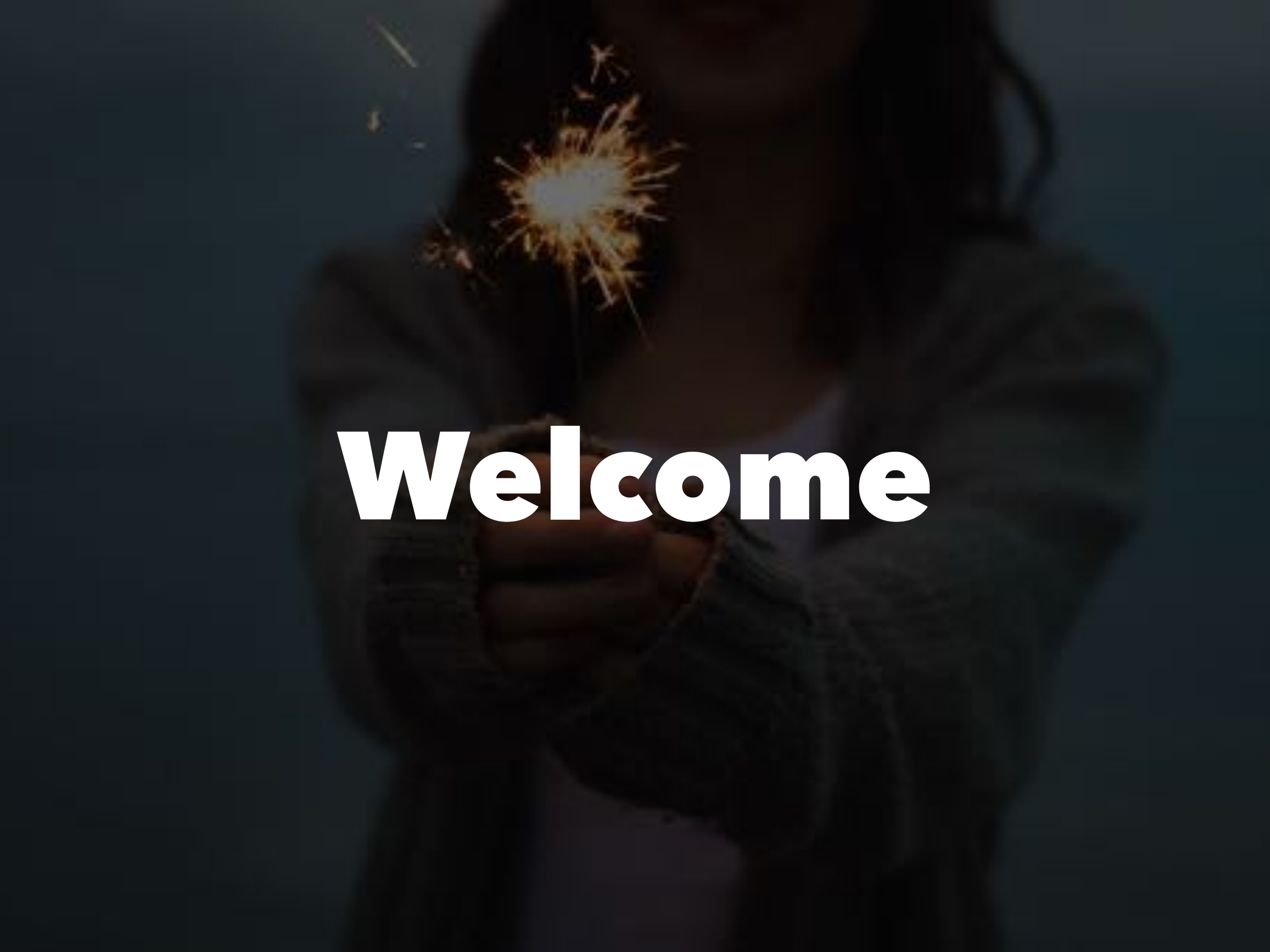
Intro to Data Science in Python Workshop

@unnati_xyz | @hasgeek


Welcome

Facilitators


Amit
@amitkaps


Nischal
@nischalhp


Raghotham
@raghothams

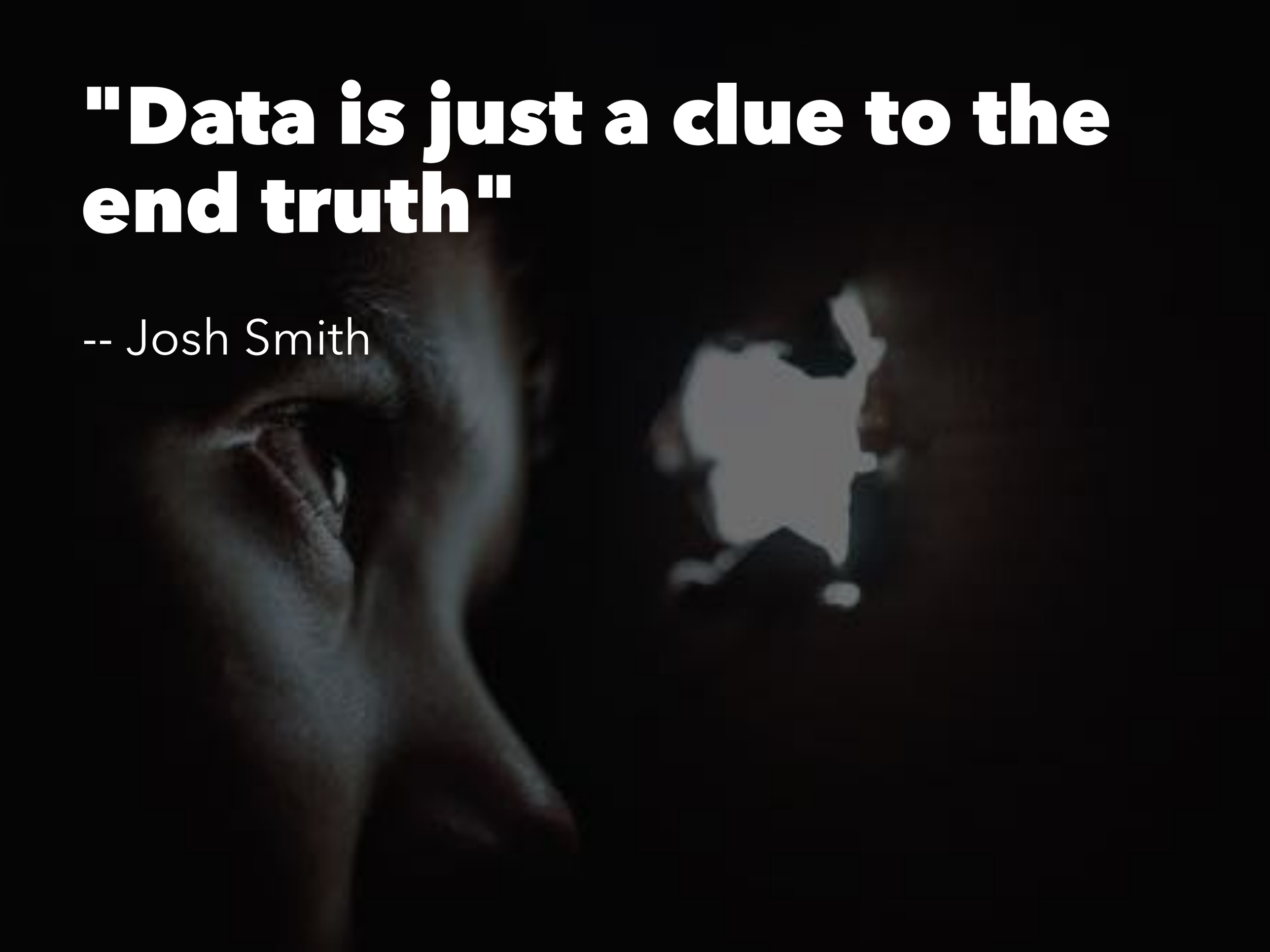

Bargava
@bargava


Shrayas
@shrayasr

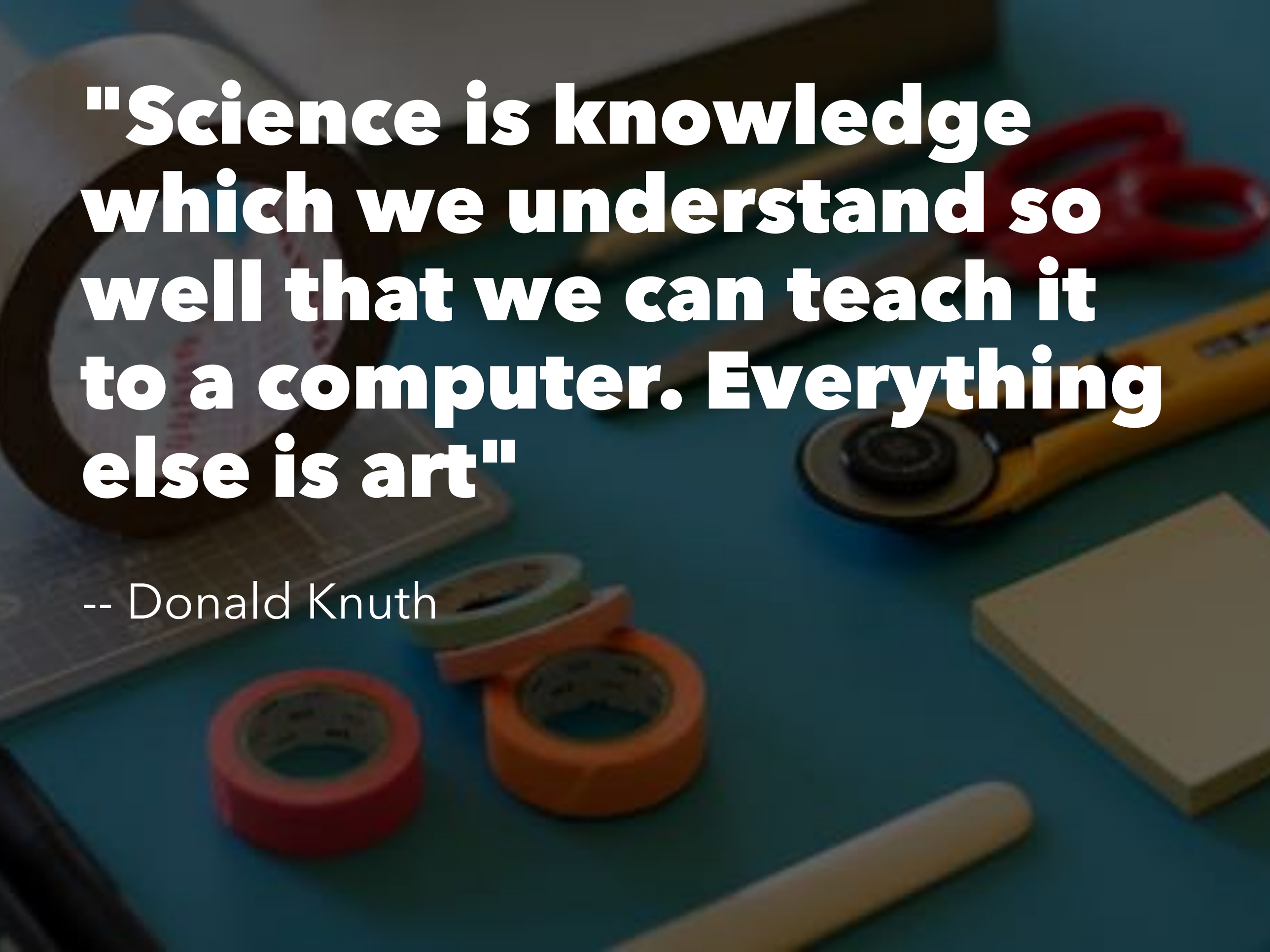
See the world through a data lens

"Data is just a clue to the end truth"

-- Josh Smith



Data Driven Decisions



"Science is knowledge which we understand so well that we can teach it to a computer. Everything else is art"

-- Donald Knuth


Data Science is
an Art

Hypothesis Driven Approach

Frame

"An approximate answer to the right problem is worth a good deal"

Acquire

"80% perspiration, 10% great idea, 10% great output"

Refine

"All data is messy."

Explore

"I don't know, what I don't know."

Model

"All models are wrong, but some are useful"

Insight

"The goal is to turn data into insight"

"An approximate answer to the right problem is worth a good deal"

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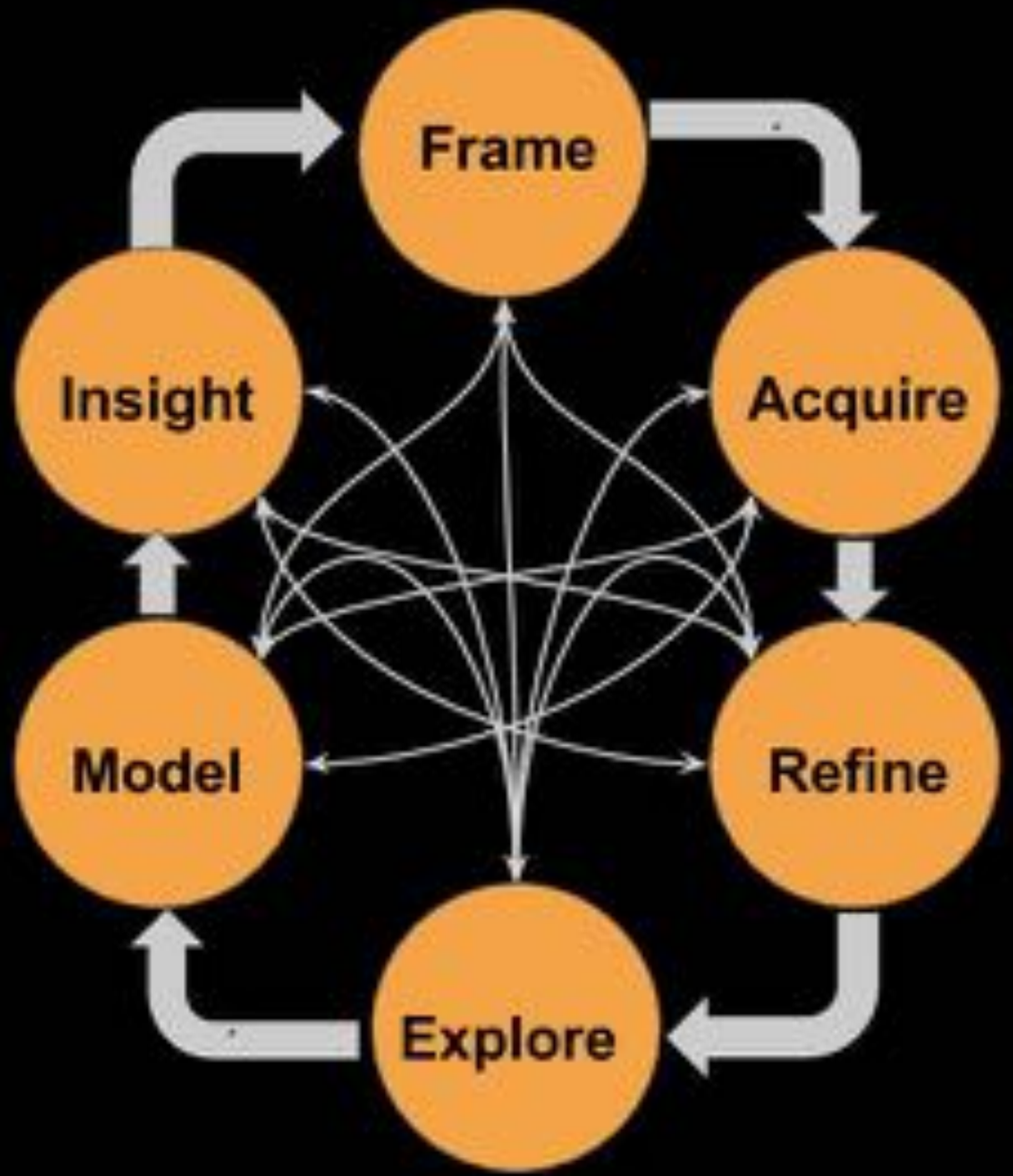

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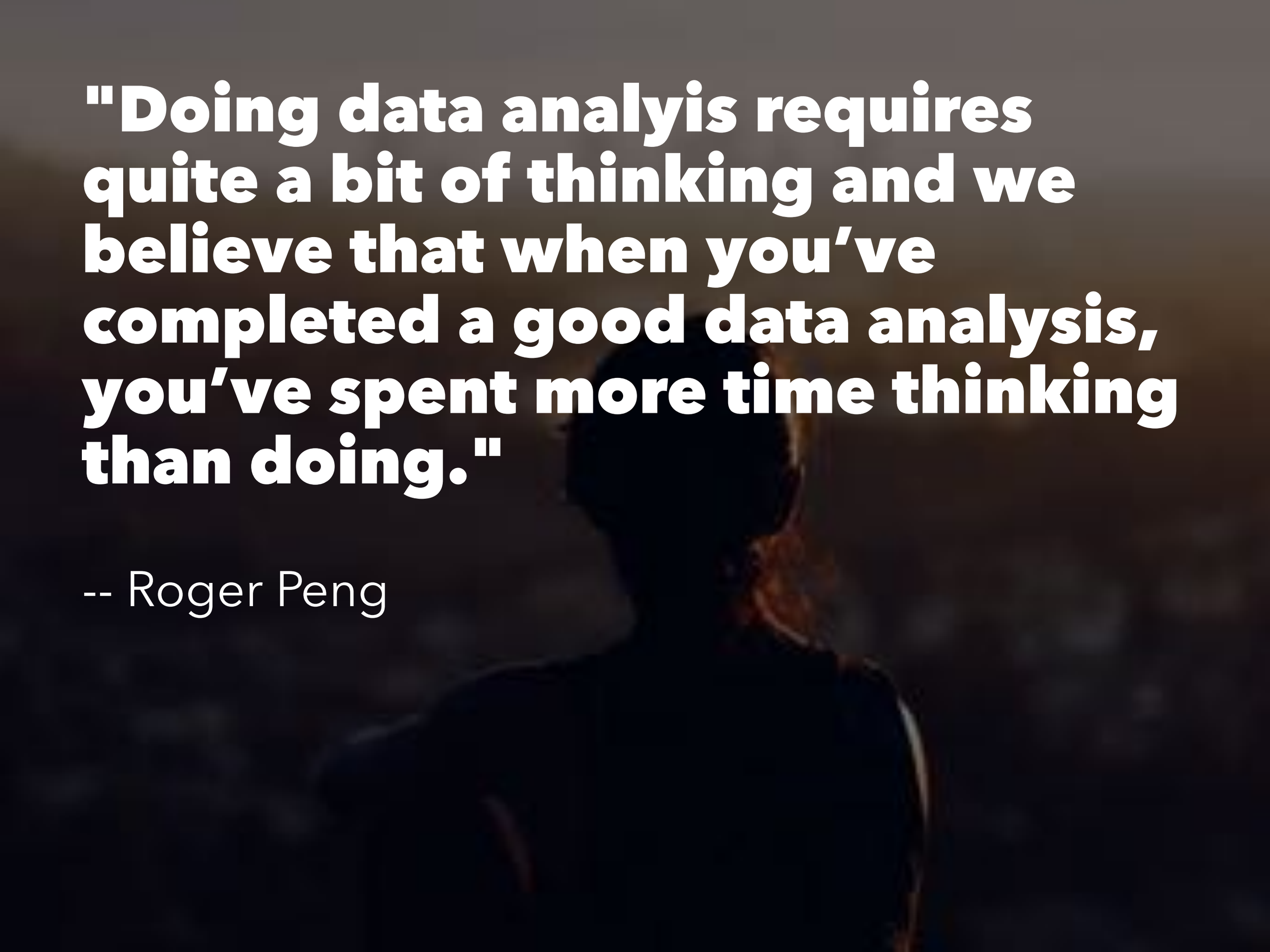


"Doing data analyis requires quite a bit of thinking and we believe that when you've completed a good data analysis, you've spent more time thinking than doing."

-- Roger Peng

Python Data Stack

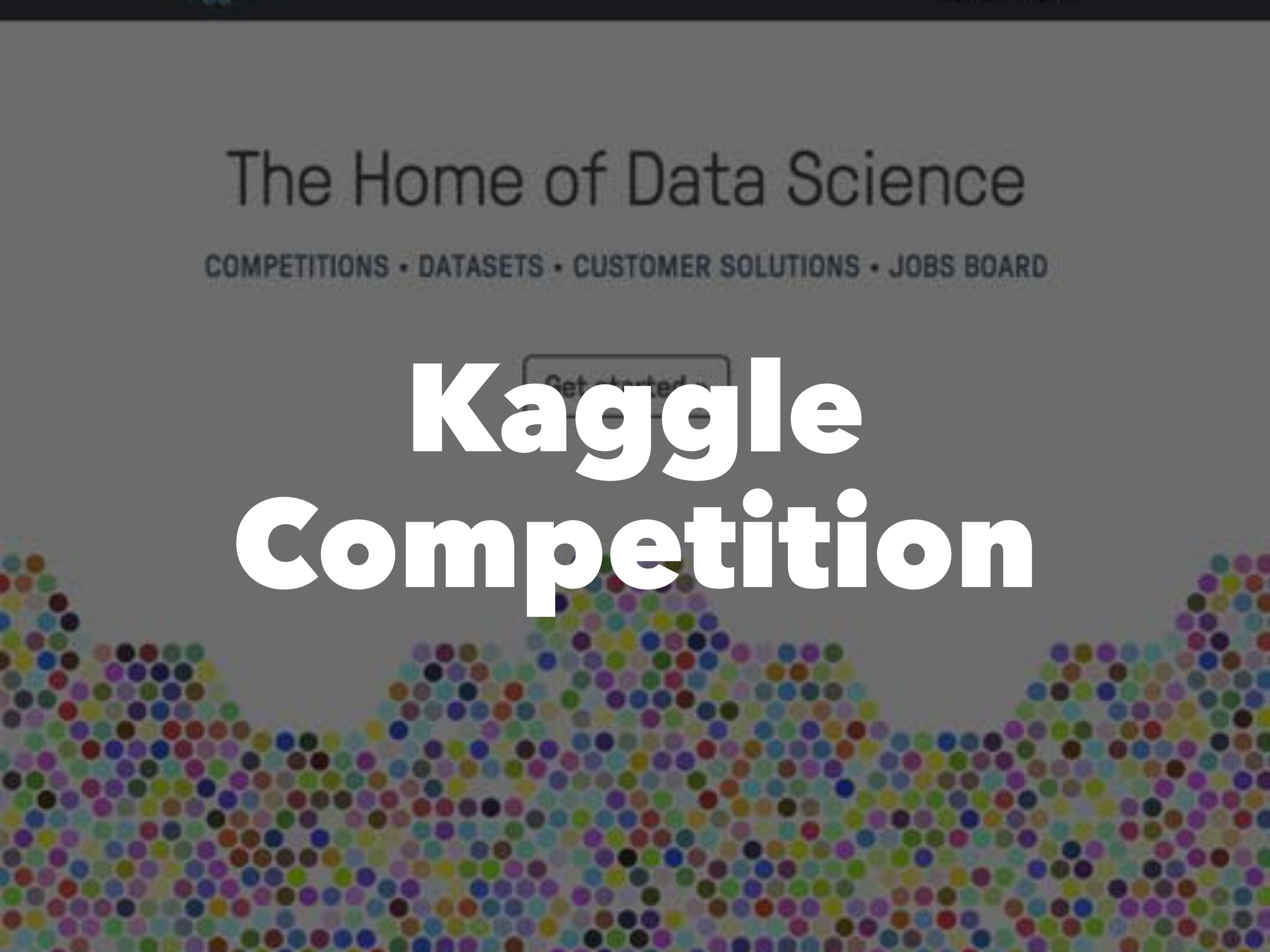
Case Studies

Peeling the Onion

Hard Disk Failure

Shining Diamonds

Red Wine Selection


The Home of Data Science
COMPETITIONS • DATASETS • CUSTOMER SOLUTIONS • JOBS BOARD
Kaggle
Competition

Learning Approach

Do the Exercises

Pair up & Learn

Call for Help

Schedule

Session 0 (0830 - 0930)

- Installation

Session 1 (0930 - 1115)

- Overview of Data Science
- Data Science Process
- How to use Jupyter Notebook
- Intro to Data Structures in Python

Session 2 (1135 - 1300)

- Case 1: Peeling the Onion
- Exploring Onion Price and Quantity

Session 3 (1400 - 1530)

- Fun visualization exercise
- Communicating the Onion Insights
- Acquiring the Onion data (Web Scraping)

Session 4 (1550 - 1730)

- Case 2: Hard Disk Failure
- Explore & build intuition around Failure Rates

Optional Advanced Session (1730 - 1830)

- Working with SQL to Acquire and Refine Hard Disk Data
- Office Hours

Food and Hydration

0830 - 0930: Breakfast

1115 - 1135: Tea Break

1300 - 1400: Lunch

1530 - 1550: Tea Break

Session 5 (0930 - 1115)

- Reflections
- Intro to Machine Learning
- Case 3: Shining Diamonds
- Linear Regression

Session 6 (1135 - 1300)

- Case 4: Red Wine
- Logistics Regression for Classification

Session 7 (1400 - 1530)

- Fun Demo : Music Visualization
- Case 5: Entering a Kaggle Competition

Session 8 (1550 - 1730)

- Kaggle Competition (contd.)
- Recap and Way Forward
- Feedback

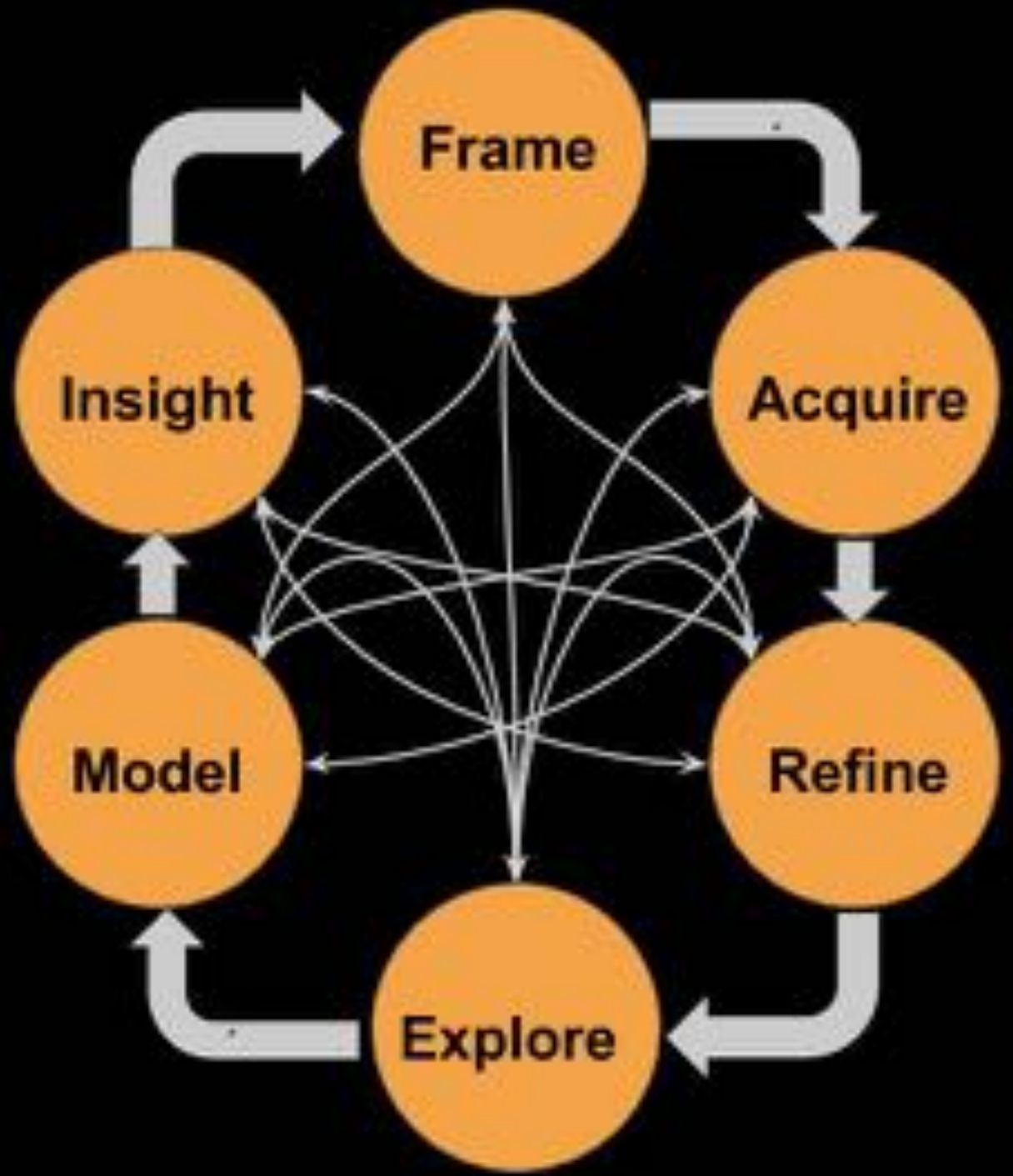
Enjoy the workshop

Recap

"An approximate answer to the right problem is worth a good deal"

"The goal is to turn data into insight"

"All models are wrong, but some are useful"



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Frame

- **Toy Problems**
- **Simple Problems**
- Complex Problems
- Business Problems
- Research Problems

Acquire

- **Scraping** (structured, unstructured)
- **Files** (csv, xls, json, xml, pdf, ...)
- **Database** (sqlite, ...)
- APIs
- Streaming

Refine

- Data Cleaning (inconsistent, missing, ...)
- Data Refining (derive, parse, merge, filter, convert, ...)
- **Data Transformations** (group by, pivot, aggregate, sample, summarise, ...)

Explore

- **Simple Vis**
- Multi Dimensional Vis
- Geographic Vis
- Large Data Vis (Bin - Summarise - Smooth)
- Interactive Vis

Model - Supervised Learning

- *Continuous*: Regression - **Linear**, Polynomial, Tree Based Methods - CART, Random Forest, Gradient Boosting Machines
- *Classification* - **Logistics Regression**, Tree, KNN, SVM, Naive-Bayes. Bayesian Network

Model - UnSupervised Learning

- *Continuous*: Clustering & Dimensionality Reduction like PCA, SVD, MDS, K-means
- *Categorical*: Association Analysis

Model - Advanced / Specialized

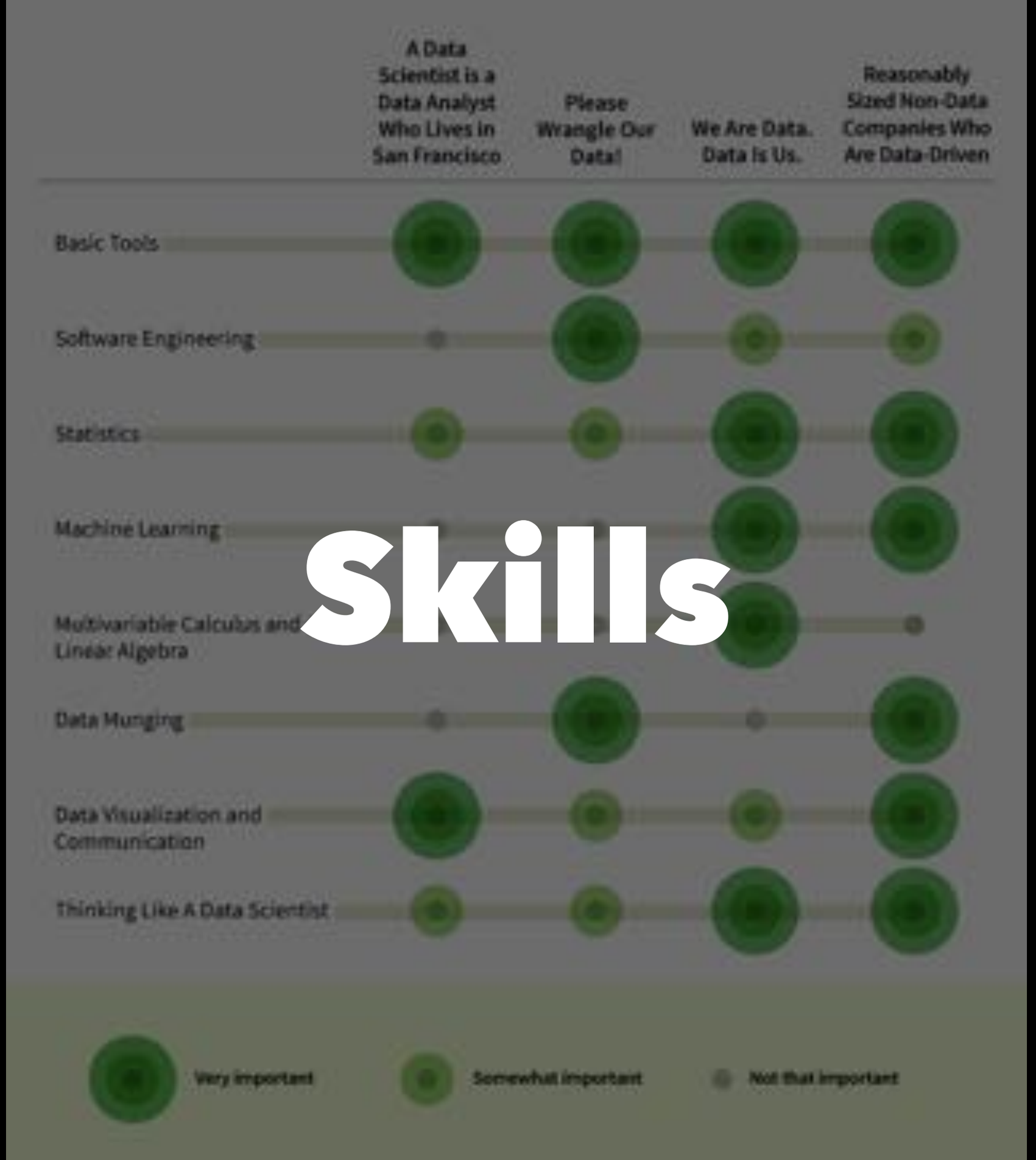
- Network / Graph Analytics
- Optimization
- Reinforcement Learning
- Online Learning
- Deep Learning
- Applications: Time Series, Text, Image, Speech

Insight

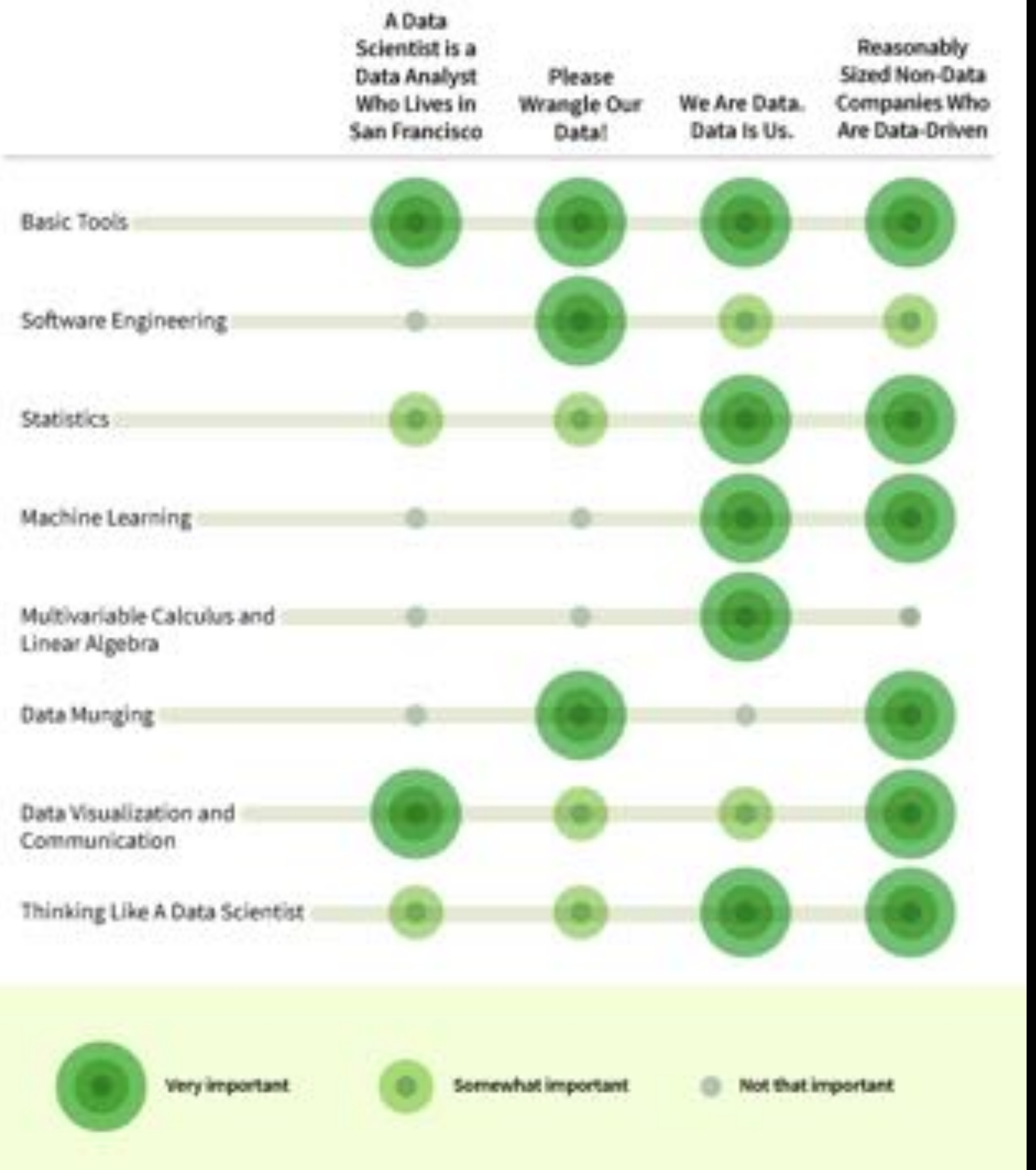
- Narrative Visualisation
- Dashboard Visualisation
- Decision Making Tools
- Automated Decision Tools

PyData Stack

- **Acquire / Refine**: Pandas, Beautiful Soup, Selenium, Requests, SQL Alchemy, Numpy, Blaze
- **Explore**: MatPlotLib, Seaborn, Bokeh, Plotly, Vega, Folium
- **Model**: Scikit-Learn, StatsModels, SciPy, Gensim, Keras, Tensor Flow, PySpark
- **Insight**: Django, Flask


A Data Scientist is a Data Analyst Who Lives in San Francisco
Please Wrangle Our Data!
We Are Data. Data Is Us.
Reasonably Sized Non-Data Companies Who Are Data-Driven
Basic Tools
Software Engineering
Statistics
Machine Learning
Multivariable Calculus and Linear Algebra
Data Munging
Data Visualization and Communication
Thinking Like A Data Scientist
Very important
Somewhat important
Not that important

skills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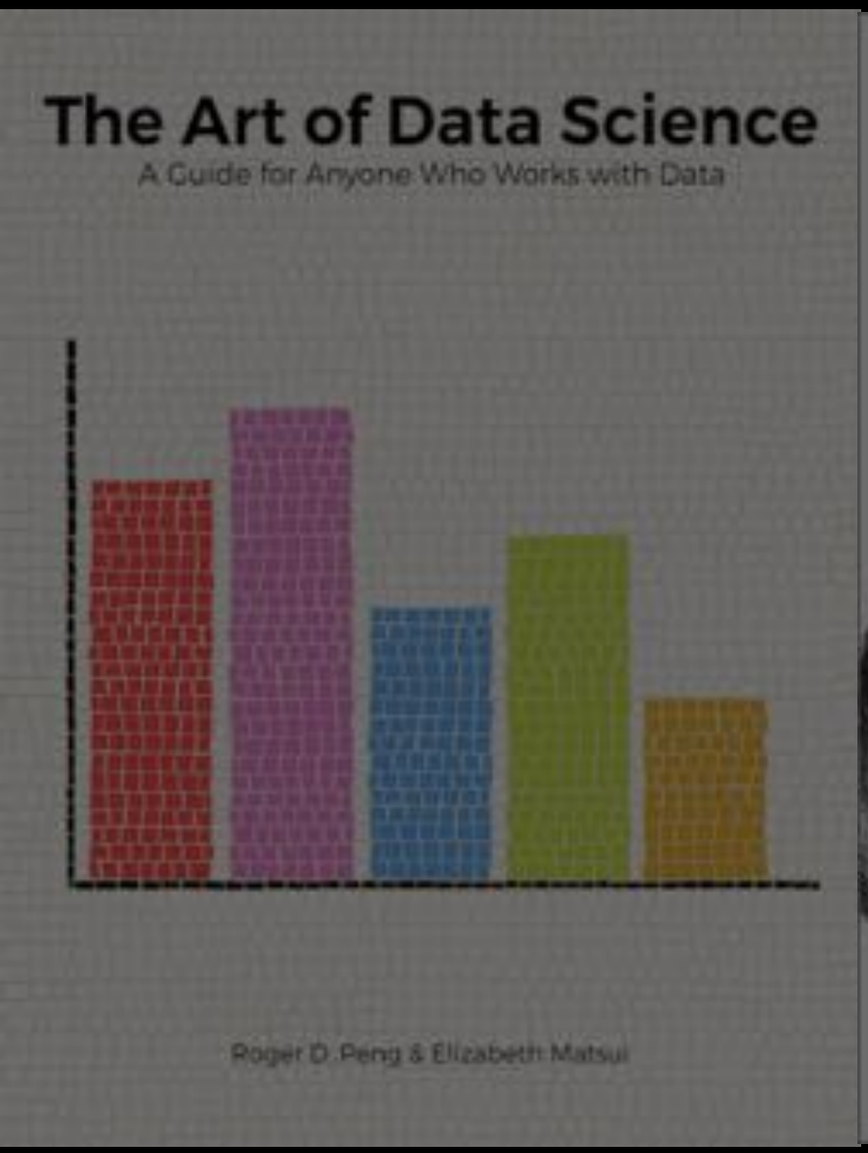
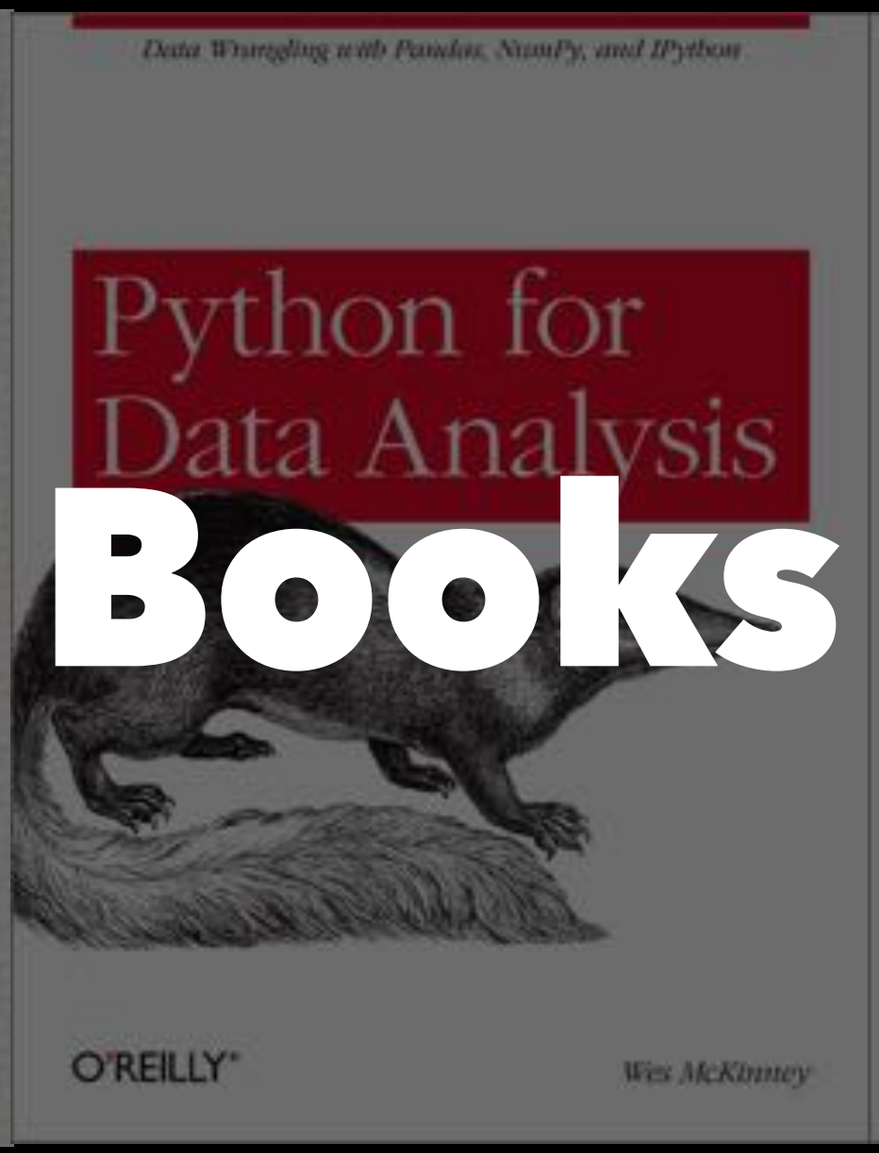
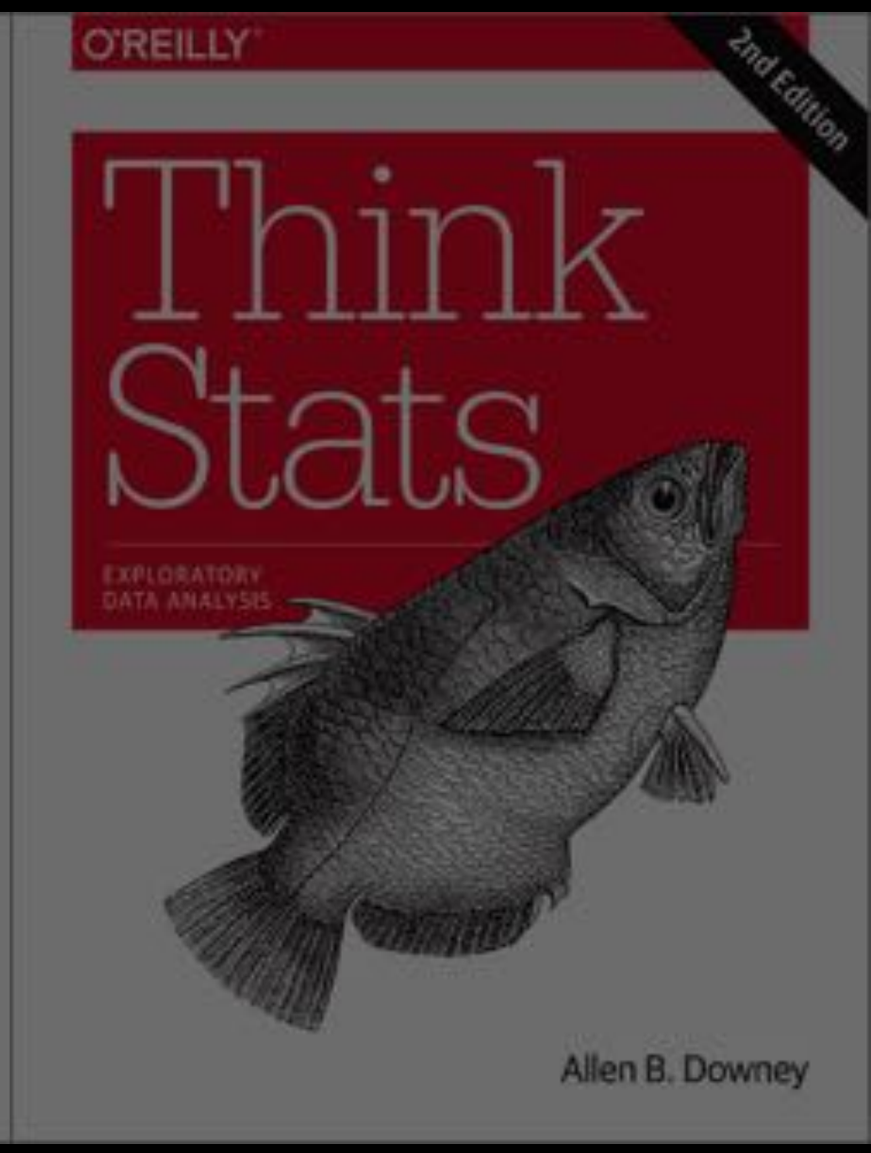

The Art of Data Science
A Guide for Anyone Who Works with Data
Roger D. Peng & Elizabeth Matsui


Data Wrangling with Pandas, NumPy, and IPython
Python for Data Analysis
O'REILLY
Wes McKinney

Books


O'REILLY
2nd Edition
Think Stats
EXPLORATORY DATA ANALYSIS
Allen B. Downey

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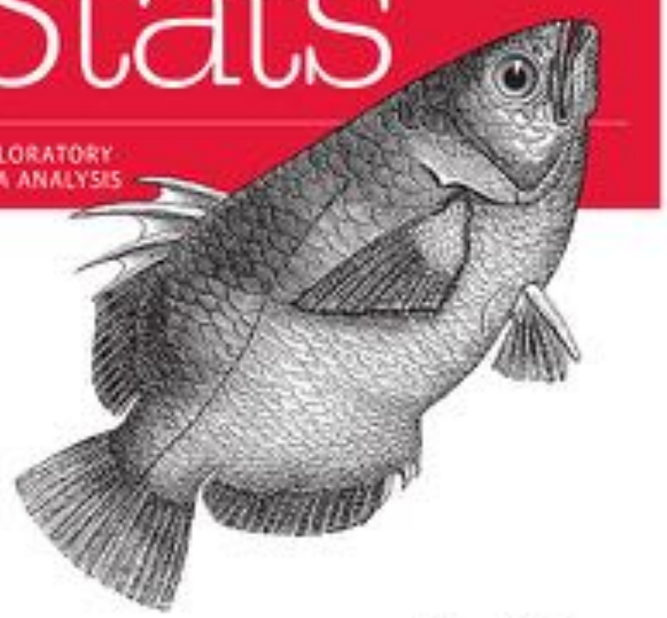

Allen B. Downey

Online Course

- Harvard Data Science Course - CS 109 Course
- Structured in similar way to the approach we shared
- Many more on Coursera & Udacity...

Upcoming Workshops

- Advanced Data Science (Machine Learning, Statistics)
- Data Science at Scale (Spark)
- Visualisation (Multi-Dimensional, Geographic, Large Data)
- Deep Learning (Text, Speech, Image, Video)

Speak to Us!

Custom Workshops

Data Science Consulting

Thank you

unnati.xyz/workshop-feedback

has geek