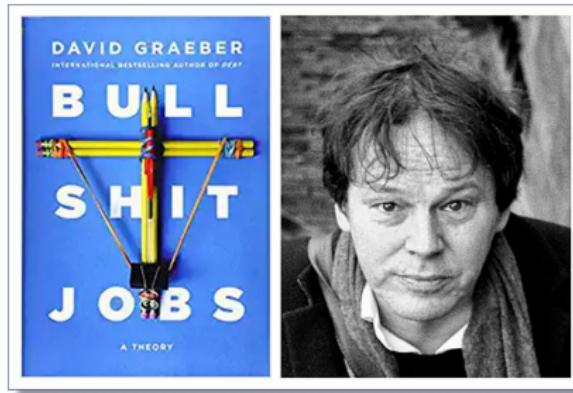
## D. Depending on Clients:

- 1. Items from B and C appear in bizarro forms
- 2. Survive executive politics (hopefully)
- 3. Utility player adventures
- 4. Anxiety



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## Good: True Believer



I think what I do is interesting and valuable to society.

When I apply myself things actually get done.

People don't talk about it much, but there are a lot of people working for big corporations who feel like they do a whole lot of toxic nothing all day.



## Both Good and Bad: Challenge

In the olden days Curtis McMullen gave a talk at Michigan and he attended a lunch with the graduate students. He asked the table...

“What do you like about math?”

...to which I answered...

“It’s really hard and I am bad at it.”

I thought it was a pretty good joke after it came out of my mouth and I played it like that, but it was the truth.



# GRIT and at least one happy ending



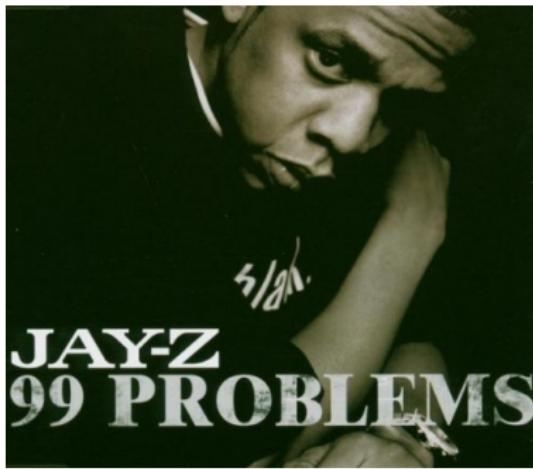
grit

I'd tell you my life story again here but I heard another entrepreneur's life story once and it's better for our purposes.



## A Catch-22, not for the faint of heart

You have 100 things you need to do in a hurry and ideally you would do each one of them before the other 99.



Research is being given some time to think a really challenging new thought, business is often more like thinking a lot of easy thoughts in a hurry with very limited margin for error.



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## Private Sector Advice: Let Perfection Go



Shaving a couple logs off some denominator (or fill in a marginal improvement from your field) can be everything in publishing a paper but less than nothing in business.

You're used to society's most detail oriented people.

## Private Sector Advice: Ego Challenges



When you first go to the private sector (or forever), you may often be at once the smartest and dumbest person in the room.

It's easy to fall in love with being the smartest and stay blind to being the dumbest, but it will lead you into suffering.

Note systems of knowledge that people coming from PhDs have difficulty acknowledging or are inclined not to respect.



# Private Sector Advice: Networking 1



Every year age 15 to when I was 35, somebody told me...

“It’s all about who you know.”

...and every year I was horrified how true it turned out to be in the preceding year.

Some of you already connected with my on LinkedIn and that's absolutely the right idea. Network as hard as you can stand.



## Private Sector Advice: Networking 2



Let me expound my doctrine of the “positive expectation lottery ticket” and share a couple motivating stories from my own life.

Networking is especially useful for avoiding getting brutally hosed on salary at your first couple jobs.



## Other Tidbits

Some final bits of advice...

- “Manage up” or suffer. It’s your choice.
- Have your life story ready.
- Have your story about “datascience” ready.

Building something datascience flavored you own and care about will really help the interview conversation for your first jobs and maybe make it all feel a little saner for you than it otherwise would.



# Questions and Conversation

Any questions?

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[https://github.com/capnion/ghostpii\\_client](https://github.com/capnion/ghostpii_client)