esri Canada | Education & Research

# Python for ArcGIS - Working with ArcGIS Notebooks

Michael G. Leahy PhD – mleahy@esri.ca

# Workshop files

https://bit.ly/**ArcGISNotebooks-2021-01**

# Workshop Agenda

- Introduction: Jupyter Notebooks -> ArcGIS Notebooks

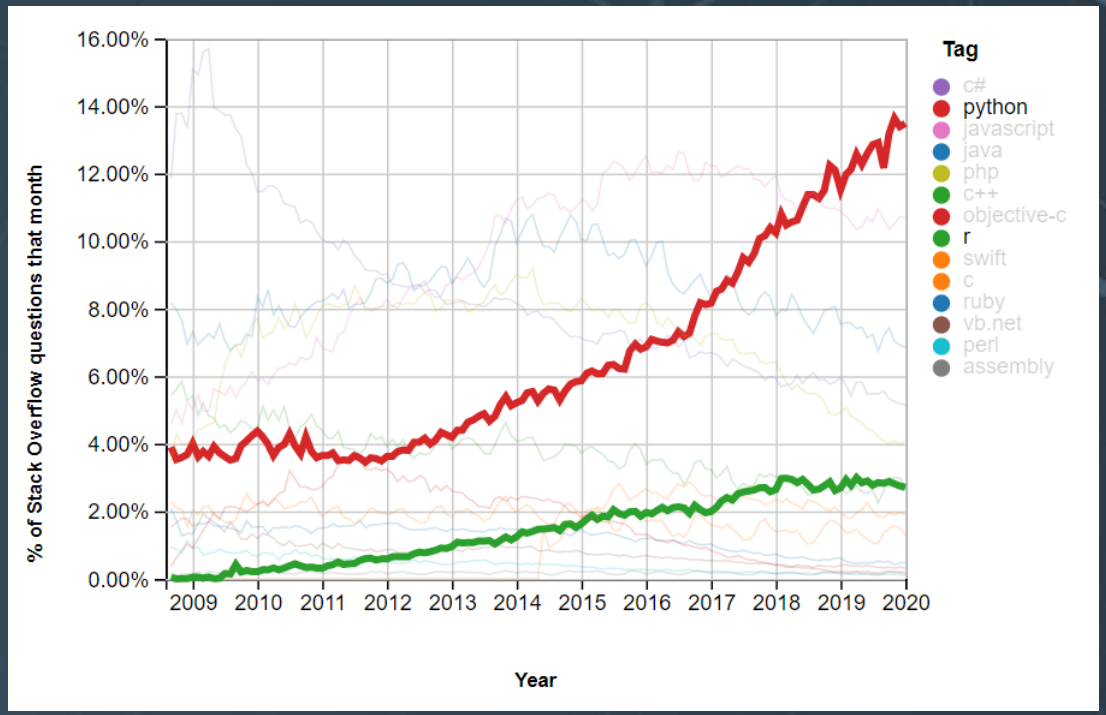
- Getting Started:
  - Basics of working with Jupyter Notebooks
  - Notebooks in ArcGIS Pro
  - Hosted Notebooks in ArcGIS Online or ArcGIS Enterprise

- Geospatial Data Science Notebook samples:
  - Data engineering
  - Data exploration
  - Data analysis

# Python

- Arguably **the** most popular programming language today

- Why?
  - Active/supportive community
  - Big Data, ML/DL/AI
  - Many high-quality libraries
  - Reliable and efficient
  - Highly accessible (easy to learn and use)




https://insights.stackoverflow.com/trends

# Jupyter Notebook

- A popular way to compose documents that include:
  - Rich formatted text
  - Embedded images
  - Multimedia
  - Math formulas
  - All interlaced with live executable code and visualization of outputs

- Why?
  - Everything in one place
  - Sharable
  - Language independent
  - Customizable
  - Reproducibility & Transparency
  - Teaching
  - Iterative exploration

- Python!

# ArcGIS Notebooks

- Notebooks – around since '80s
  > IPython (2001)
  > Jupyter (2014, multi-language)

- ArcGIS:
  - Geoprocessing with Python since ArcGIS 9.0 (2004)

- 2016: ArcGIS Notebooks =
  Jupyter Notebook server
  + Python
  + ArcGIS API for Python
  + ArcPy

- 2019: Hosted Notebooks =
  ArcGIS Notebook
  + ArcGIS Enterprise 10.7.1+
  + Notebook Server for ArcGIS

- 2020:
  **ArcGIS Pro Notebooks** =
  ArcGIS Pro 2.5+
  + ArcGIS Notebooks

  **Hosted Notebooks** =
  ArcGIS Notebook
  + ArcGIS Online

# What can ArcGIS Notebooks do?

Data Engineering (Wrangling)

(Spatial) Data Analysis

ML / DL / AI

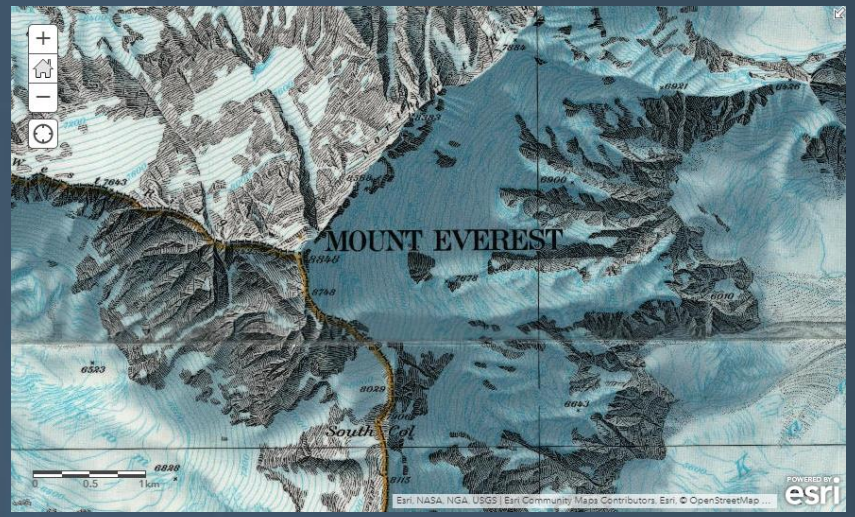
Automation

Collaboration

Storytelling

Iteration & Experimentation (Learning)

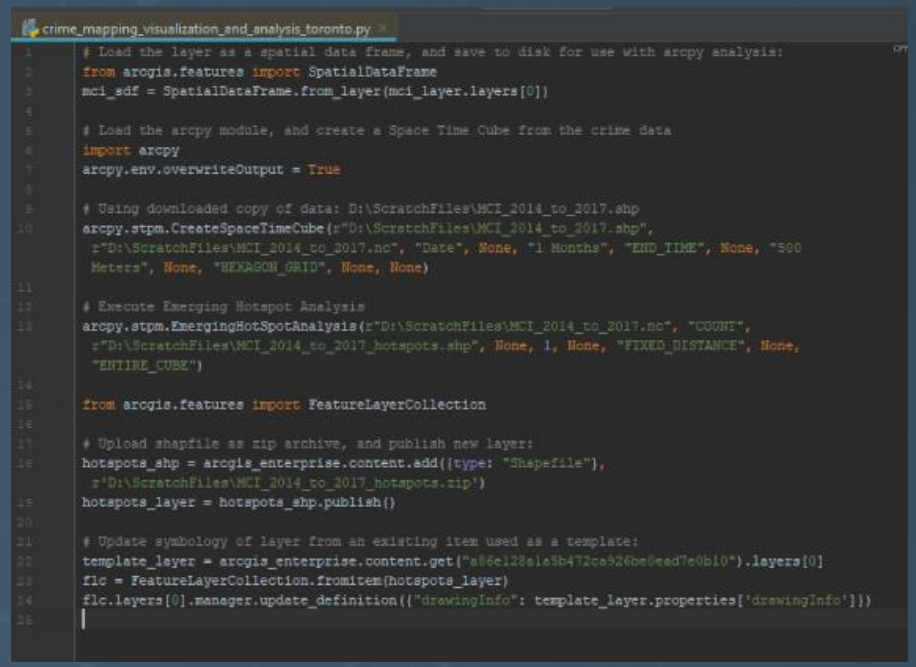
# ArcGIS StoryMaps...



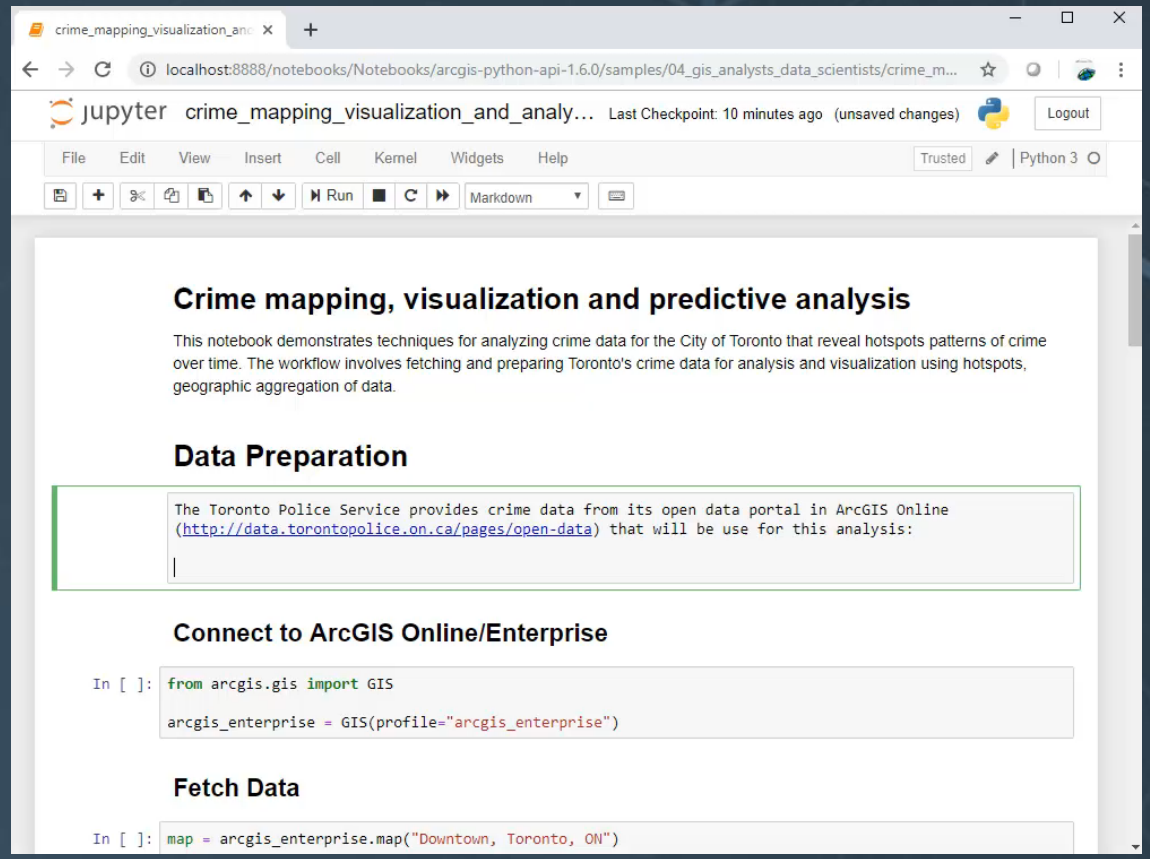

help you turn this...
(simple web maps)


...into this.

# ArcGIS Notebooks…




help you turn this…
(python scripts)




…into this.

# Learn Python

- Python Docs: https://www.python.org/about/gettingstarted/
- Free tutorials: https://learnpython.org (example)
- (many more) …

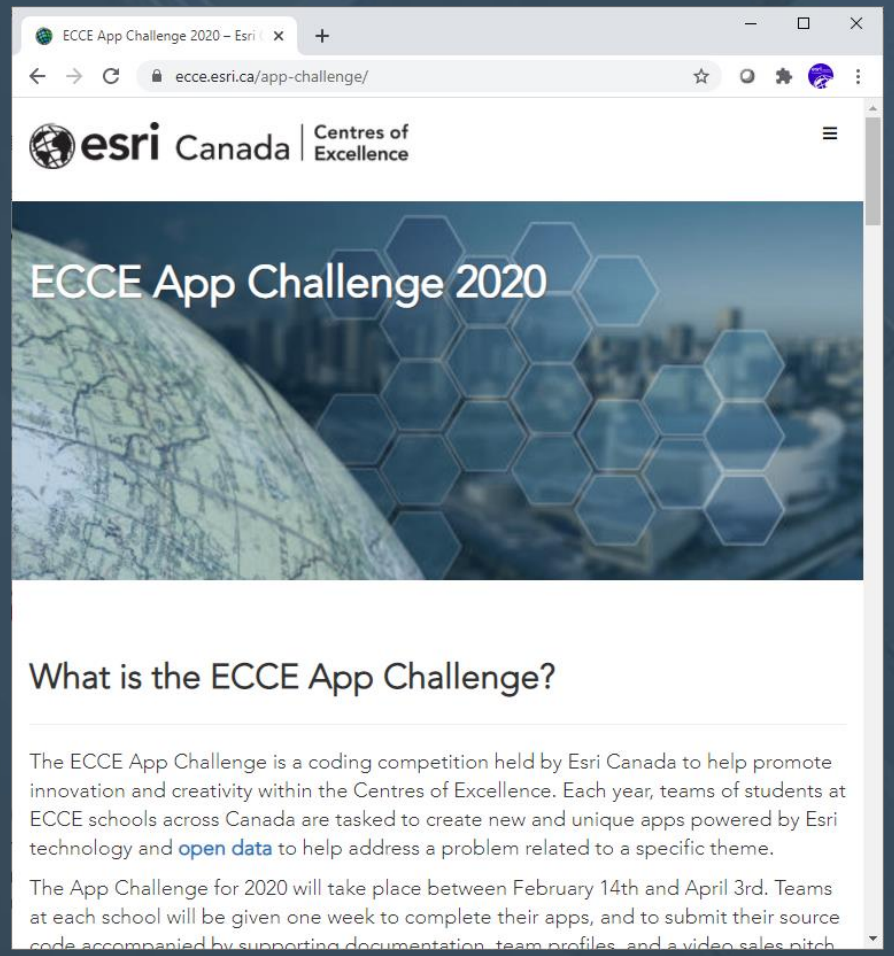
- ArcGIS Reference (arcpy): https://pro.arcgis.com/en/pro-app/arcpy/main/arcgis-pro-arcpy-reference.htm
- ArcGIS API for Python (arcgis): https://developers.arcgis.com/python/
  - Samples: https://developers.arcgis.com/python/sample-notebooks/

- Esri Canada Education & Research Resources: https://hed.esri.ca/resourcefinder/

# Getting Started...

# ECCE App Challenge 2021

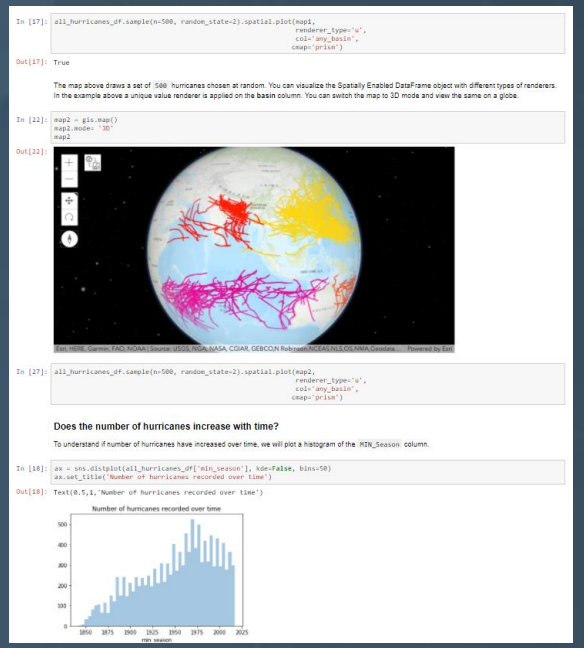
- An annual one-week team-based competition held at ECCE schools across Canada
- Teams of 2-3 students must:
  - Develop apps that address a specific topic/theme using Open Data and Esri Technology *
  - Develop a team mission statement and associated documentation
  - Produce a video to demonstrate/promote the team's creation
- Open to all students at ECCE schools
- Dates to be announced (between late-February and early-April)
- Contact ECCE directors at your school to join a team: https://ecce.esri.ca/schools/
- **Prize:** Expenses paid trip to Esri User Conference in San Diego **
- **No coding necessary** (but it is welcome)



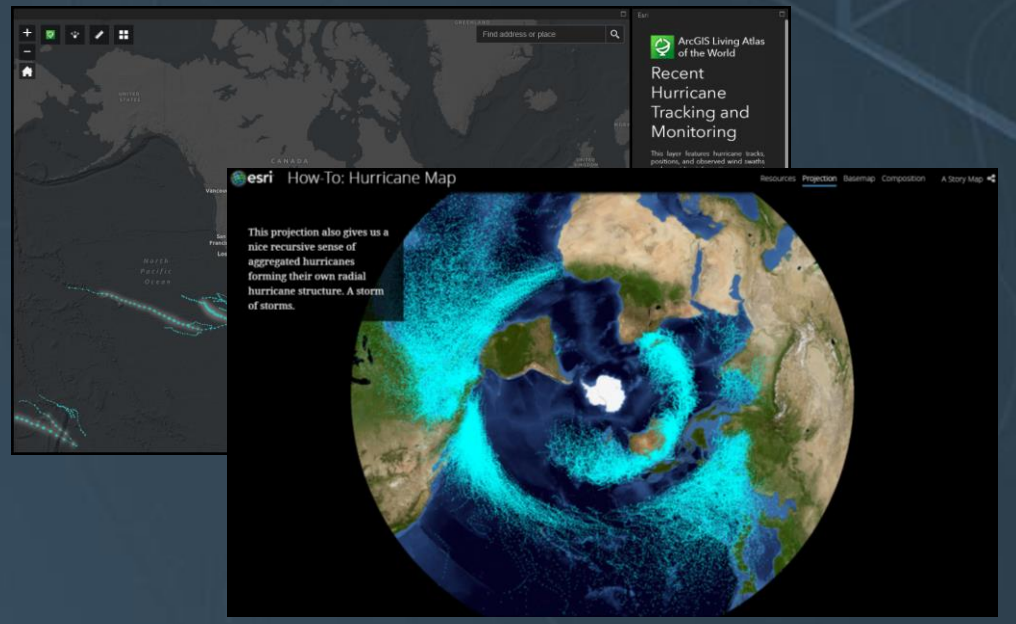

https://ecce.esri.ca/app-challenge/

# ArcGIS Notebooks in the App Challenge:

Example...




+




Use ArcGIS Notebooks to:

- Showcase data preparation, and analysis steps.
- Automate workflows that create and/or update output datasets.

Use apps/story maps to:

- Enable users to view, interact with, and analyze your output data.
- Share insights, tell the story that data and analyses support.

esri Canada | Education & Research

https://hed.esri.ca highered@esri.ca

# QUESTIONS?

Michael G. Leahy PhD – mleahy@esri.ca

**ListServ: https://hed.esri.ca/studentlistserv**

**Twitter: @GIS4HEd**