

# Anything Anywhere but Not All At Once

*What you can do as a former astronomer*

**Speaker: James Guillochon**

# Outline

- ✦ Who I am
- ✦ How I got my jobs
- ✦ My last job and what I did there
- ✦ My current job and what I do there
- ✦ Job hunting advice

# Who I am

- ✦ Originally from San Diego.
- ✦ Went to college at UC Irvine (physics), senior thesis with James Bullock. Betsy Barton was one of my professors!
- ✦ HRL Laboratories doing unmanned aerial vehicles sensing/planning (2005 - 2007).
- ✦ UC Santa Cruz grad school (astronomy), PhD 2013 with Enrico Ramirez-Ruiz.
- ✦ Postdoc at Harvard from 2013 - 2018 (mentor: Avi Loeb).

# Academic Summary

- PhD: Tidal disruptions of stars, supernovae from merging white dwarfs, hot Jupiters. Mostly hydrodynamical simulation work.
- Postdoc: Tidal disruptions of stars, open data catalogs, transient light curve fitting, SETI, stellar dynamics.
- Service: Created Vox Charta (ended a few years ago), Open Supernova Catalog (still running). Maintain Physics GRE policy spreadsheet for astronomy programs.
- In the end: ~6.7k citations, ~20 first author pubs, ~100 pubs total. Refereed 30 papers. Applied 4 job cycles (~50 positions), 5 shortlists, no offers.

Note: To industry, these numbers are pretty meaningless. My PhD field is a good conversation starter. Harvard name matters a lot, sadly. My appearance on NOVA helped too.

# Before I got my first job out of academia

- End of 2017: Contacted Taka (speaker today!) who had done Insight Data Science program. He referred me to the Boston program, I interviewed with them, they accepted me for their AI program in Winter 2018.
- Early 2018: Last serious attempt at faculty job. This ate up much of my late 2017/early 2018. Contacted Insight and they switched me to Summer 2018 Data Science program instead.
- Spring 2018: Applied to two jobs that I had connections with before starting Insight program in the summer. Failed miserably at first interview, second wanted to hire provisionally.
- Summer 2018: Insight Data Science program.

# How I got my jobs

- BG: Postdoc friend's roommate's company was hiring engineers.
- Esri: Postdoc friend's sister-in-law's friend's company was hiring data scientists.
- In both cases: my specific background as an astrophysicist with famous institution credentials impressed people. But I needed to be able to *talk* to people to get far in the interview process. Most cold resume submissions completely ignored.



"I am your father's brother's nephew's cousin's former roommate!"

— Lord Helmet, Spaceballs

My first company: **Berkshire Grey**

Fun building things both  
hardware and software!



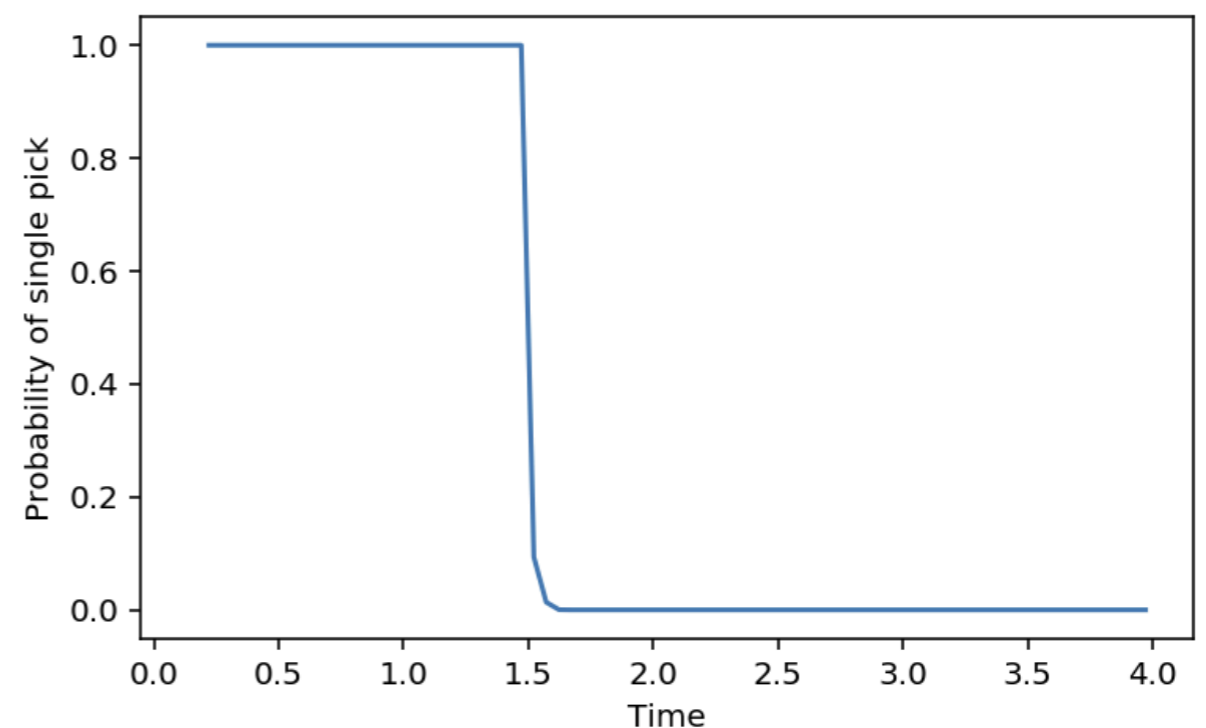
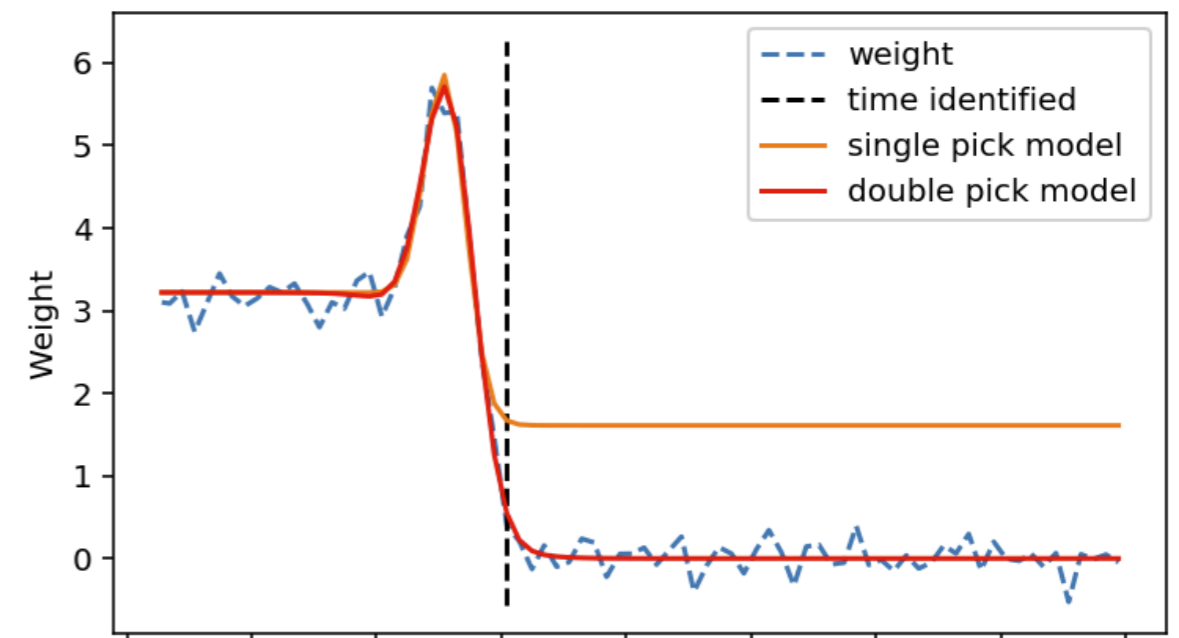
# Day-to-day at BG

- ✦ My job title was **principle software engineer**. I was regarded as a “generalist” which means I hopped around our code a bunch fixing/improving various things.
- ✦ Data sciencey stuff was perhaps ~20% of my job.
- ✦ Most of the job was *logical reasoning*. Robotics is about taking in data, fusing it, reacting to it, and coordinating with other automated elements in real time.

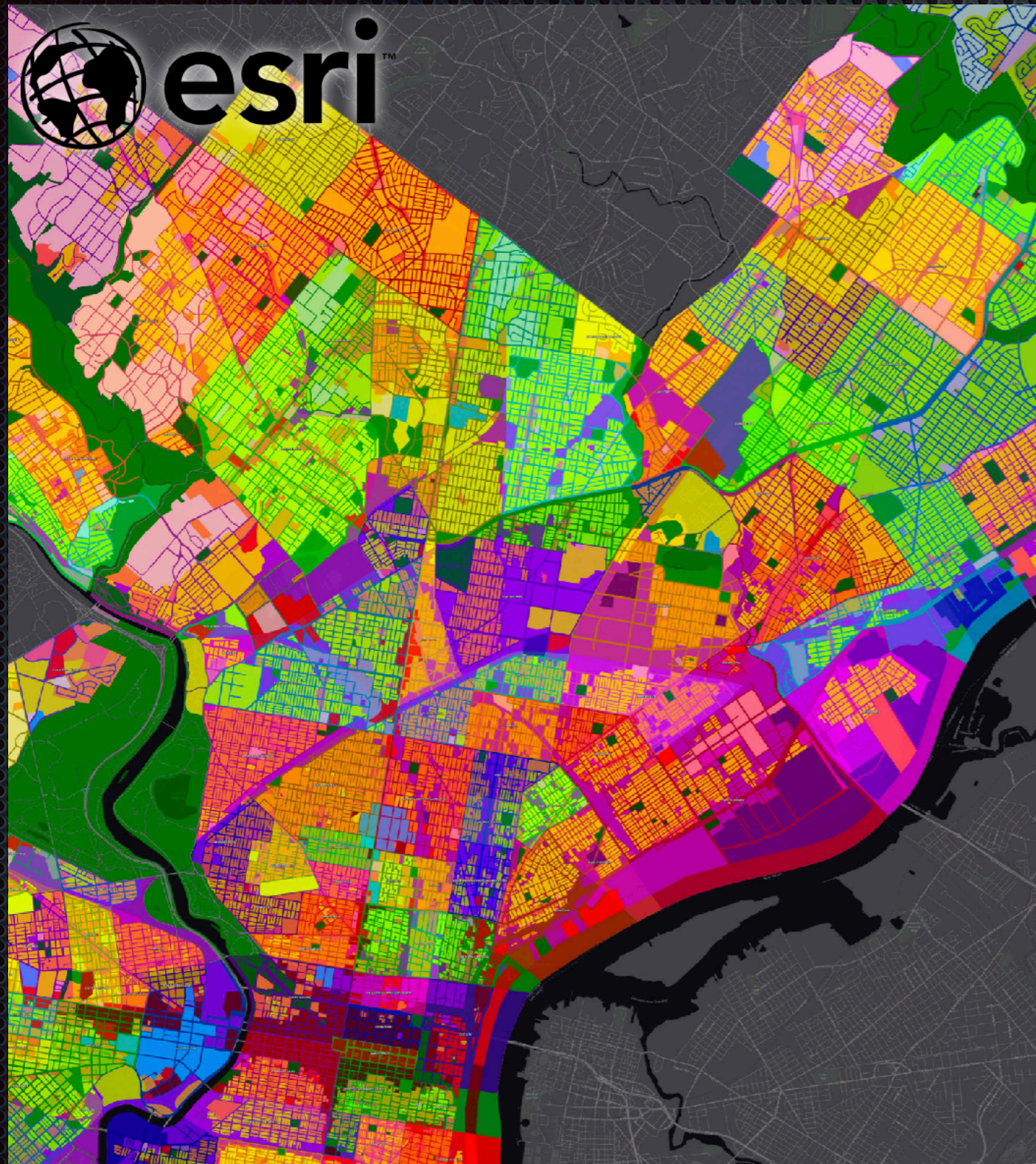
# Example thing I worked on at BG:

## How many items did we pick?

- ✦ Algorithm for finding places to pick up items isn't perfect, sometimes pick up 2+ items at once.
- ✦ Deliver the wrong number and customer isn't happy.
- ✦ ~1 second to make a decision on whether to continue or drop and try again.
- ✦ Solution: Maximum likelihood comparison between single pick and multipick models.
- ✦ This is the same method as I used for my transient fitting code. On a patent!



# My current company: **Esri**



- GIS (geographic information services) company founded in 1969.
- Put simply: Makes a massive collection of tools for dealing with maps for government and commercial purposes.
- 5,000 employees, based in Redlands CA, but I'm fully remote from San Diego.
- Private company, profit sharing but no equity.
- I'm an internal consultant, senior data scientist is my title, my job is ~70% data sciencey.

# Esri User Conference



- ✦ Every year at the San Diego Convention Center
- ✦ Last year there were 15,000 attendees! (Comparable to AAS!)

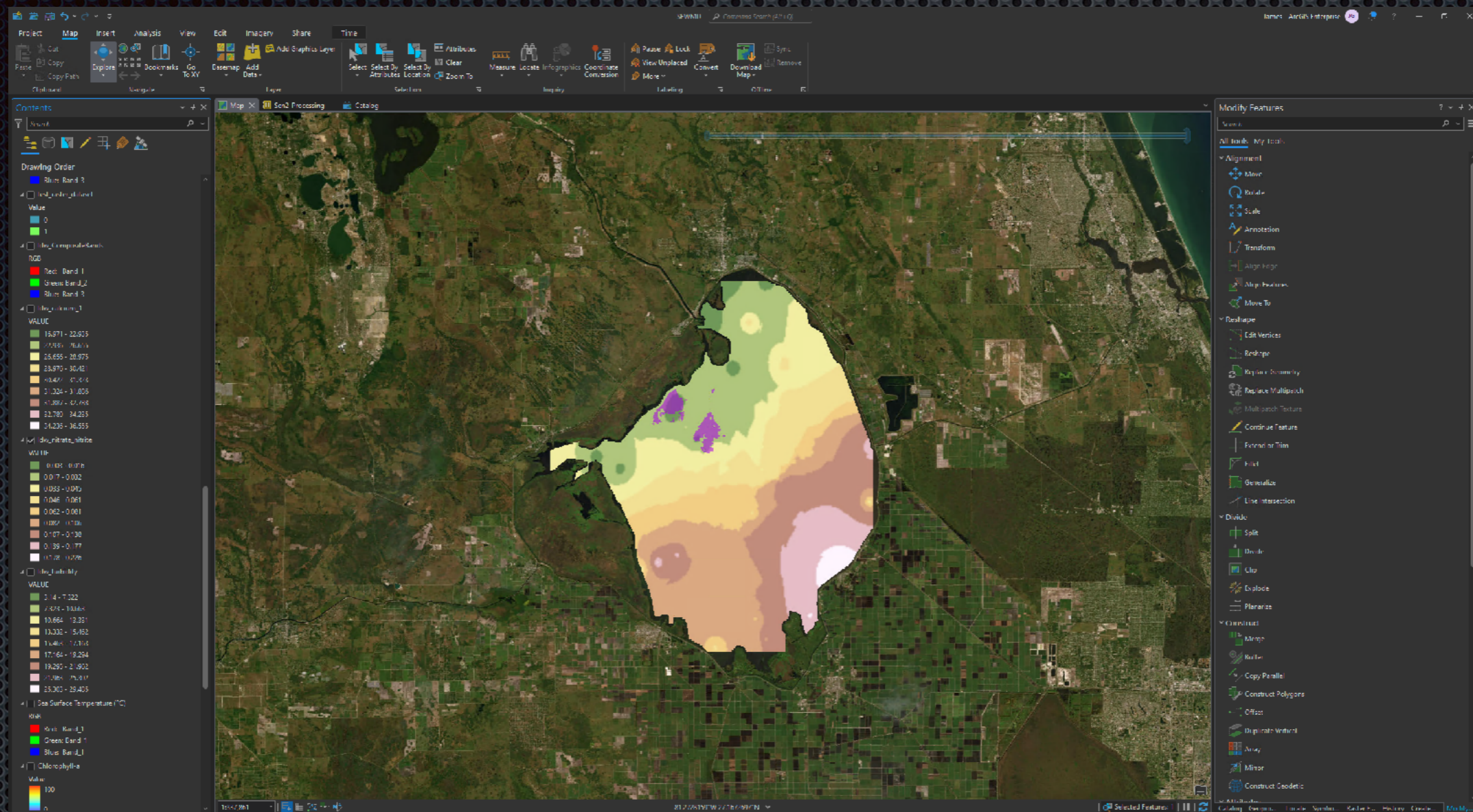
# Why did I change jobs?

- BG was a startup in the process of going public, starting getting intense/less fun to work at.
- Balance at BG was a little *too* much on the engineering side, particularly on the tail end of my time there. I wanted to do a little bit more science.
- Esri was in southern CA, allowed me to work from San Diego where my family is.
- As an internal consultant I would get to work on a wide variety of problems for different customers.
- Team is a bunch of PhD recipients from many fields, seemed like a fun group!

# My colleagues at Esri

- ✦ Former astrophysicist (me!)
- ✦ Former economics professor
- ✦ Former ecologist/biologist
- ✦ Former volcanologist
- ✦ Former geologist
- ✦ Former aerospace engineer
- ✦ ...and lots of younger folks starting their careers at Esri from a variety of backgrounds/degrees

# Day-to-day at Esri



- I primarily work in a Windows desktop software suite called **ArcGIS Pro** (screenshot above).
- As a consultant I am helping customers create workflows that do various tasks that loosely fall into the “data scientist” category of things, often classifying/segmenting 2D/3D images, but some textual/tabular analysis as well.
- Sometimes I just combine existing off-the-shelf tools, other times I am writing custom code to fill gaps in the software for challenging problems.
- Engagements range from a few hours long to hundreds of hours. Customers can be national organizations, cities, commercial customers. Good amount of freedom to take/pass on various projects.

# Things I've worked on at Esri (so far).

- Predicting where rogue waves may occur in the ocean.
- Extracting dirt roads from satellite imagery.
- Classifying ice from radar/satellite imagery near the Earth's poles.
- Determine locations of assets along a rail line from LIDAR for a major rail freight company.
- Geolocating water meters for a US city's water utility.
- Extract easement boundaries from scanned property descriptions.
- Forecasting where algal blooms are likely to occur in the next few days in a state's largest water reservoir.
- Classify satellite imagery into generic groups based on land type.
- Determine effectiveness of road barriers in reducing incidence of fatal crashes.

# Example: Extracting Easements from Documents

## EXHIBIT "B"/EASEMENT PREMISES

LISE 1156870039

### SOUTH WETLAND DESCRIPTION

Part of the Northwest 1/4 of Section 22, T. 1 N., R. 8 E., City of Novi, Oakland County, Michigan, described as;

Commencing at the North 1/4 corner of said Section 22; thence N. 87° 30' 09" W. 1344.10 feet along the North line of said Section 22, said line also being the centerline of 11 Mile Road; thence S. 01° 14' 43" W. 1803.19 feet to the POINT OF BEGINNING; thence S. 49° 08' 01" E. 87.22 feet; thence S. 36° 53' 16" E. 40.40 feet; thence S. 14° 51' 46" W. 93.89 feet; thence S. 35° 57' 11" E. 70.09 feet; thence S. 17° 23' 33" E. 49.91 feet; thence S. 10° 08' 24" W. 60.24 feet; thence S. 02° 25' 01" W. 49.08 feet; thence S. 13° 01' 41" E. 52.89 feet; thence S. 28° 41' 42" E. 46.79 feet; thence S. 45° 13' 05" E. 100.24 feet; thence S. 80° 16' 11" E. 46.09 feet; thence N. 67° 25' 09" E. 127.96 feet; thence N. 80° 12' 45" E. 42.30 feet; thence S. 66° 12' 16" E. 43.20 feet; thence S. 27° 27' 59" E. 57.00 feet; thence S. 30° 01' 46" E. 89.03 feet; thence S. 43° 55' 39" E. 102.26 feet; thence S. 59° 58' 41" E. 102.24 feet; thence S. 46° 10' 25" E. 119.14 feet to a point on the East/West 1/4 line of said Section 22; thence N. 88° 02' 13" W. 794.69 feet along said East/West 1/4 line; and thence N. 01° 14' 43" E. 832.13 feet to the POINT OF BEGINNING. Containing 5.60 acres of land, more or less. Subject to any and all easements or rights of way of record, if any.

### CENTRAL WETLAND AREA

Part of the Northwest 1/4 of Section 22, T. 1 N., R. 8 E., City of Novi, Oakland County, Michigan, described as;

Commencing at the North 1/4 corner of said Section 22; thence N. 87° 30' 09" W. 1344.10 feet along the North line of said Section 22 said line also being the centerline of 11 Mile Road; thence S. 01° 14' 43" W. 1646.31 feet; thence S. 88° 45' 17" E. 316.96 feet to the POINT OF BEGINNING; thence N. 48° 09' 35" E. 48.81 feet; thence S. 72° 30' 19" E. 86.38 feet; thence N. 49° 33' 27" E. 87.14 feet; thence N. 01° 00' 09" W. 174.60 feet; thence N. 17° 13' 32" E. 87.52 feet; thence N. 51° 51' 39" E. 134.06 feet; thence S. 58° 46' 22" E. 193.60 feet; thence S. 18° 58' 20" E. 147.01 feet; thence S. 07° 42' 32" W. 55.83 feet; thence S. 30° 18' 40" W. 249.53 feet; thence S. 81° 35' 45" W. 73.12 feet; thence N. 80° 30' 18" W. 285.15 feet; and thence N. 29° 40' 11" W. 80.23 feet to the POINT OF BEGINNING. Containing 3.53 acres of land, more or less. Subject to any and all easements or rights of way of record, if any.

Prepared By:

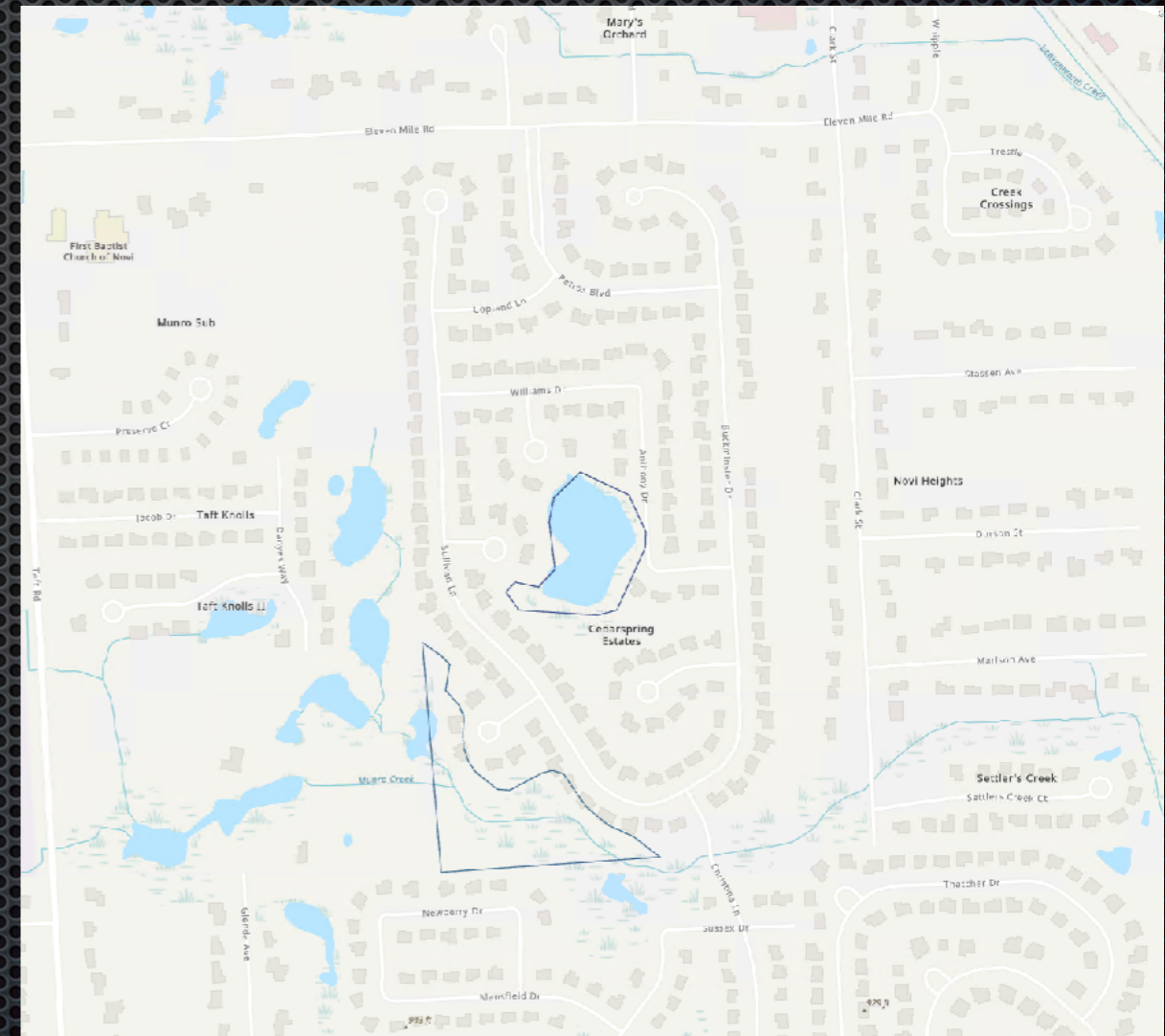
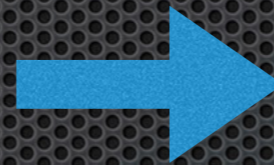
Dietrich, Bailey & Associates, P.C.  
107 S. Main Street  
Plymouth, MI 48170

12/11/89

22-22-176-001 ft. parcel

22-22-176-001 ft. parcel  
Repeal

5.6  
+ 3.53  
= 9.13



# My tips for job hunting success!

1. Resume: Highlight your **skills**, the **problems you solved**, and your ability to work in a **team**.
2. Programming: git gud. **Python**, **C++**. Learn **process** (documentation, source control management, code review). People will admire your Rust/Julia street cred but no one uses these (yet). *No ancient languages like FORTRAN on your resume.*
3. Data science: You already know how to science if you're here. You don't know all the **vocabulary** of data science. There are undergrads popping out of data science/machine learning programs who know this much better than you.
4. Teamwork: Help others. Learn to compromise. Be empathetic. Try to avoid working by yourself. These are somewhat *antithetical* to academic success. The **stories you tell** of how you interact with others carry a lot of weight in the interview process. Personality matters a lot.
5. Networking: Talk to us after our talk and connect with us on LinkedIn. Good connections are those who have left academia recently, they know how to play the game the best and know what you're going through. These people don't have to be your best friends, **most people want to help!**
6. Synthesize: Combine the advice you like together into a **plan**.