Python For Geographers

Manushi Majumdar, mmajumdar@esri.com, @Manushi_M

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Goals

1. Understanding how to read Python
2. Environment setup essentials
3. Ways to teach yourself Python

Agenda

1. Bare basics for getting started
2. Basics of Python programming
3. Python Open Source packages
4. GIS and Data Analysis in Python
5. Learning Resources

What is Python?

- Object-oriented, free scripting language
- Syntax that is easy to learn and understand
- Flexible language for building prototypes

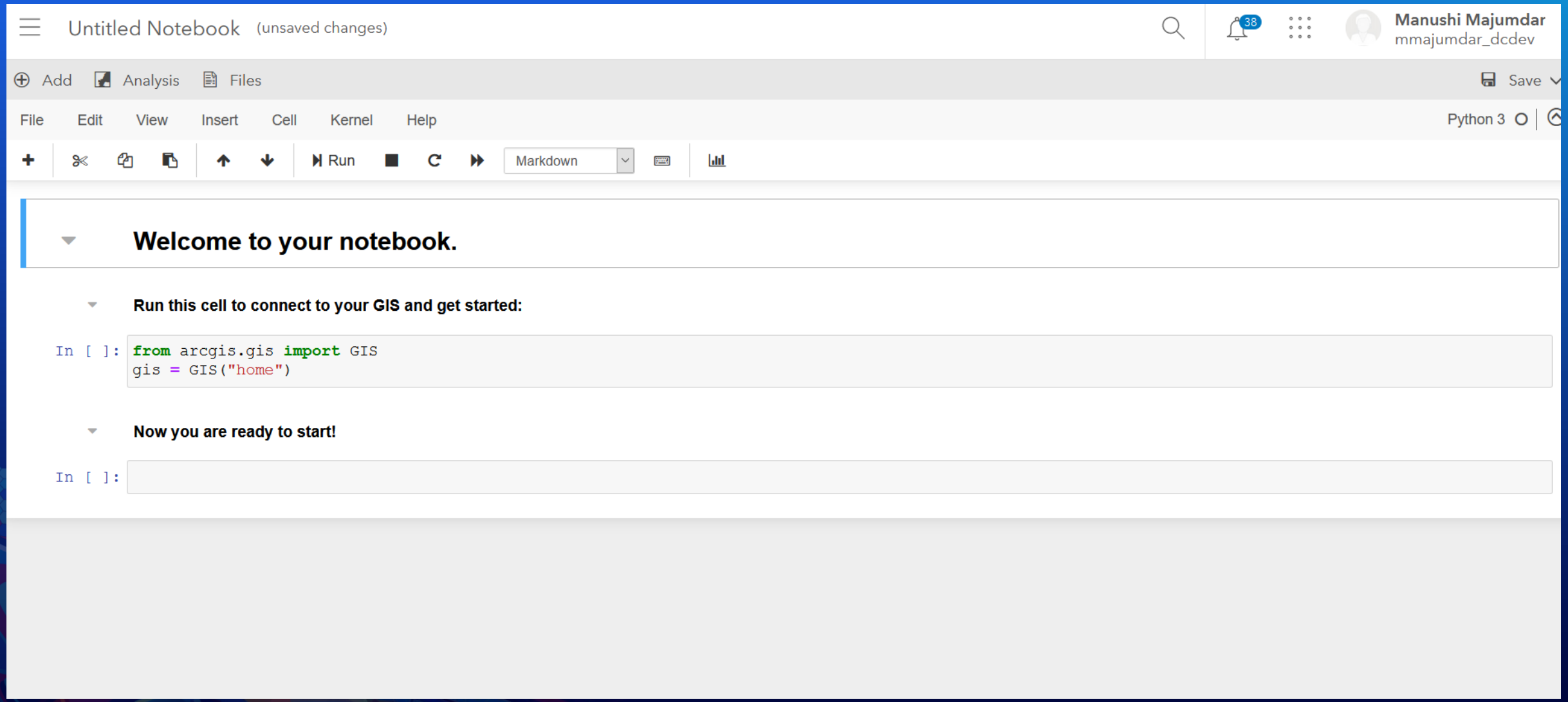
Benefits:

1. Scalability
2. Integrated packages
3. Open source and community development

Getting started with Python

- **Get Python - https://www.anaconda.com/distribution/**
- **Install Python - https://docs.anaconda.com/anaconda/install/**
- **Verify install - https://docs.anaconda.com/anaconda/install/verify-install/**
- **Virtual Environments - https://uoa-eresearch.github.io/eresearch-cookbook/recipe/2014/11/20/conda/**
- **Scripting environments - Terminal, Sublime, Idle, Visual Studio, PyCharm, Python window in Pro, Jupyter (ArcGIS) notebooks**

ArcGIS Notebooks



Scripting in Python 1 – Data types

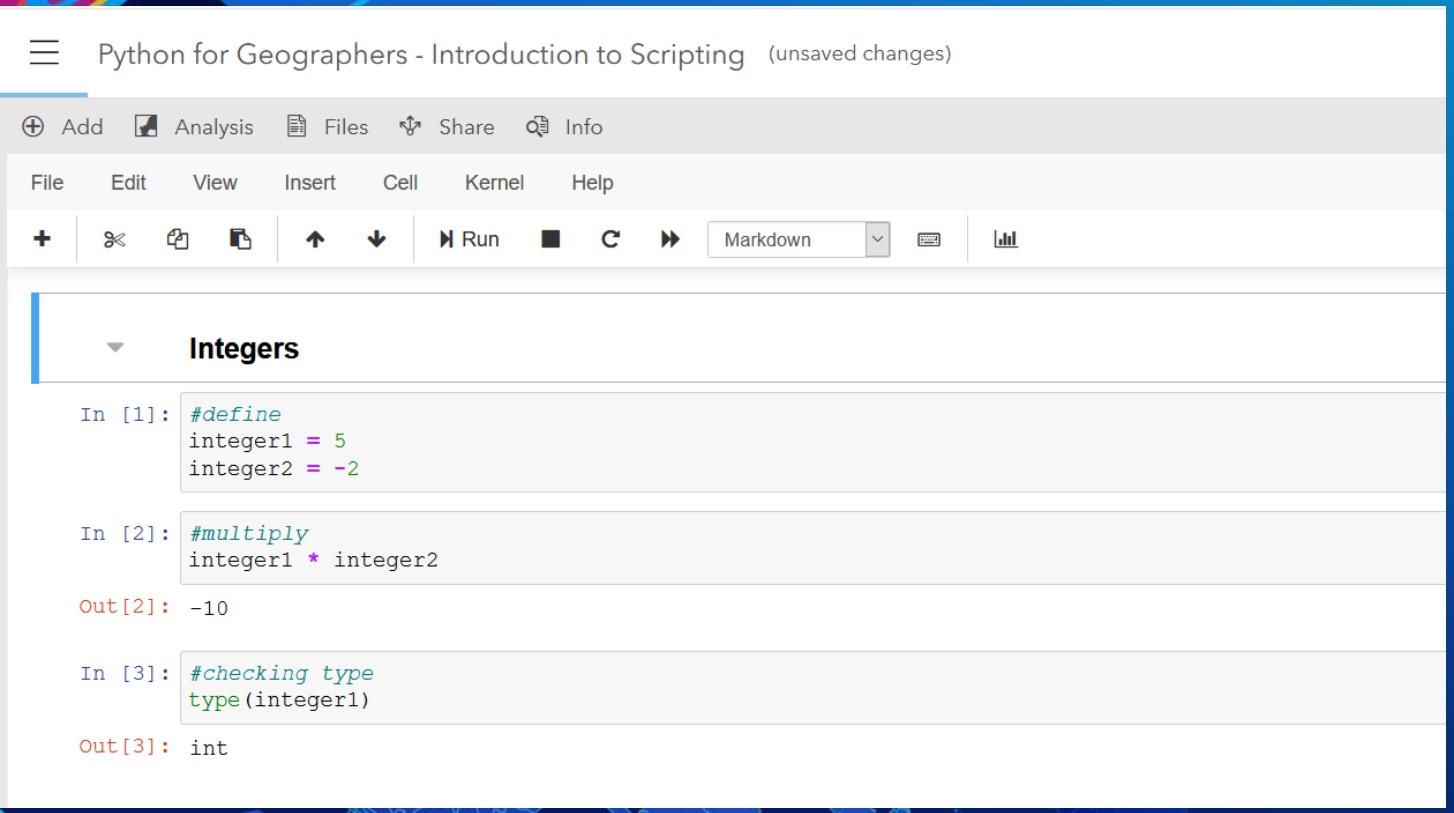
- **int:** 5, -72
- **float:** 5.6, -95.234
- **str:** “Python”, “I am a String”
- **bool:** True, False
- **list:** [4, 26, 11], [‘Hello’, 42, ‘World’, 9.9]
- **tuple:** (5,3), (‘a’, 2.8, 7)
- **dict:** {“name”:”Anne”, “age”:20}

Scripting in Python 2 – Instructions

- **Statements:**
- **print, import, del, if-else, for, try-except**

- **Built in functions:**
- **len(), max(), min(), type(), sum()**
- **https://docs.python.org/3/library/functions.html**

- **Methods:**
- **Functions that are associated with a specific data type or object.**



Introduction to Python Scripting

Presenter(s)

Popular Open Source Python packages

- **Pandas – https://pandas.pydata.org/pandas-docs/stable/getting_started/10min.html#min**
- **Numpy – https://docs.scipy.org/doc/numpy/user/quickstart.html**

- **Matplotlib – https://matplotlib.org/tutorials/index.html**
- **Seaborn - https://seaborn.pydata.org/introduction.html**

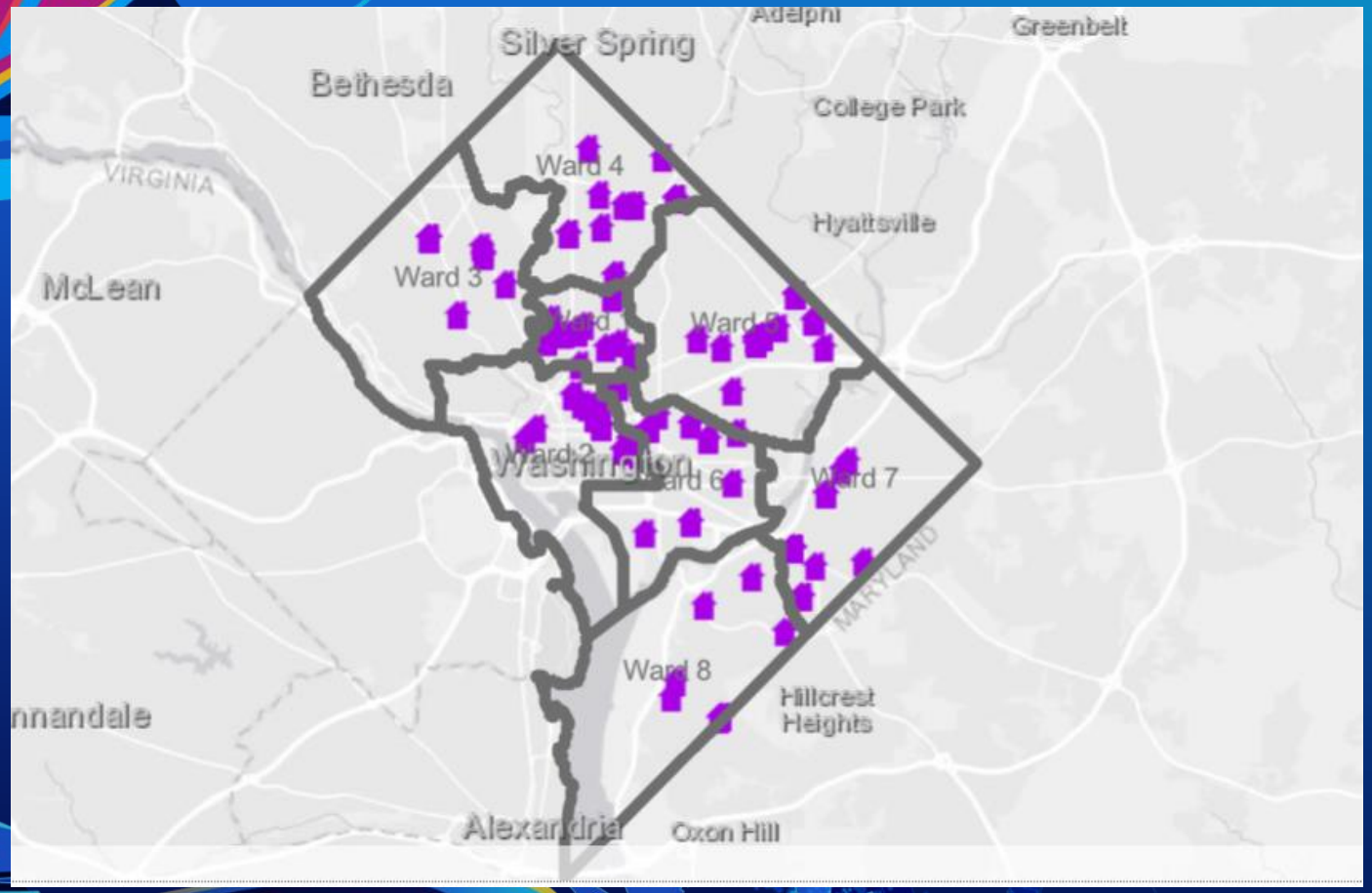
- **Scipy – https://www.tutorialspoint.com/scipy**
- **Scikit-learn - https://scikit-learn.org/stable/tutorial/index.html**

Popular Open Source Python packages

- **Geopandas – https://geopandas.readthedocs.io/en/latest/reference.html**
- **Shapely – https://shapely.readthedocs.io/en/stable/manual.html**

- **RSGISLib – https://www.rsgislib.org/**
- **GDAL - https://gdal.org/**

- **Pyshp – https://pypi.org/project/pyshp/**
- **PYSAL - https://pysal.org/**



Demo Title

Presenter(s)

Learning Resources

- W3Schools - https://www.w3schools.com/python/
- Python Tutorial - https://docs.python.org/3/tutorial/
- Books
  - Head First Python (O'Reilly)
  - Think Python: How to think like a Computer Scientist (O'Reilly)
- Arcpy
  - https://www.esri.com/training/
  - Python Scripting for ArcGIS (Esri Press)
- ArcGIS Python API - https://developers.arcgis.com/python/
- Exercises for practice - https://www.practicepython.org/

Recap

- Get Python with Anaconda
- Script = Data Types + Instructions
- Leverage Open Source libraries for your needs
- GIS analysis using ArcGIS Python API
- Slides + demos - https://github.com/ManushiM/esri-devsummit/tree/master/PythonForGeographers_2021
- Python is Fun!

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