From Physics to Bloomberg

HUGS 2021 Career Workshop
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Outline

Who am I?

https://www.linkedin.com/in/iambriantice/

Q & A

Physics Background

- 2005-2008 B.S. Physics from Carnegie Mellon
  - No career related internships. Went home in summer for personal reasons.
- 2008-2013 Ph.D. Nuclear Physics from Rutgers University
  - Adviser: Prof. Ron Ransome
  - Experiment: MINERvA - **M**ain **IN**jector **N**eutrino **E**xperiment for **v-A** @ Fermilab
- 2013-2015 Postdoc in ANL Medium Energy Physics
  - Adviser: Dr. Paul Reimer
  - Experiment: SeaQuest @ Fermilab

What did I do on MINERvA?

- Vertex fitting - C++/Gaudi
- Batch/grid computing infrastructure - perl + python
- Software analysis core tools - C++/Gaudi
- Nuclear target analysis - C++/ROOT

Thesis: Measurement of Nuclear Dependence in Inclusive Charged Current Neutrino Scattering

FERMILAB-THESIS-TICE-2014-01

What do you love about MINERvA?

ν Neutrino Physics

"I want to measure neutrino oscillations"
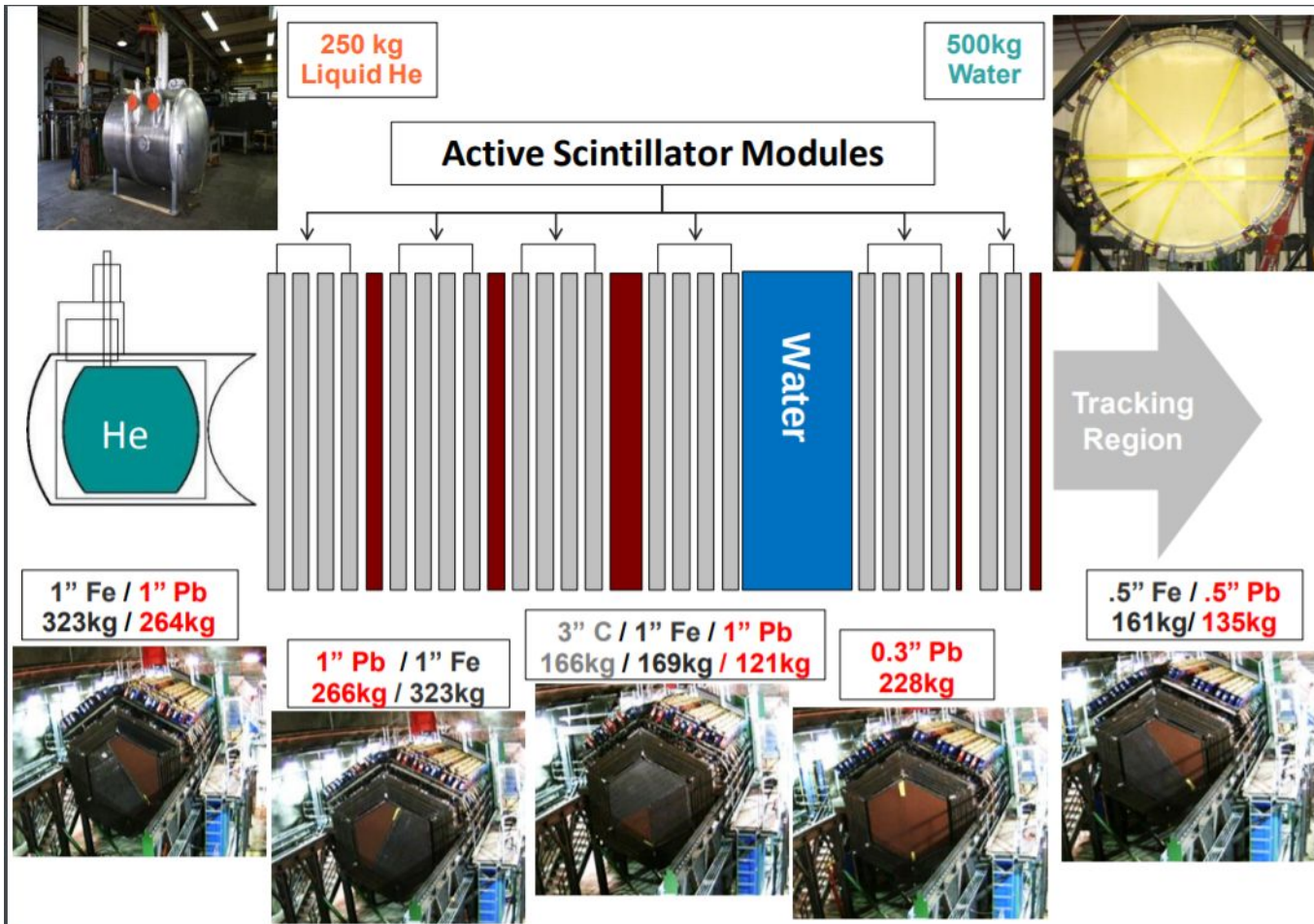
MINERvA will…

- help me understand neutrino energy reconstruction
- reduce my uncertainties from cross sections and nuclear effects
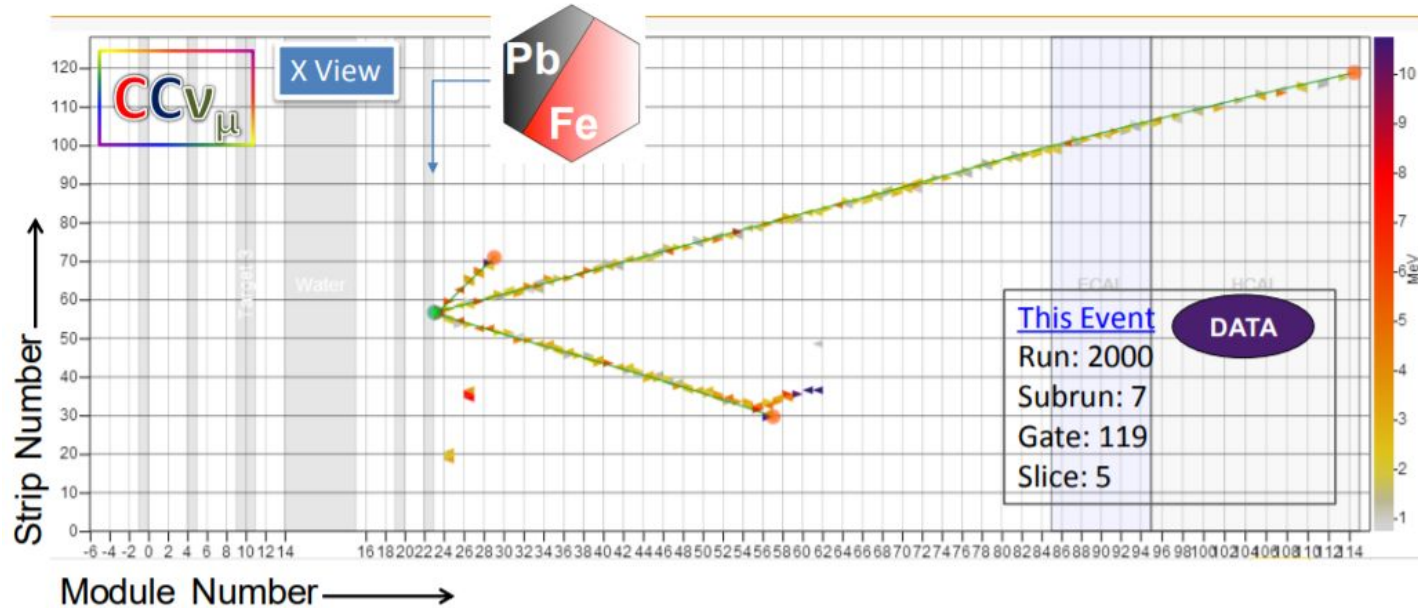
A Nuclear Physics

"I want to measure nucleon structure"

MINERvA will…

- use a probe sensitive to flavor and axial structure

250 kg Liquid He

500kg Water

Active Scintillator Modules

He

Water

Tracking Region

1" Fe / 1" Pb
323kg / 264kg

1" Pb / 1" Fe
266kg / 323kg

3" C / 1" Fe / 1" Pb
166kg / 169kg / 121kg

0.3" Pb
228kg

.5" Fe / .5" Pb
161kg/ 135kg

Event Reconstruction

Need to reconstruct **muon energy**, **muon angle**, **hadronic energy**
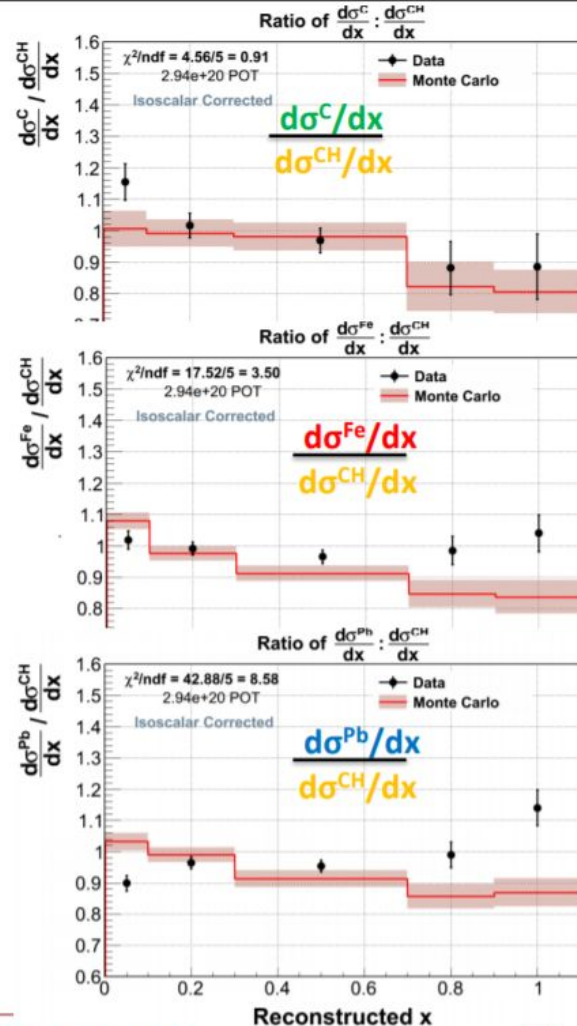
$$E_\nu = E_\mu + E_{had}$$

$$\nu = E_\nu - E_\mu$$

$$Q^2 = 2E_\nu \left(E_\mu - p_\mu cos\left(\theta_\mu\right)\right)$$

$$y = E_{had}/E_\nu$$

$$x = \frac{Q^2}{2M\nu}$$

High x Summary

- At x=[0.7,1.1], we observe a **excess** that grows with the size of the nucleus

- This effect is not observed in simulation

Ratio of $\frac{d\sigma^C}{dx} : \frac{d\sigma^{CH}}{dx}$

$\chi^2/ndf = 4.56/5 = 0.91$
2.94e+20 POT
Isoscalar Corrected

$\frac{d\sigma^C/dx}{d\sigma^{CH}/dx}$

Data
Monte Carlo

Ratio of $\frac{d\sigma^{Fe}}{dx} : \frac{d\sigma^{CH}}{dx}$

$\chi^2/ndf = 17.52/5 = 3.50$
2.94e+20 POT
Isoscalar Corrected

$\frac{d\sigma^{Fe}/dx}{d\sigma^{CH}/dx}$

Data
Monte Carlo

Ratio of $\frac{d\sigma^{Pb}}{dx} : \frac{d\sigma^{CH}}{dx}$

$\chi^2/ndf = 42.88/5 = 8.58$
2.94e+20 POT
Isoscalar Corrected

$\frac{d\sigma^{Pb}/dx}{d\sigma^{CH}/dx}$

Data
Monte Carlo

Reconstructed x

What did I do on SeaQuest?

- DAQ Software - C++
- Detector QC system - python
- Various small analysis projects - C++/ROOT + python

Where I am now? Bloomberg LP

- Bloomberg LP is a financial software, data, and news provider
- Founded in 1981
- Core business built around the "Bloomberg Terminal"

Where I am now? Bloomberg LP

- Joined as a software engineer in 2015
- Team leader 2020-now
- Teams
  - Fixed Income Realtime Pricing
  - BVAL GSAC - (also fixed income pricing)
  - Teams are ~6 engineers working with quant and product teams
- Software stack is mostly C++, python, some javascript
  - Other tech: kafka, SQL, cassandra, S3, docker, jenkins
  - Different tech used by different teams

Questions?

Resume/CV Hot Takes

You do not need a CV. Resume should be 1 page.

I suggest a brief 1-3 sentence statement addressing that you are leaving academia. Not a full cover letter.

For interviews - I will look at your experience to understand what to expect when I ask you to code. I will glance at quality of your school/GPA, previous institutions. Looking for good code, communication and company fit.

The resume will give me a basis to evaluate you (What can I ask you to explain to me? How well do you know the things you say you know?). Resume itself isn't very important once you get through general resume screen.

Resume Quick Tips

Put most relevant/recent items higher.   E.g. PhD above BS.

Make it very easy to navigate.

Don't claim skills you can't prove in front of an expert. Skills show that you have the ability to learn. Things like "communication", "leadership" aren't persuasive skills - better to be able to list "conference organizer" or "analysis coordinator" in experience.

Have a good answer for "why company X?" Make it specific to the position.

Questions?

What does Bloomberg do?

What is fixed income pricing?

What is your typical day like?

Why did you leave physics?

What misconceptions/assumptions did you have before leaving physics?

What do you miss about physics?

Why did you pick Bloomberg?

What do you love about Bloomberg?

How does a physicist sell him/herself?

How did you find/acquire your job?