Welcome to the future.

“We can never know about the days to come.
But we think about them anyway.”

— Carly Simon

opening lines of “Anticipation”

What's a "Prediction"? (v1)

Nobody has responded yet.

Hang tight! Responses are coming in.

Start the presentation to see live content. For screen share software, share the entire screen. Get help at **pollev.com/app**

The Prediction Project

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Timelines

▶ **Why predict?**

Omens, Oracles & Prophecies

Mesopotamian Haruspicy
Egyptian Priests
Yoruba Ifa
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Roman Augury
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Oracle of Delphi
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Aztec Rituals
Maya Spacetime
Comets of Doom

cross-cultural conversations

The Rise of Theory

Ancient Mesopotamia, Egypt, Greece & Rome
Islamic Science

The Path to Newton

▶ *Indian Mathematics*
European Renaissance

Lost without Longitude (Navigation)

Help, I'm Lost!
Tools of the Navigator

The Royal Society

Modern Prediction

John Snow & Cholera
Cholera Map

Health
▶ *Epidemiology*
▶ *Personal Genomics*
▶ *Population Genetics*

Wealth
▶ *Climate & Wealth*
▶ *Behavioral Economics*

The Future of the Future
▶ *AI, Derek's Day*
▶ *Philosophy*
▶ *Uncertainty*

Earth
▶ *Climate & Energy*
▶ *Climate Policy*
▶ *Tent Tarot*
▶ *Earthquakes*

Space
▶ *Futures of our Universe*
▶ *SETI*

Interactive Resource ▶ video(s) Coming Soon

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edX HarvardX predictionx.org

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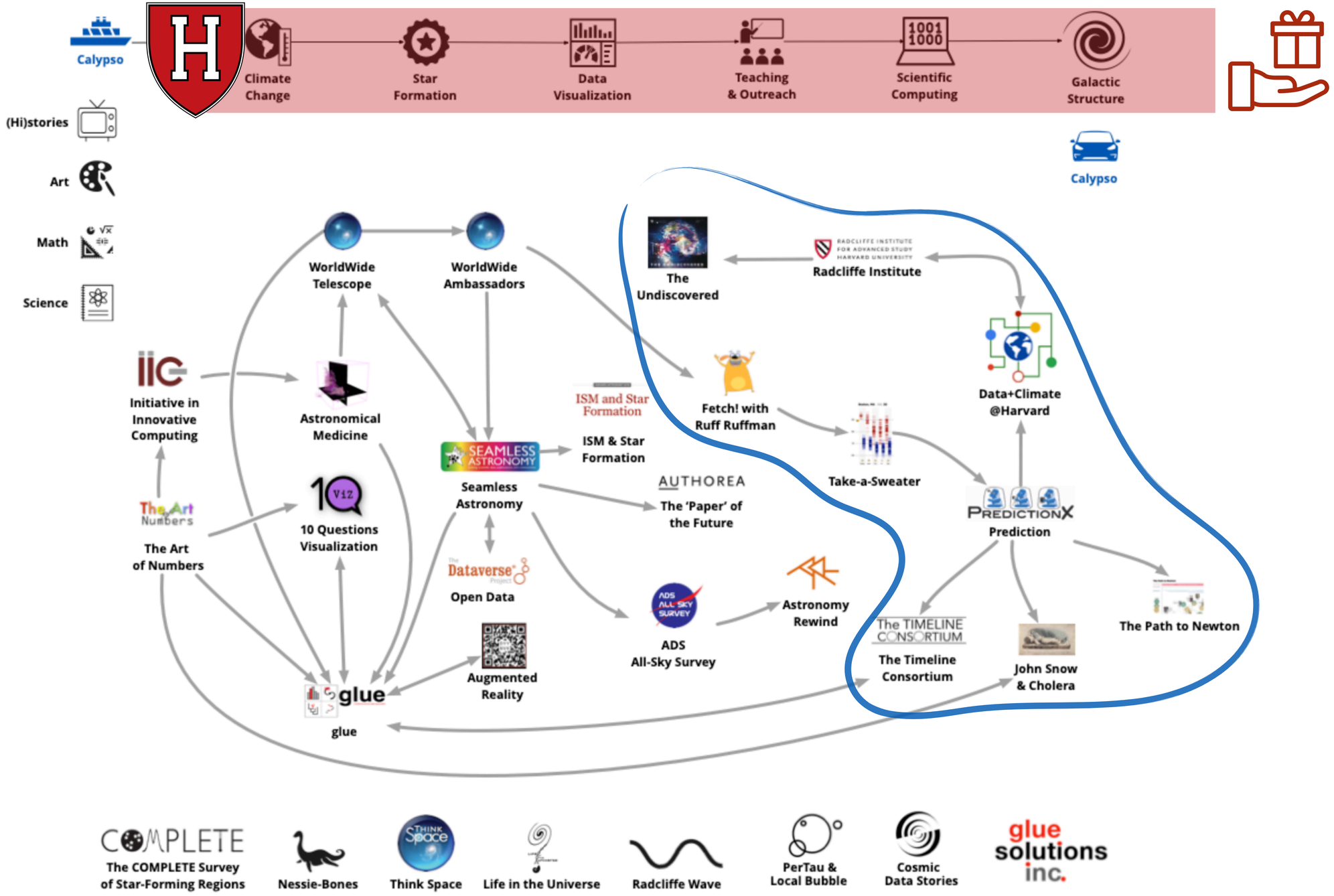
Calypso
Climate Change
Star Formation
Data Visualization
Teaching & Outreach
Scientific Computing
Galactic Structure
(Hi)stories
Art
Math
Science
Calypso
WorldWide Telescope
WorldWide Ambassadors
The Undiscovered
Radcliffe Institute
Initiative in Innovative Computing
Astronomical Medicine
ISM and Star Formation
ISM & Star Formation
Fetch! with Ruff Ruffman
Data+Climate @Harvard
Seamless Astronomy
AUTHOREA
The 'Paper' of the Future
Take-a-Sweater
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glue
The COMPLETE Survey of Star-Forming Regions
Nessie-Bones
Think Space
Life in the Universe
Radcliffe Wave
PerTau & Local Bubble
Cosmic Data Stories
glue solutions inc.

PREDICTIONX

2008 WGBH

2011

2014 edX HarvardX

2015 HARVARD COLLEGE Freshman Seminar Program

2016

2017 predictionx.org

The TIMELINE CONSORTIUM

SPIN-OFF
(TSF METADATA STANDARD, TOOL)

2018

2019 Harvard College Program in General Education
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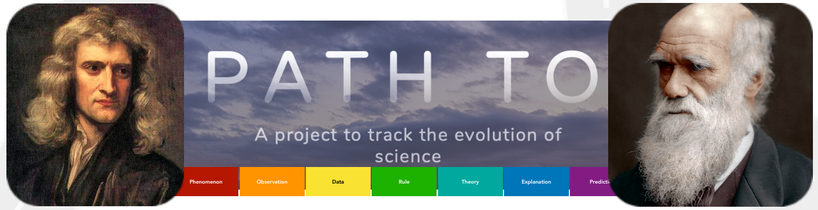
2019



2020 LabXchange™
Science and learning–connected.

2020

SPIN-OFF (PATH-TO FOUNDATION)

Path-to-Foundation

2021

2022

2025

GenEd 1112: Prediction: The Past & Present of the Future: 2025

Week	Date	Topic/Case Studies/Event
1	January 29	**Introduction**/Overview: What is Prediction? Why Predict? What about AI?
2	February 05	Conceptions of **Time & Space/Ancient Predictive Systems** Declan Maloney
3	February 12	**Free Will & Determinism** Predictive Systems Fair
4	February 19	From **Phenomena to Theory/Paths-to** (especially Newton / History of Motion
5	February 26	**Origins of Scientific Predictio**n/Path to Newton Fair
6	March 05	**Navigation**/Lost without Longitude Phil Sadler / Outdoor Navigation Exercise
7	March 12	**Health**/John Snow & Cholera/Path-to Darwin/Modern Genetics Immaculta De Vivo
	March 19	*Spring Break!* [Order of topics after spring break is likely to change!]
8	March 26	**AI** Intro/**Earth**/Weather & Climate Kelsey Johnson
9	April 02	Modern **Data Science**/ Health, + AI Jais Brohinsky/Simeon Sayer
10	April 09	**Wealth**/Finance/Climate Change/Behavioral Economics Game / David Laibson
11	April 16	**Space**/Astrophysical Simulation & SETI, **SimCity** Pipit Triani
12	April 23	Hypothesis-free Prediction?/Path-to AI/**AI (Machine Learning,** LLMs) Simeon Sayer
concl.	April 30	The **Future of the Future**/Health/Wealth/Earth/Space Student Project Showcase

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PREDICTIONX

NVIDIA
“Imagine a world where we can predict the future...”

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Modern Prediction

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- *Epidemiology*
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- *Population Genetics*

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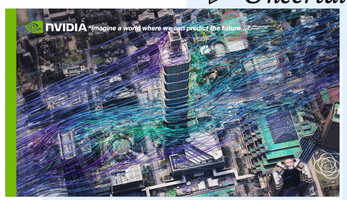
The Future of the Future

- *AI, Derek's Day*
- *Philosophy*
- *Uncertainty*



- *Earthquakes*

Space

- *Futures of our Universe*
- *SETI*

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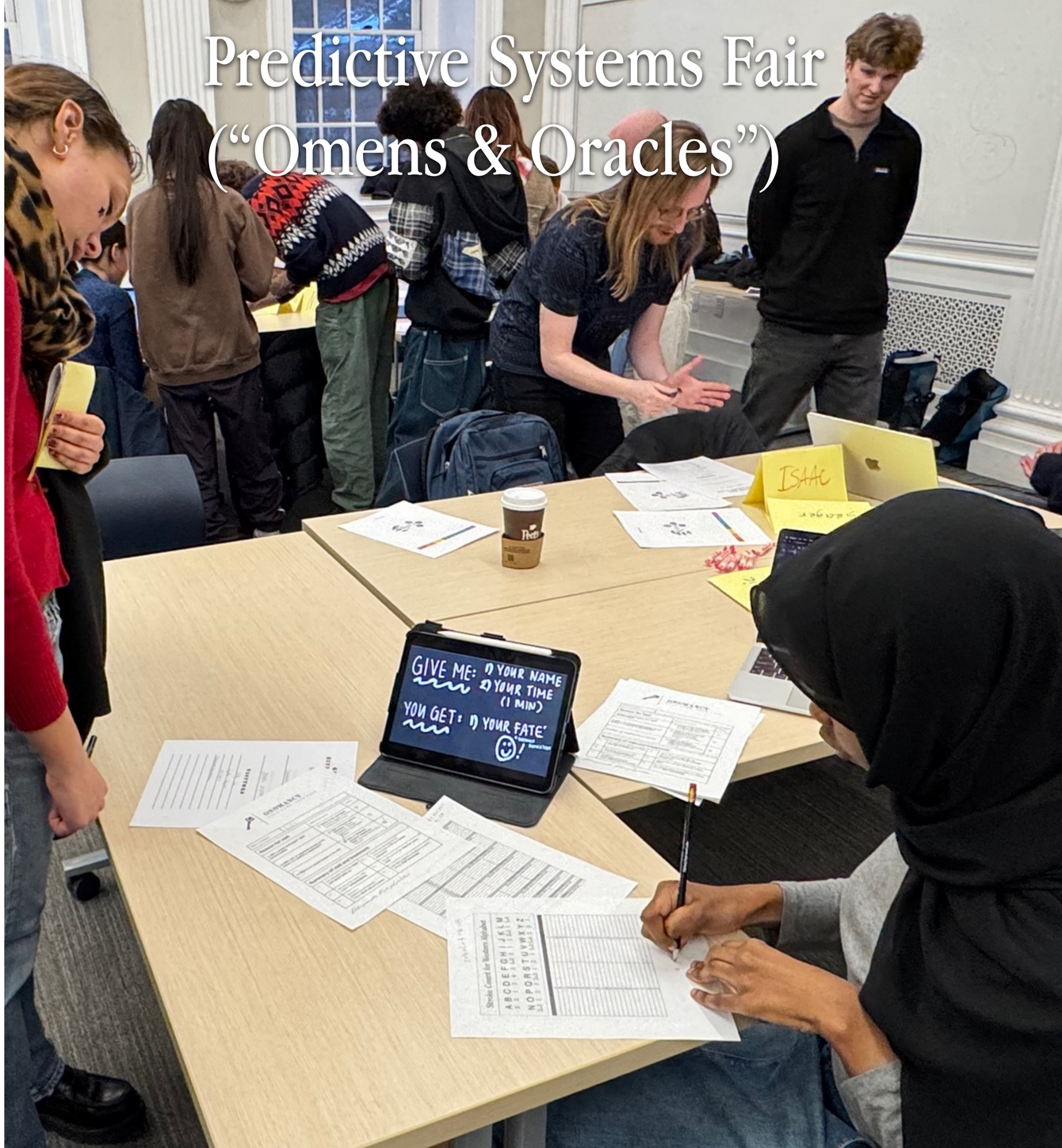
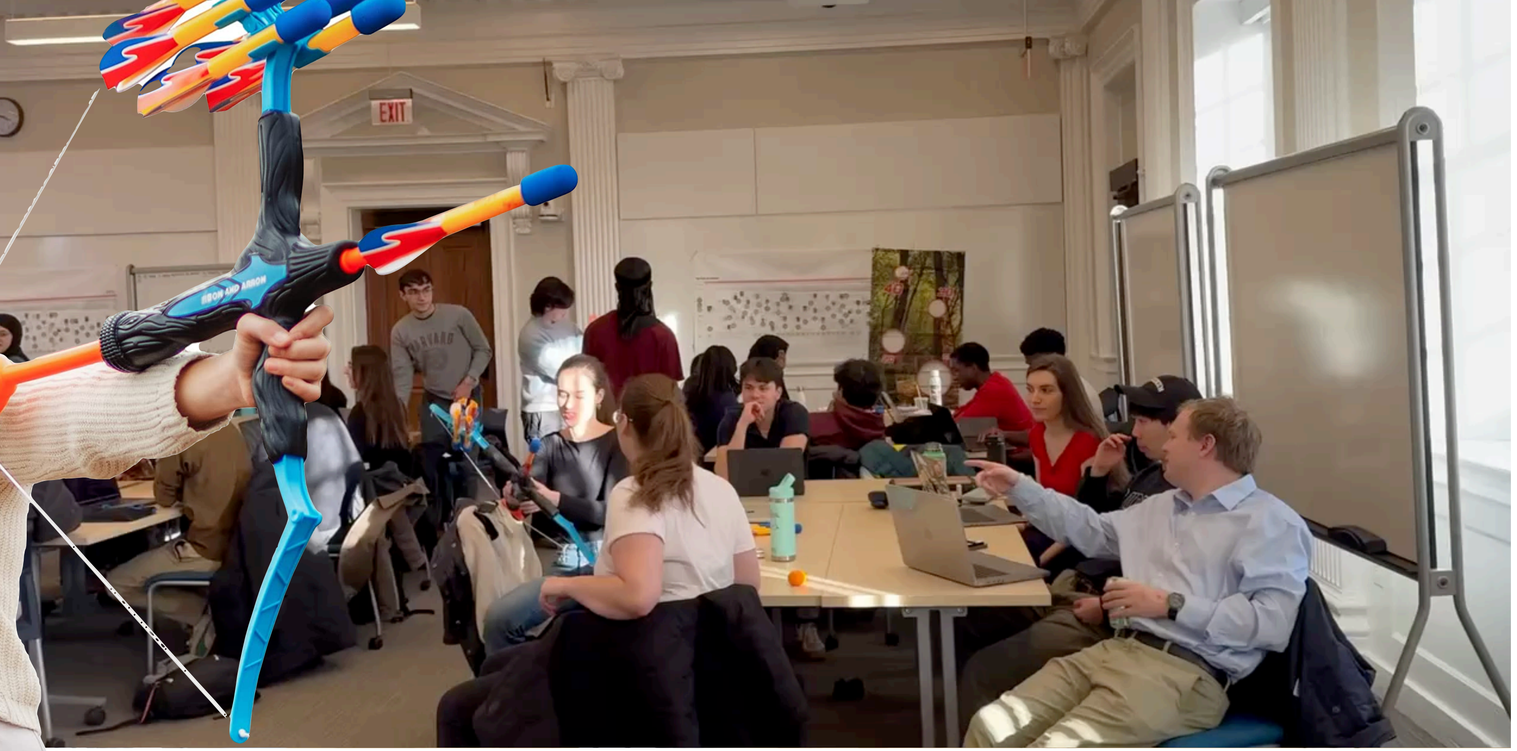
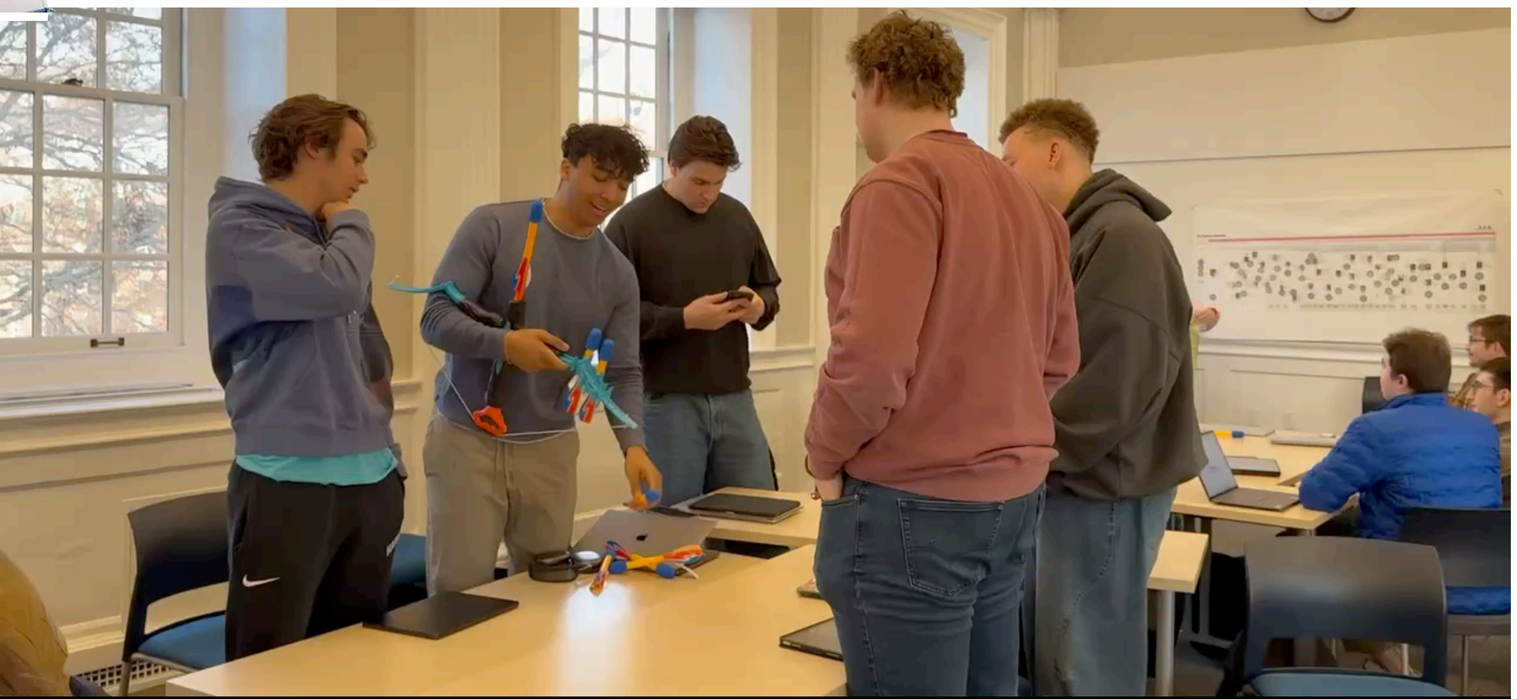
Predictive Systems Fair
(“Omens & Oracles”)

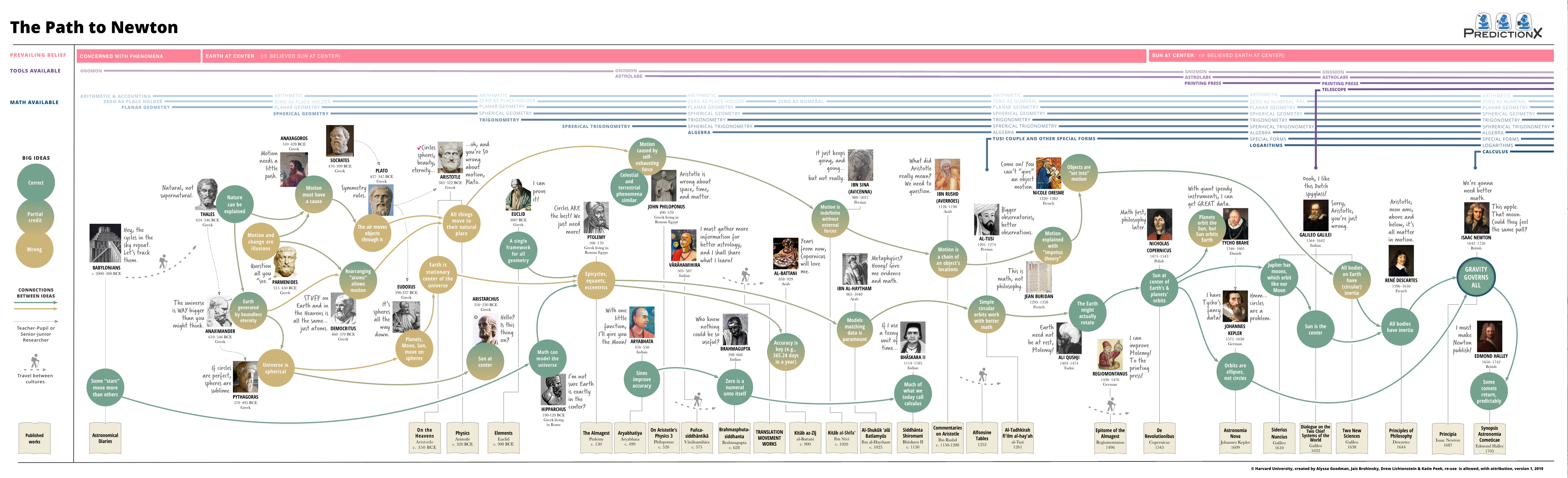


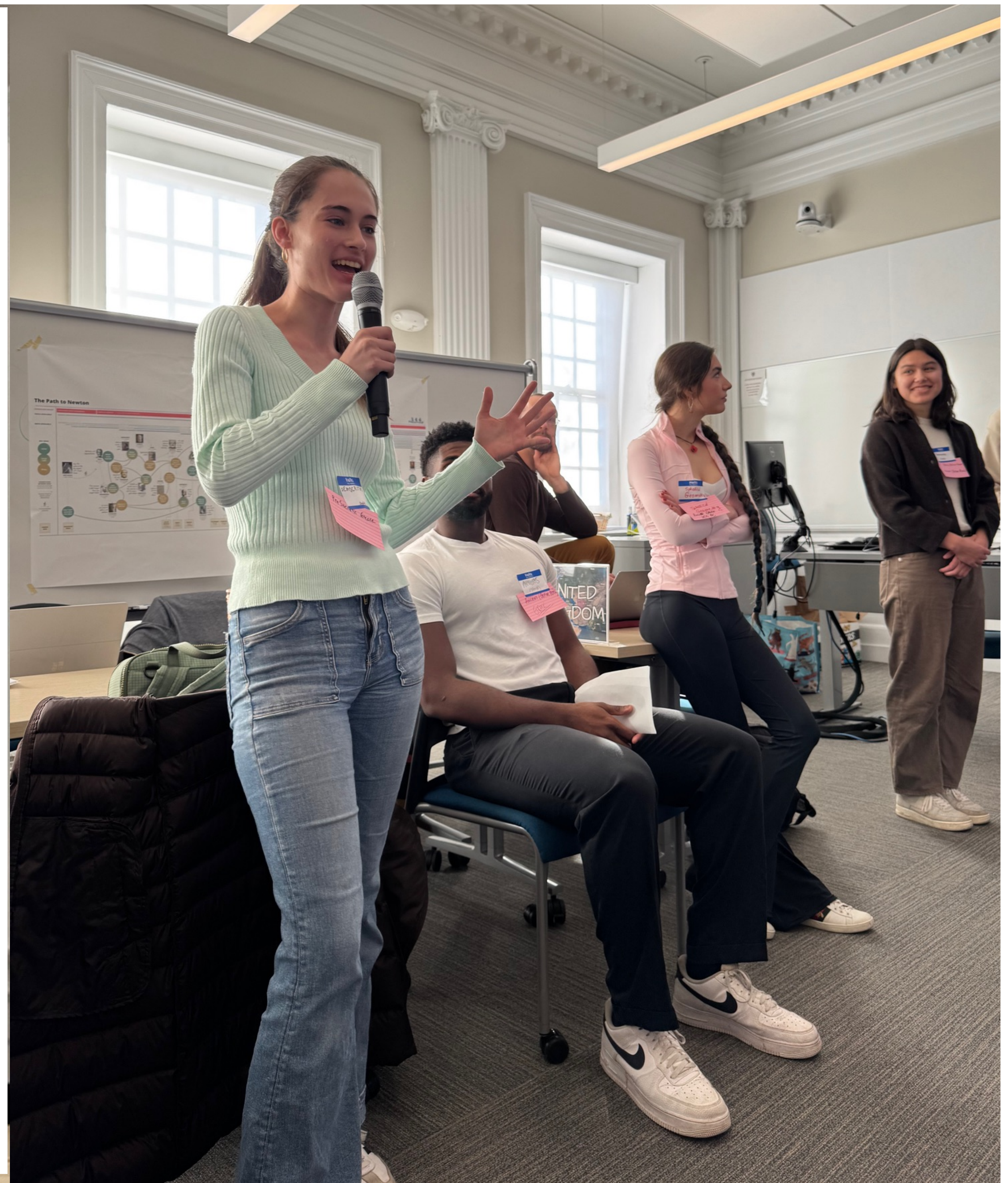




“The Rise of Theory”

What is motion? What are we seeing happen? Why does it happen?



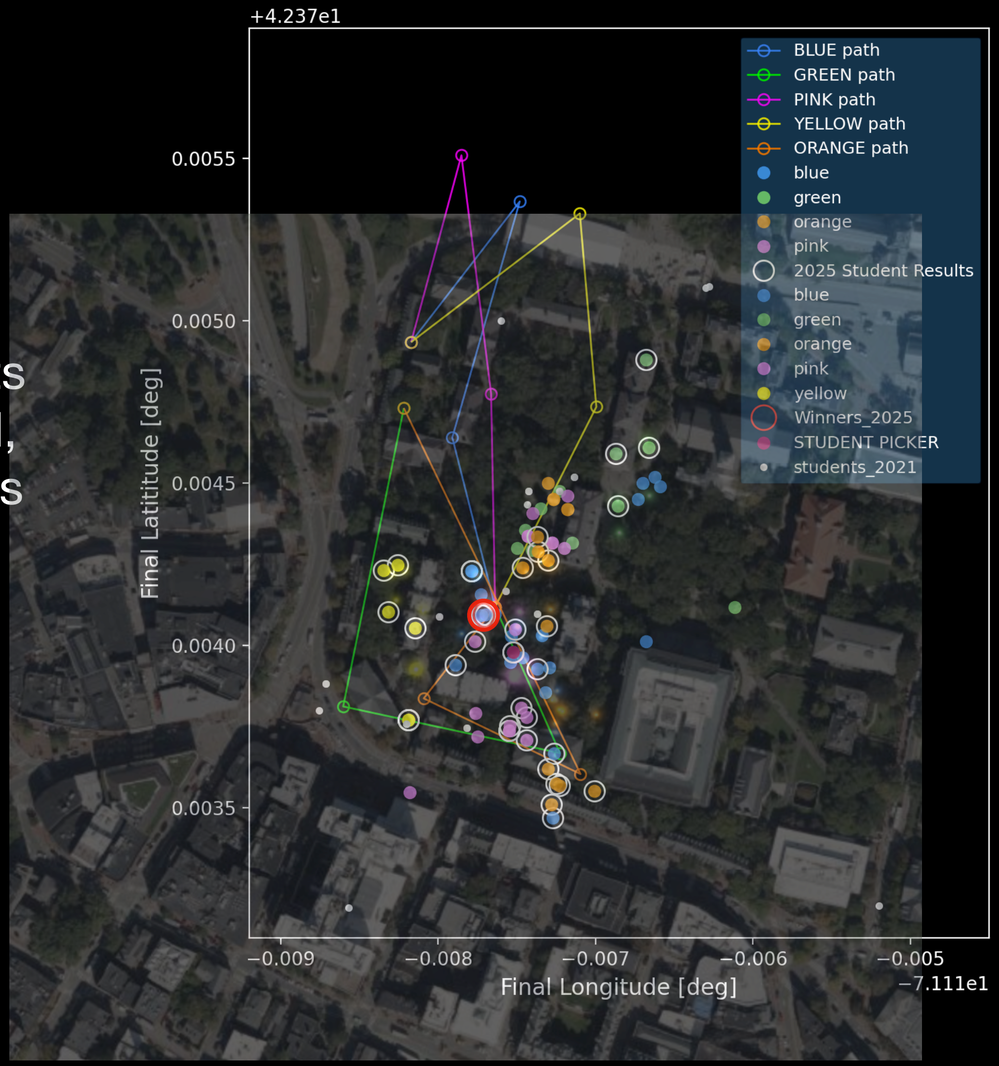


The Path-to Newton (Fair)

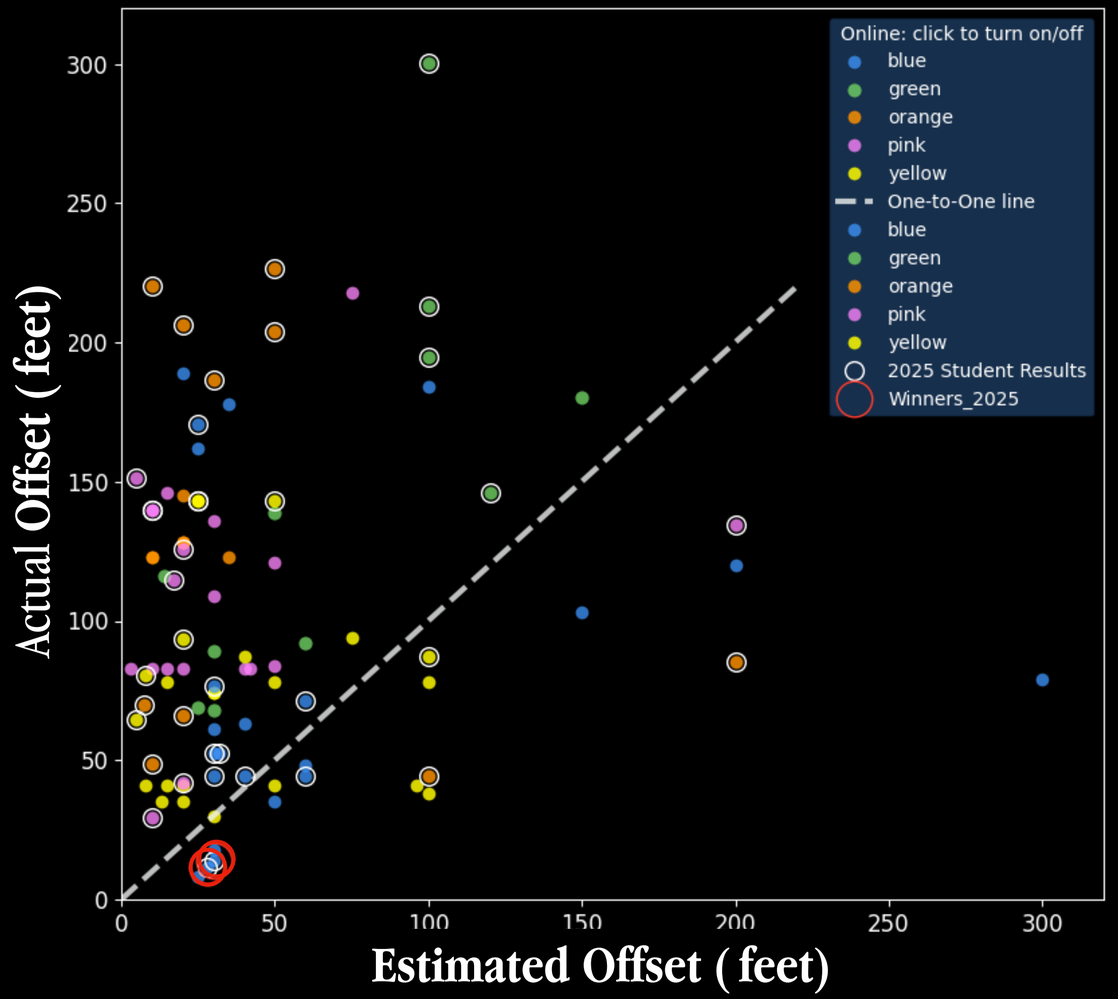
“Lost without Longitude”
(Outdoor Navigation Exercise)

Uncertainty estimation is as hard, and as important, as prediction.

2025 points are circled, RED shows winners

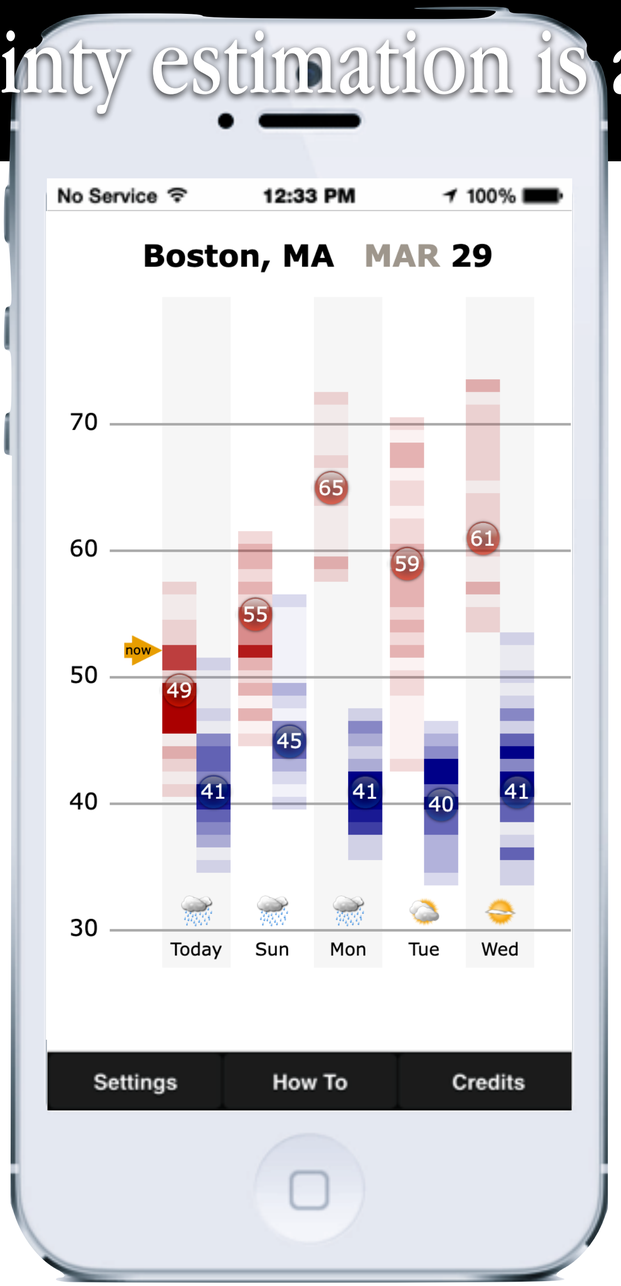


prescribed routes & actual ending points



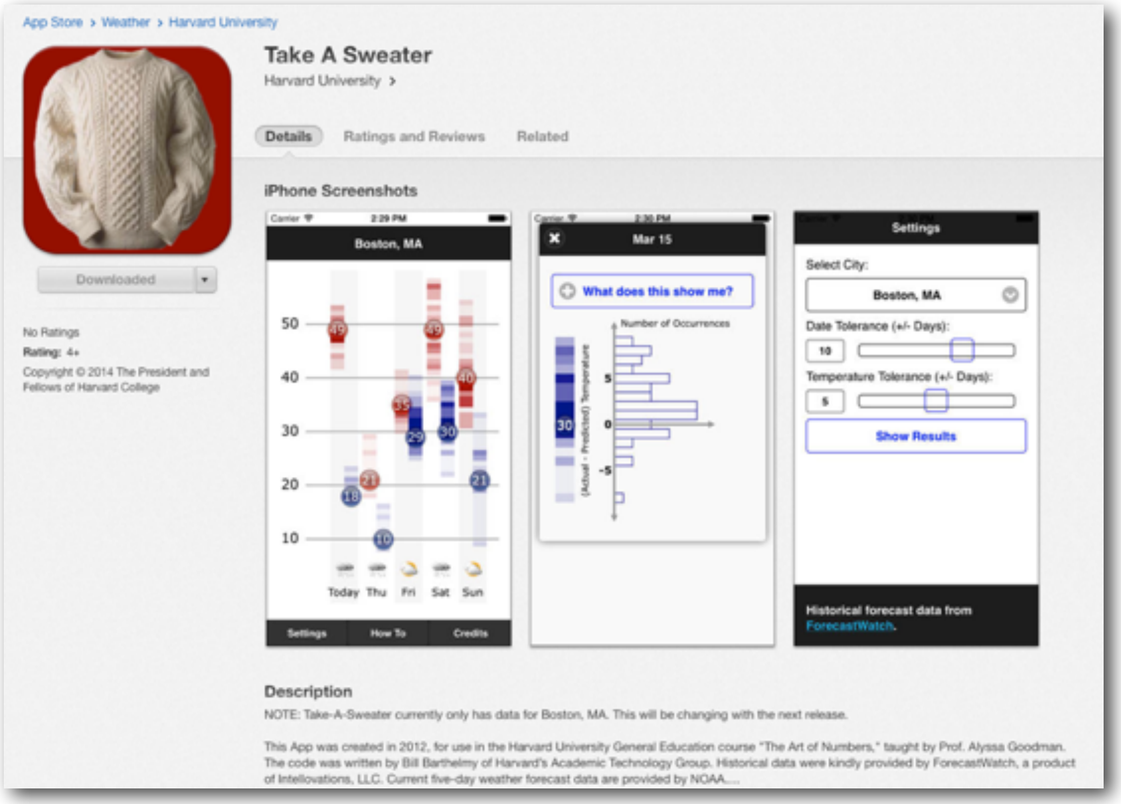
(over) confidence: actual offset vs. estimated offset

Uncertainty estimation is as hard, and as important, as prediction.



"Take A Sweater"

2011



takeasweater.com

with thanks to Eric **Floehr** of Forecast Watch and Bill **Barthelmy** of HUIT Academic Technology at FAS

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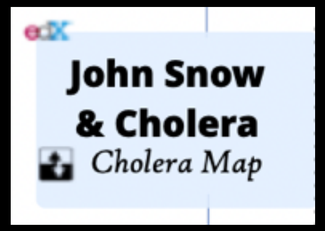
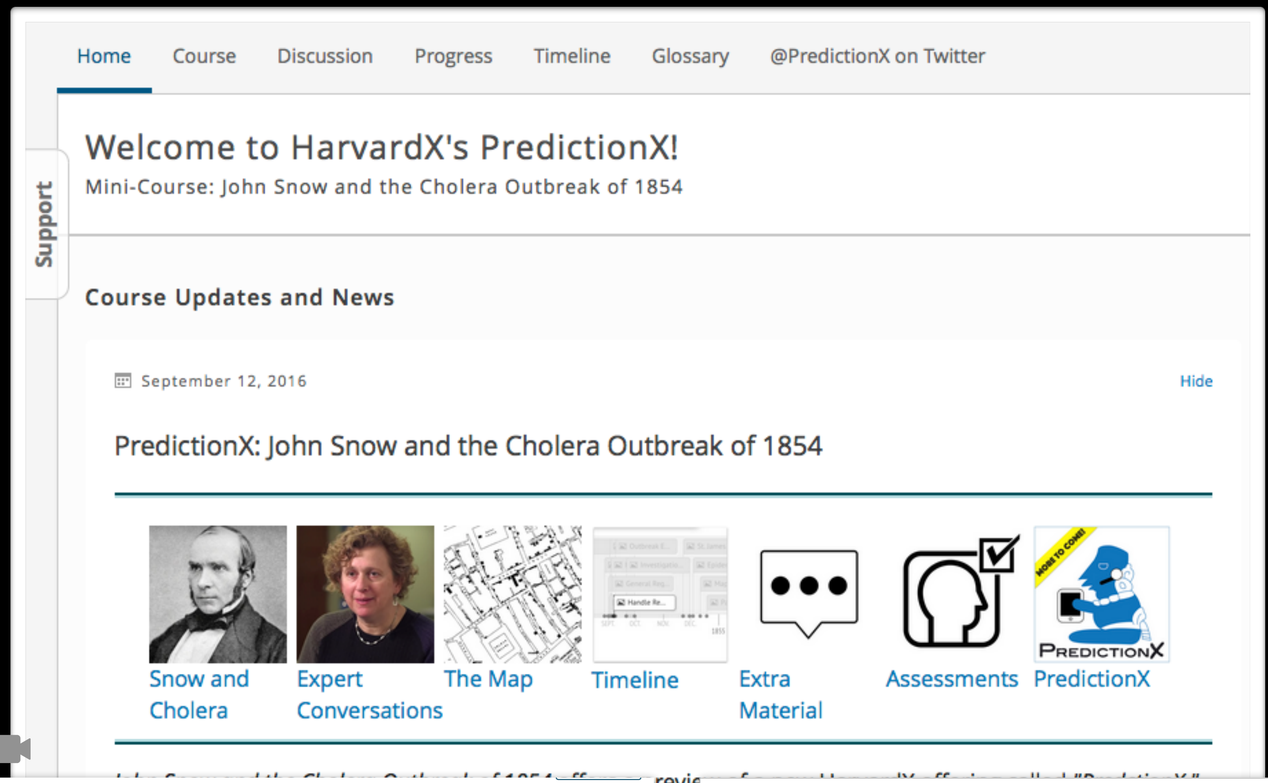
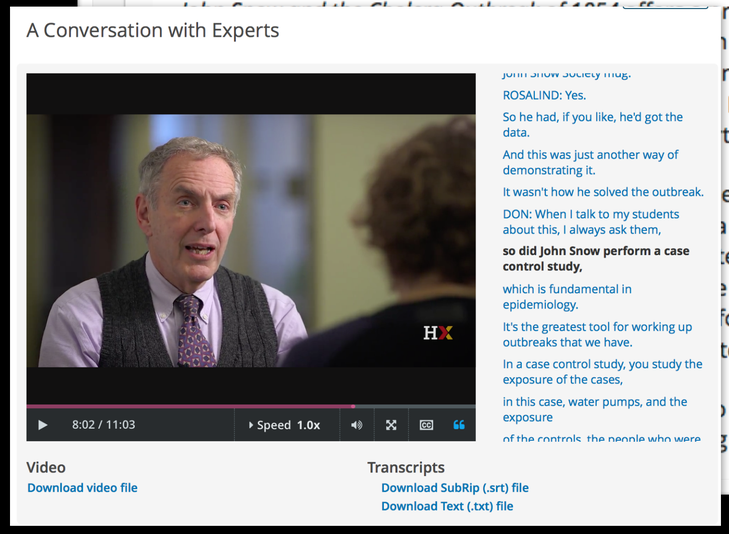
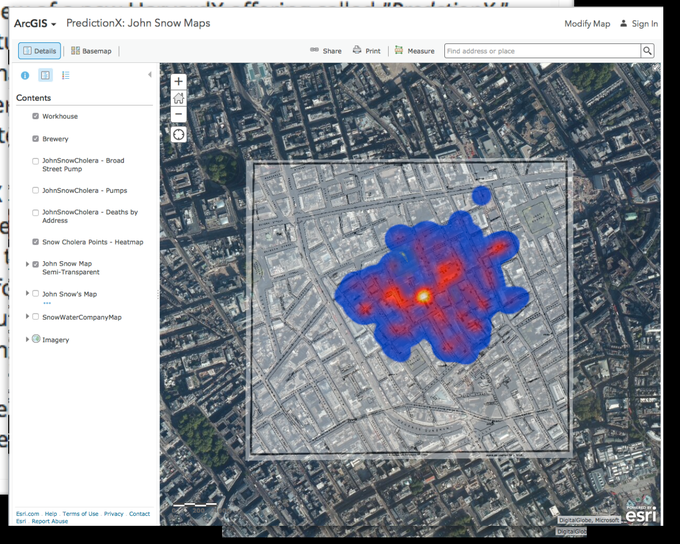


John Snow & Cholera







featuring Don Goldmann, AG & Rosalind Stanwell-Smith

Prediction: Day 7

opening remarks on COVID-19 & plans for the rest of GenEd1119

quick review of outdoor **Navigation Exercise**

questions about **"Prediction in Space & Time" re:Navigation,** ***and Epidemiology***

John Snow & Cholera (edX highlights & more)

Student research/discussion re:COVID-19 using survey at **tinyurl.com/gened1112covid19**

Modeling *the spread of epidemics, and* ***uncertainty***

Bookkeeping **SIR Models** **SEIR Models** **Agent-based models** **AI models**

Prediction and decision in the face of **uncertainty**: COVID-19 and Harvard (discussions)

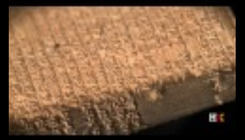
Logistics post-Spring-Break

Special Guest: geneticist **Dr. Immaculata DeVivo,** Professor in the Department of Epidemiology at the Harvard T.H. Chan School of Public Health and at Harvard Medical School

Wednesday, March 11, 2020

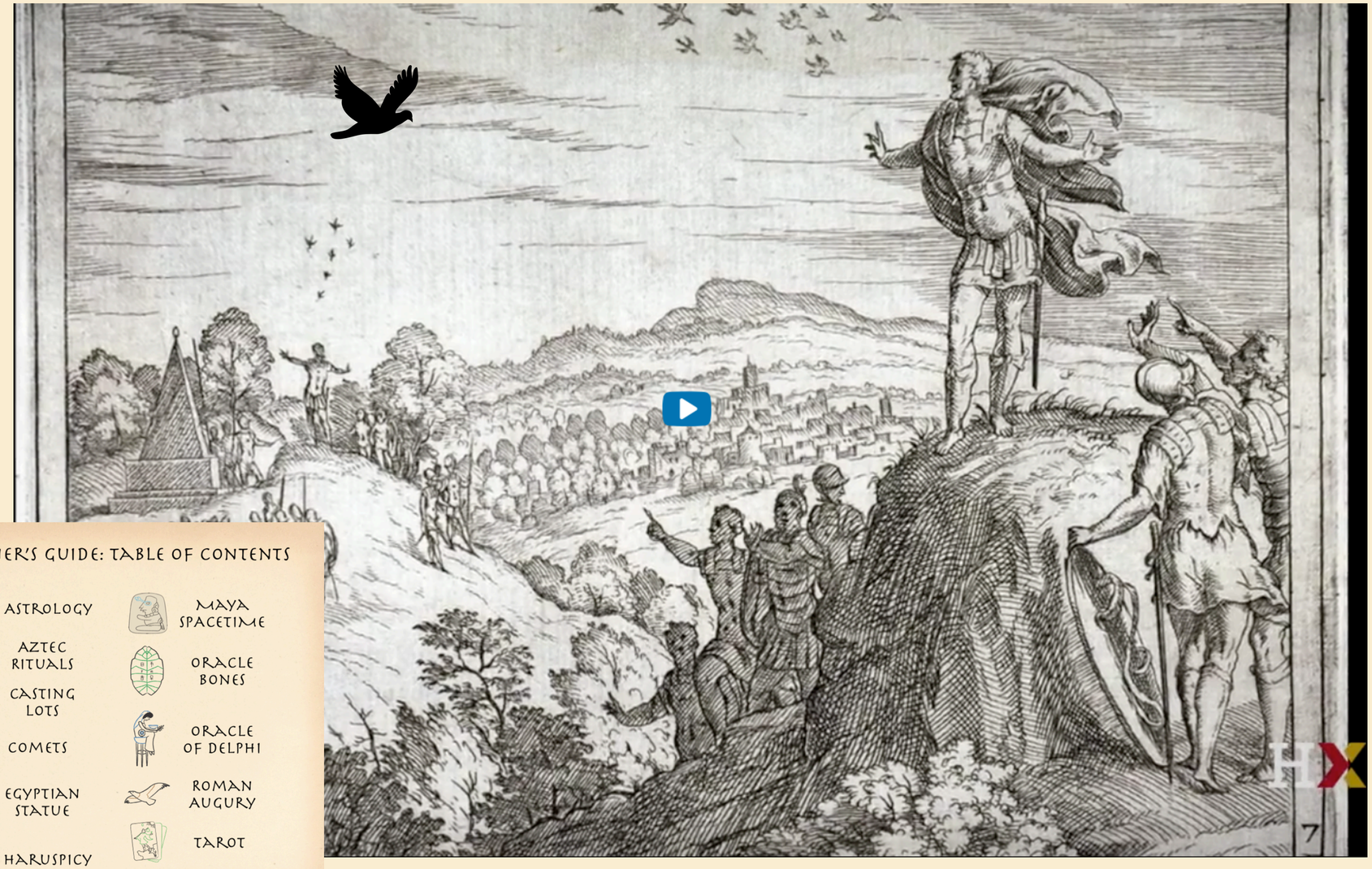
income
housing
water

ROMAN
AUGURY



ROMAN AUGURY

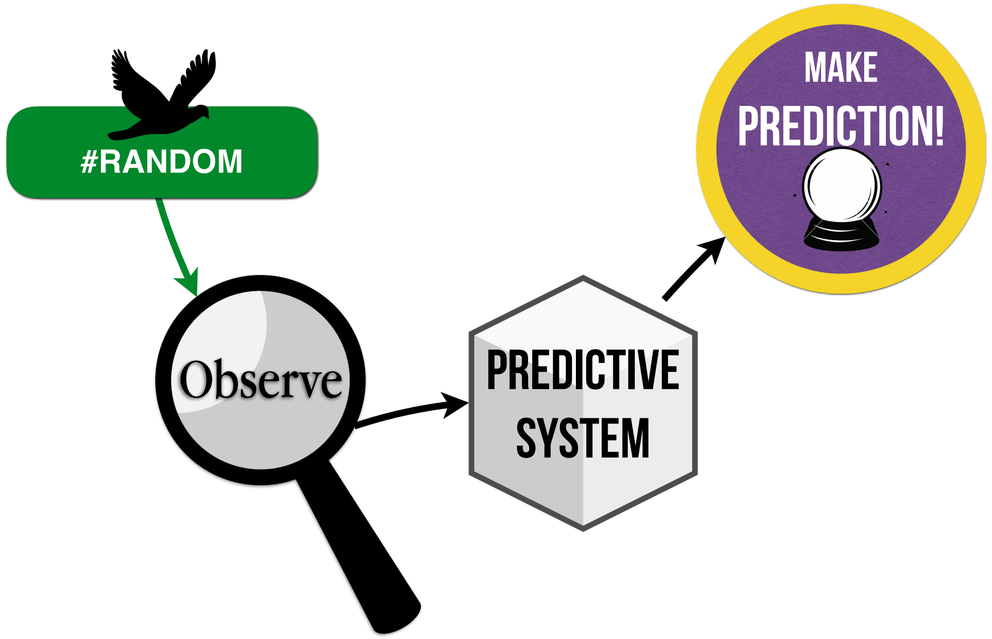
"Senior political officials of the Roman state had to take auspices before any major political event like elections." —Emma Dench



DIVINER'S GUIDE: TABLE OF CONTENTS

ASTROLOGY
AZTEC RITUALS
CASTING LOTS
COMETS
EGYPTIAN STATUE
HARUSPICY
IFA
MAYA SPACETIME
ORACLE BONES
ORACLE OF DELPHI
ROMAN AUGURY
TAROT
TASSEOGRAPHY

(see "Roman Bird Augury" video on edX)



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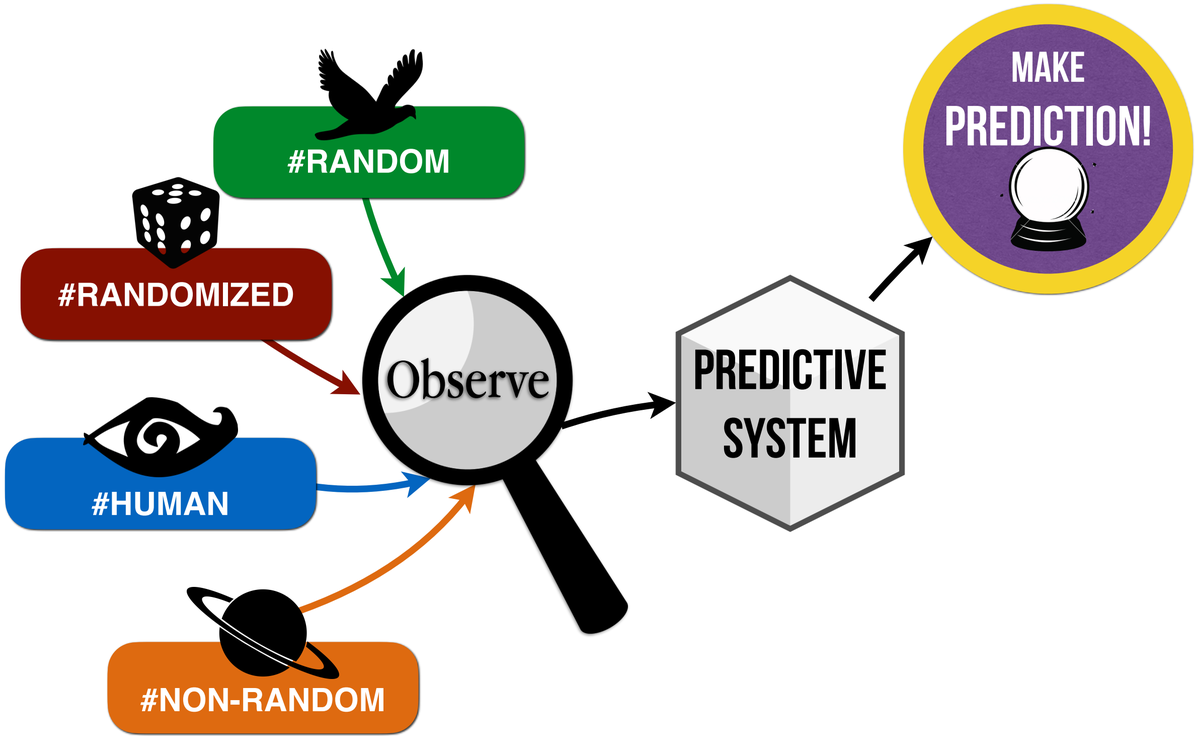

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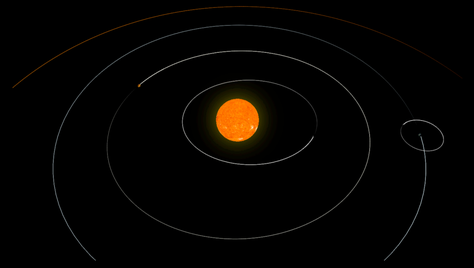
#NON-RANDOM



Celestial Motion

#RANDOMIZED

Ifa

#HUMAN

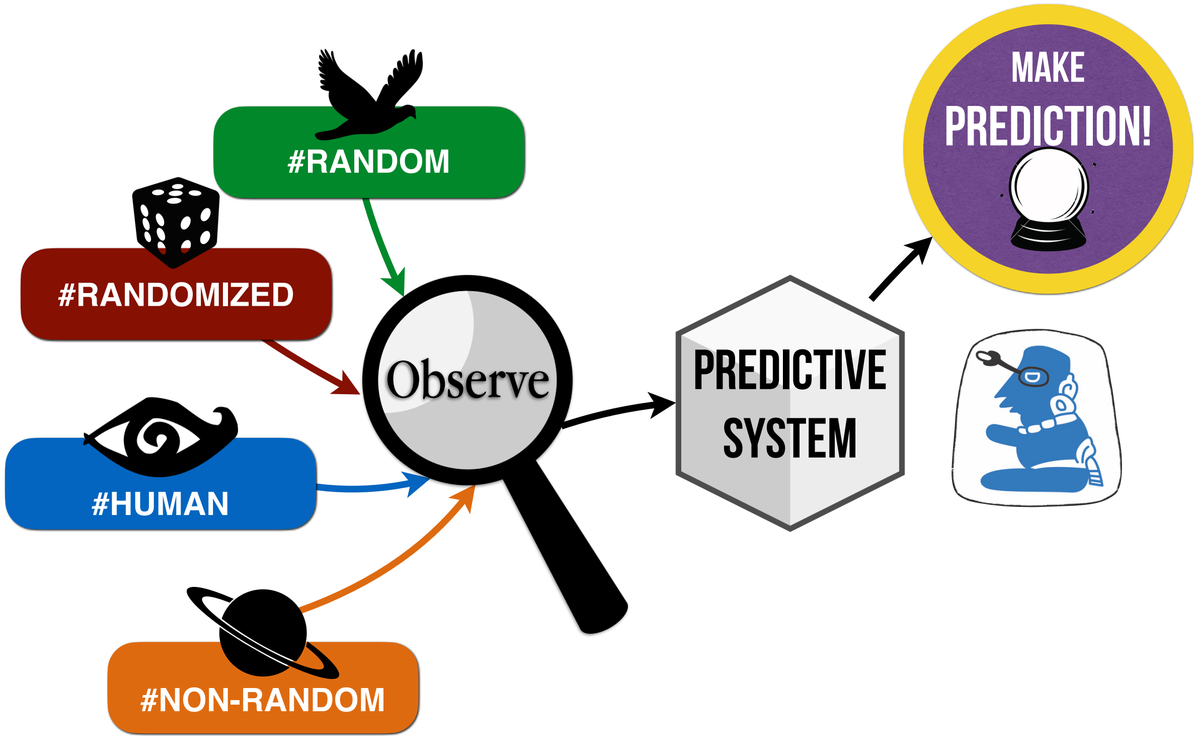
Egyptian “Bobble Head”

#RANDOM

Comets of Doom

#HUMAN

Ancient Egyptian Divination, featuring Prof. Peter der Manuelian (Harvard Semitic Museum)



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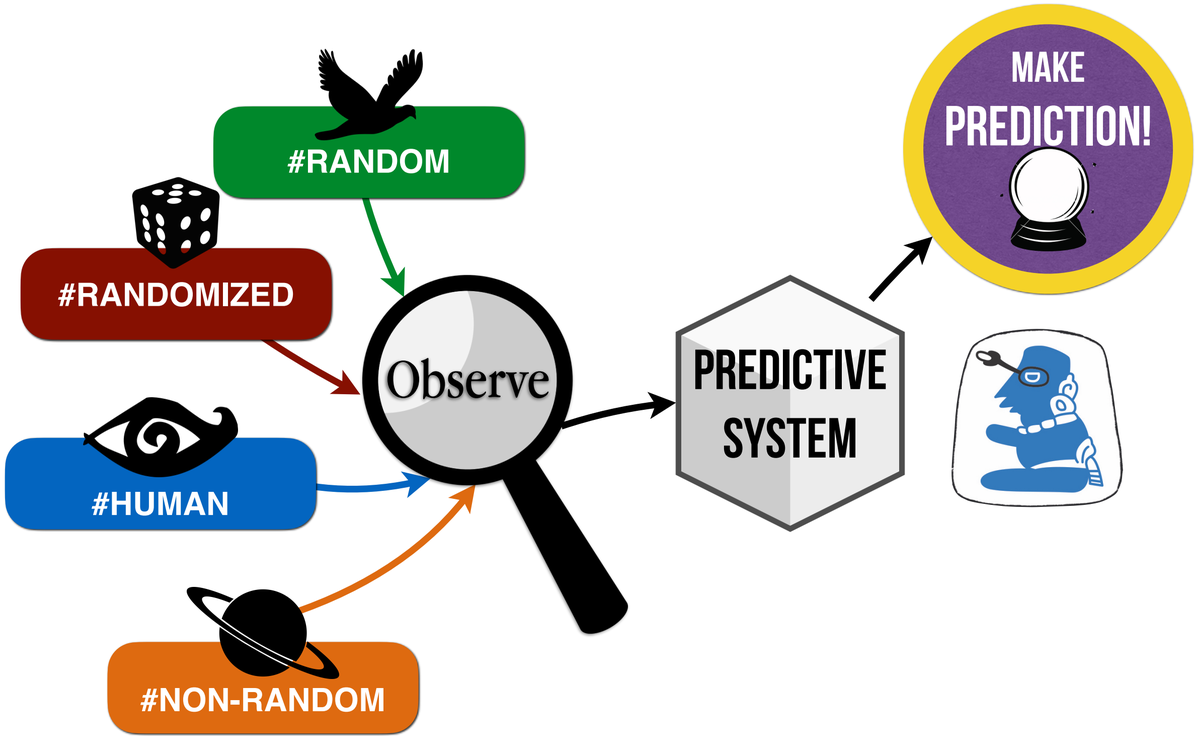

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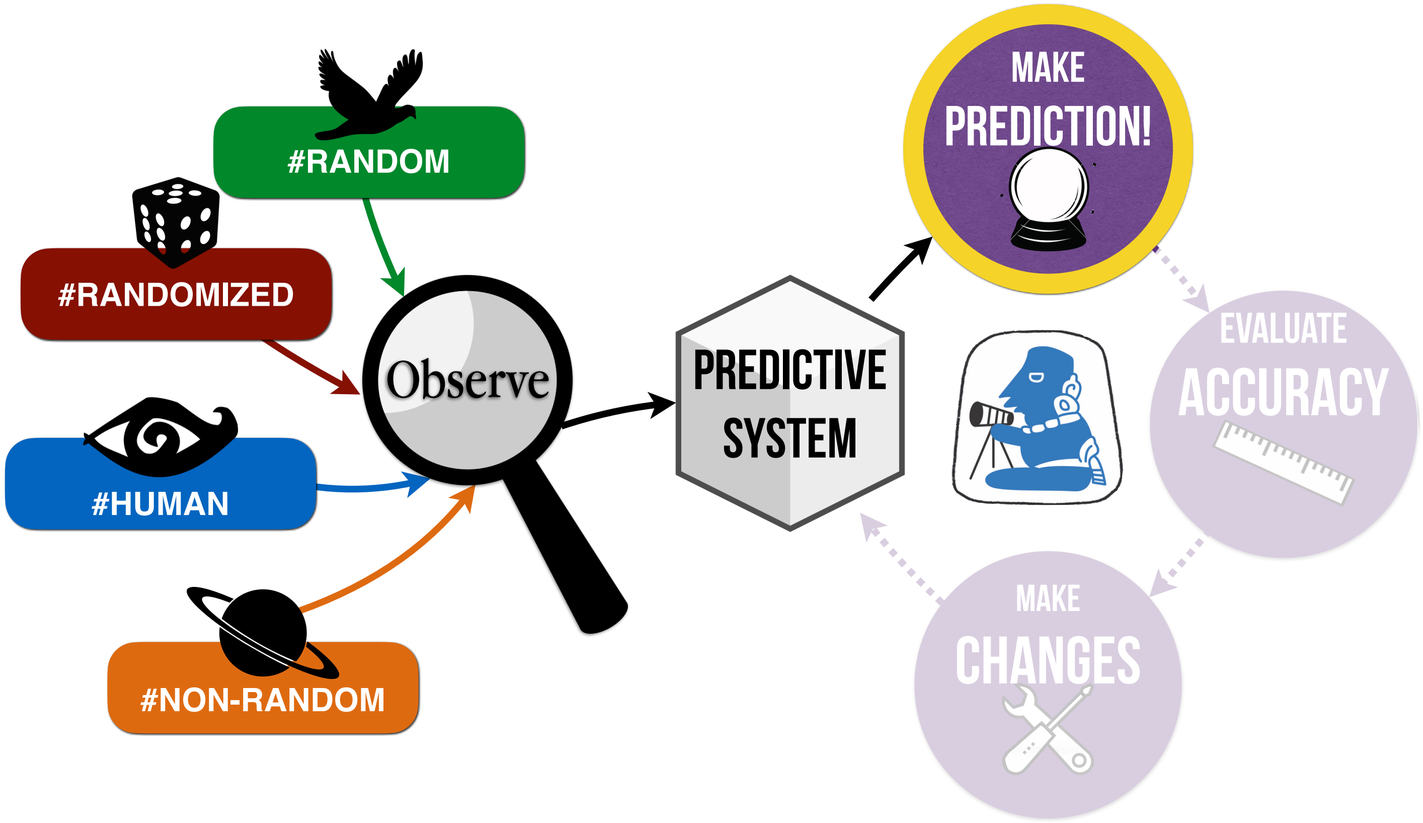

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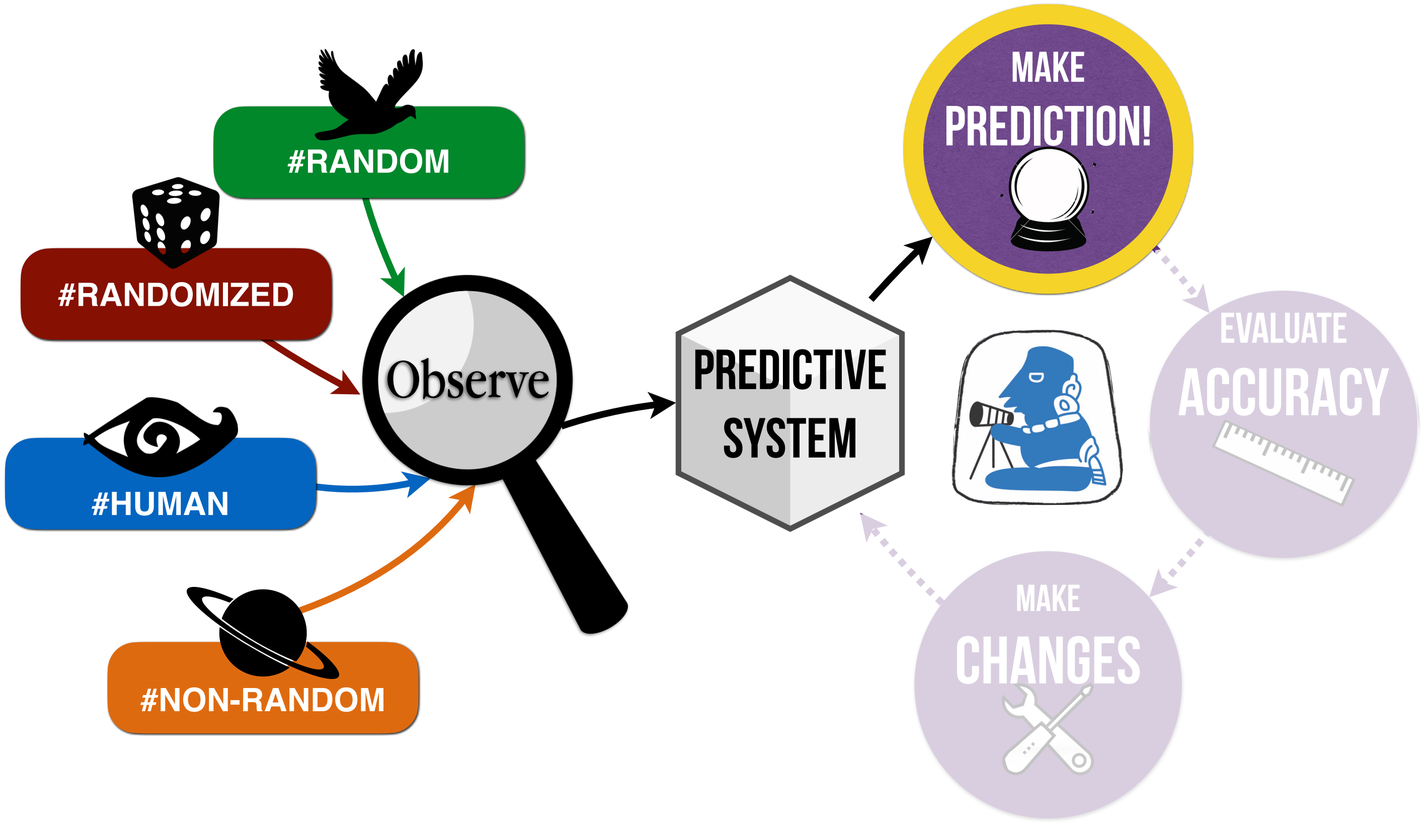

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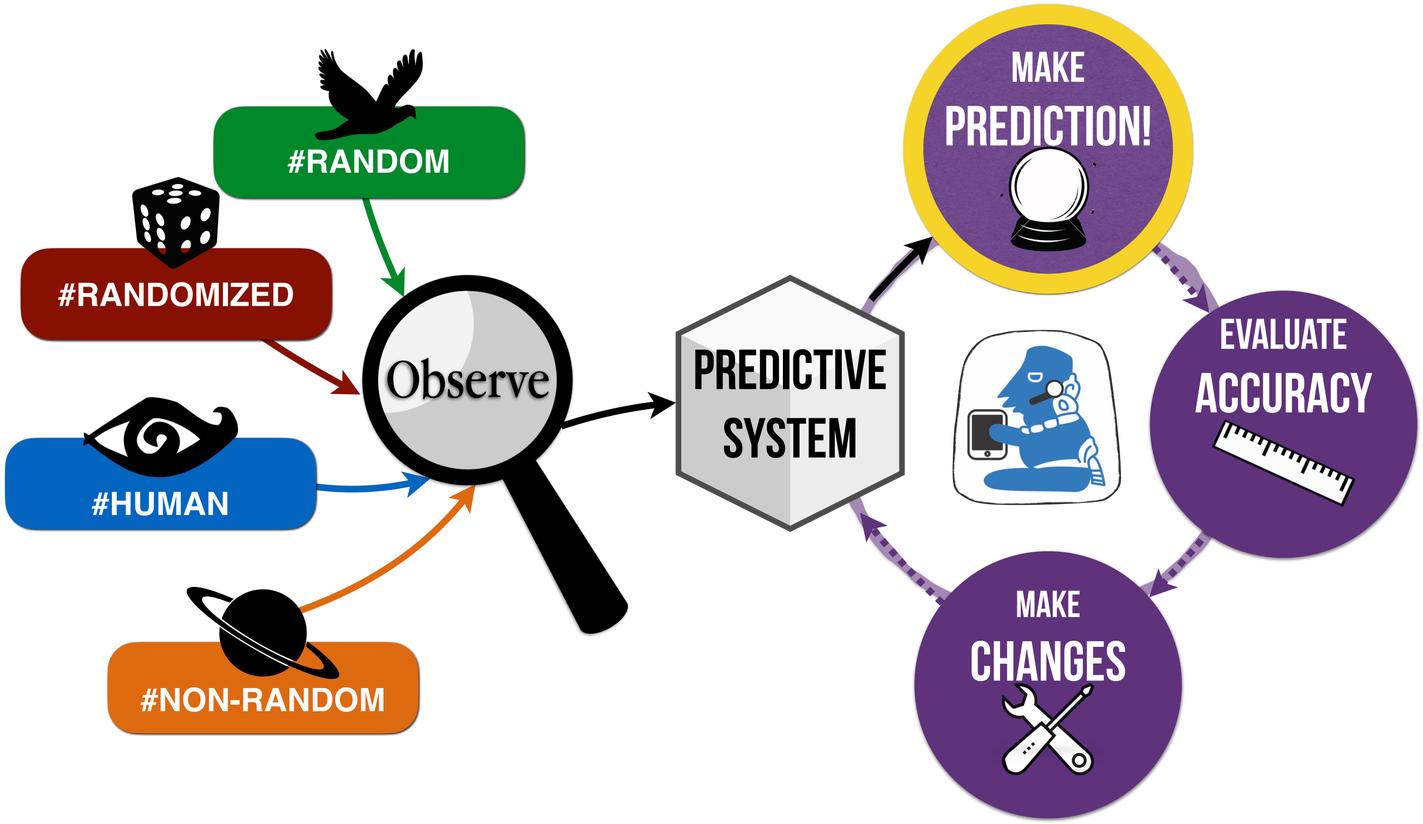

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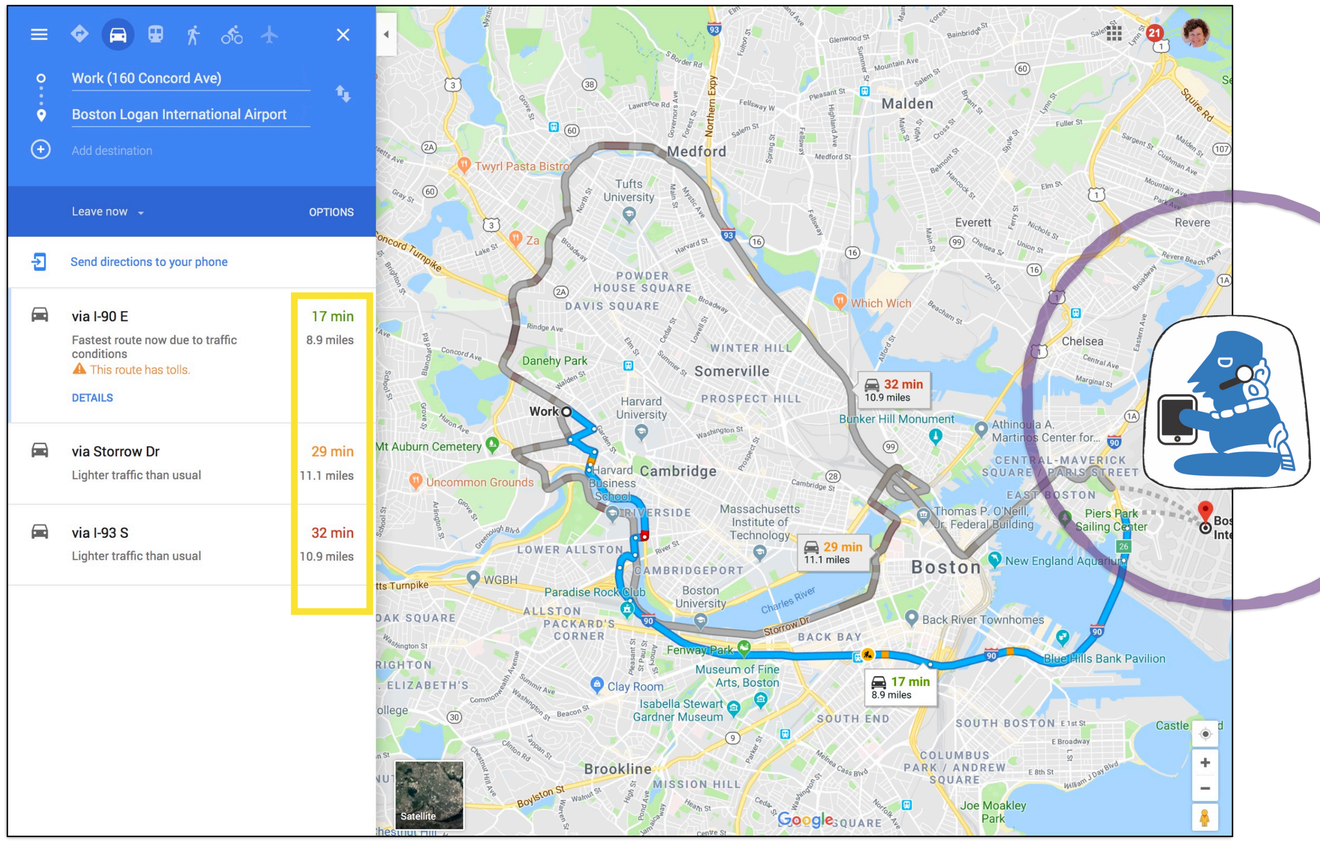
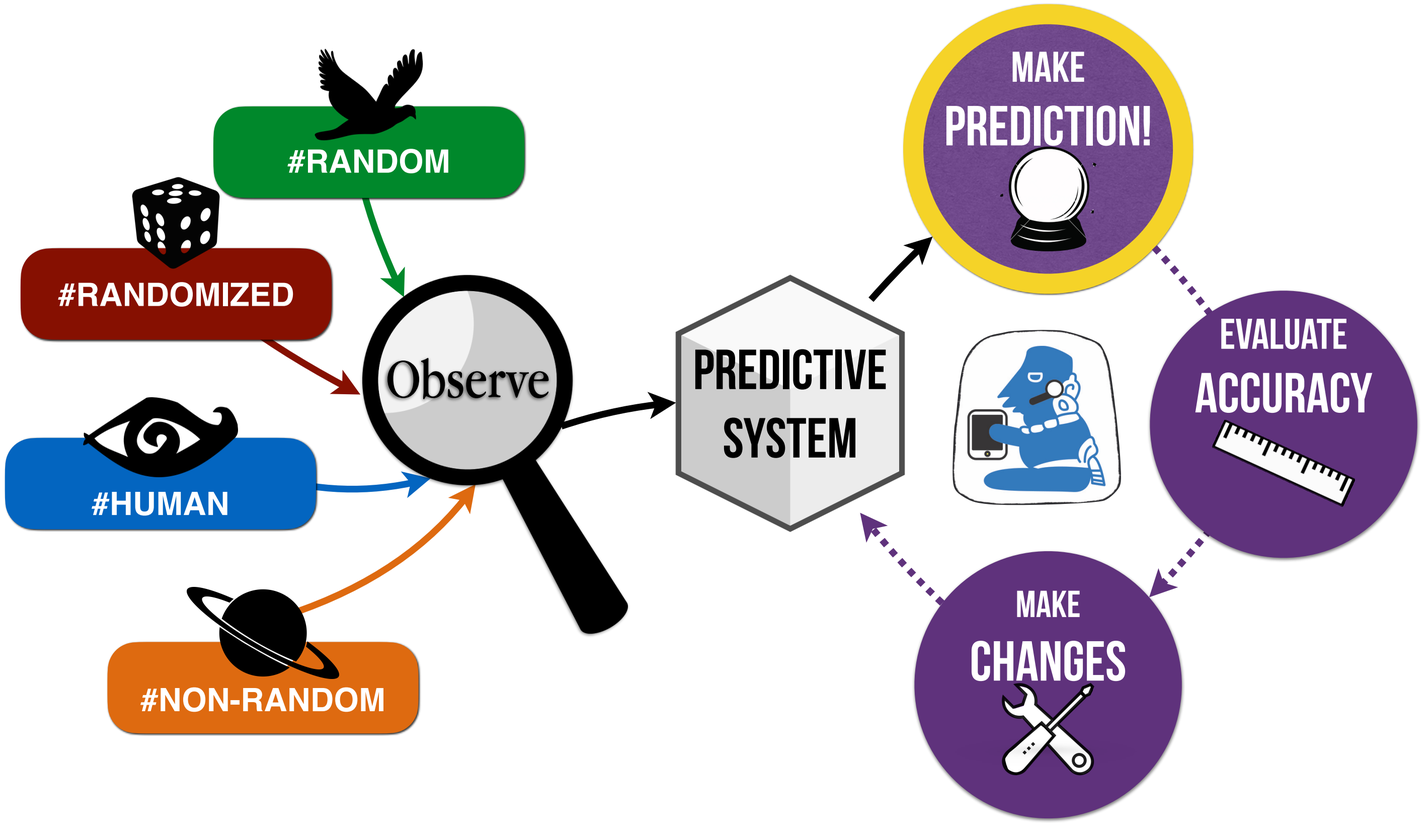


"Most companies who do live traffic **compare** their predictions against actual time in traffic to tune their algorithms and data sources.
The likely result of this is that the companies who have access to the best usage data … are likely to end up with the best predictions in the medium to long term."

Forbes Tech, July 2013

Framework for Predictive Systems



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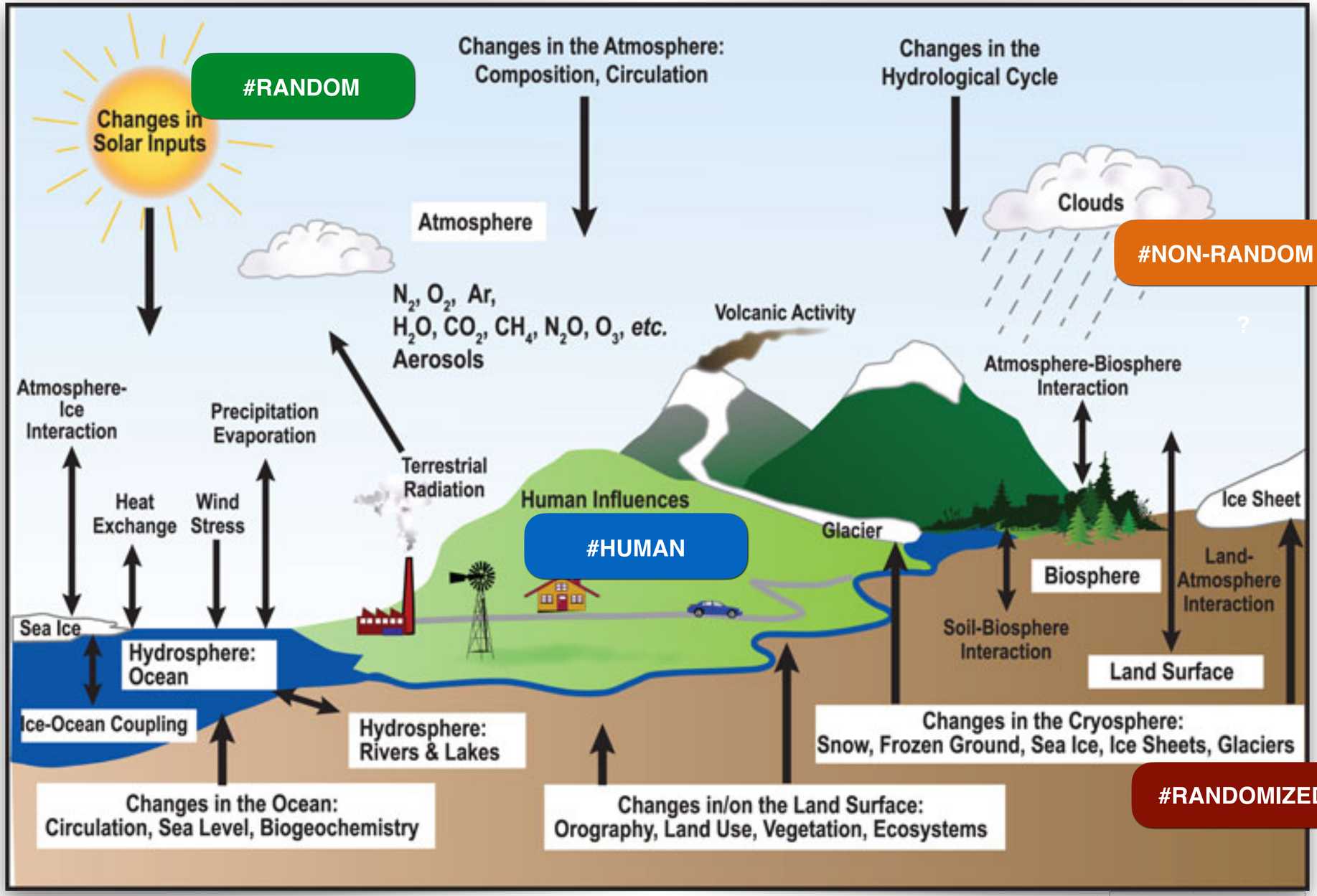
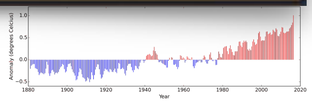
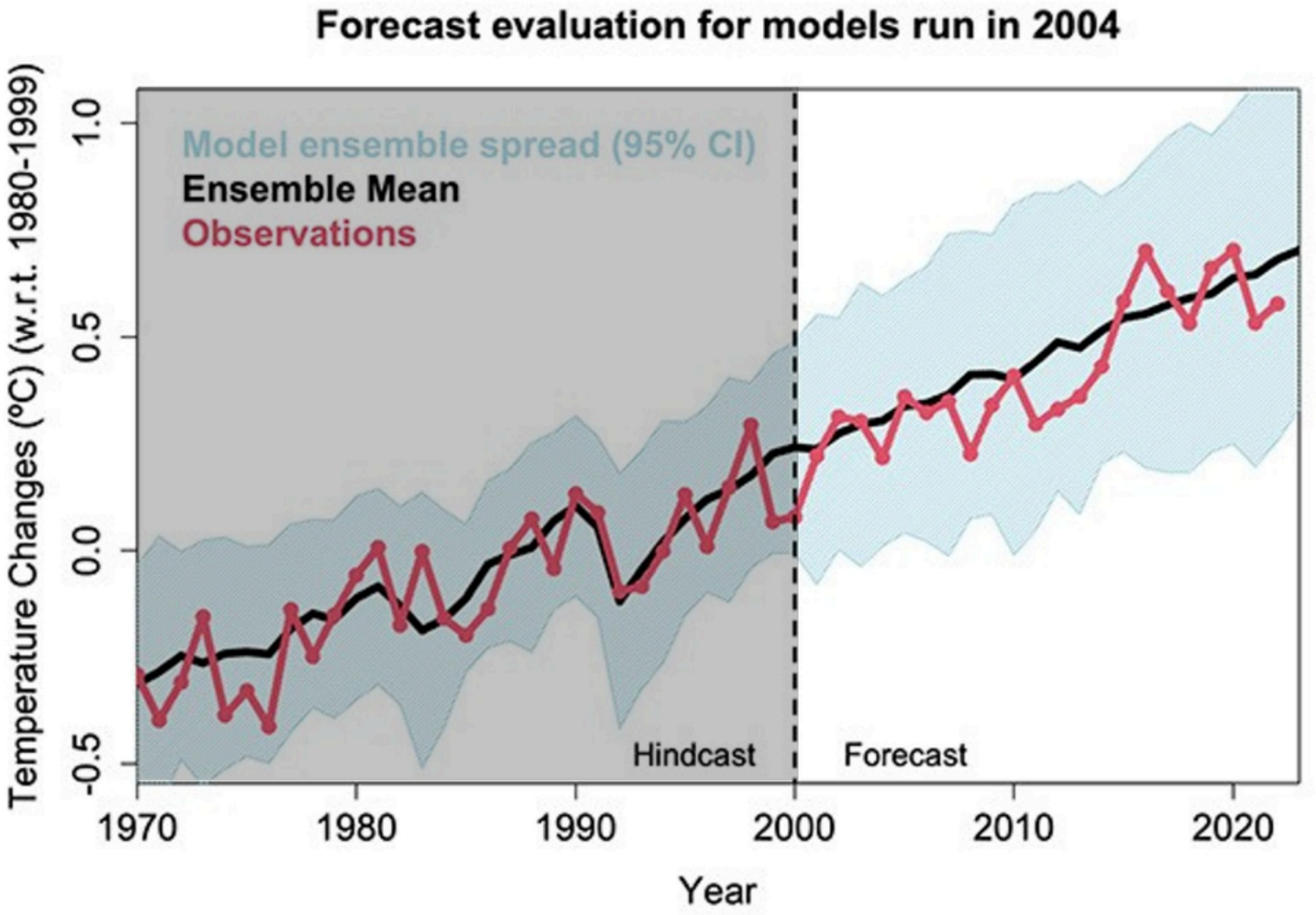
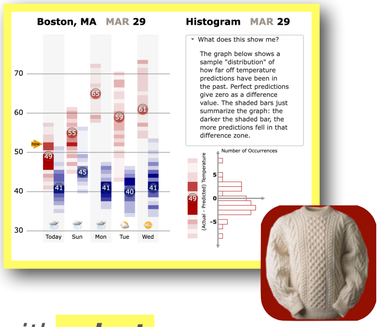
EVALUATE
ACCURACY



blogs.scientificamerican.com/the-curious-wavefunction/are-more-accurate-climate-change-models-worse







*Models that were used in the IPCC 4th Assessment Report can be evaluated by **comparing** their approximately 20-year **predictions** with **what actually happened**. In this figure, the multi-model ensemble and the average of all the models are plotted alongside the NASA Goddard Institute for Space Studies (GISS) Surface Temperature Index (GISTEMP). Climate drivers were known for the 'hindcast' period (before 2000) and forecast for the period beyond. The temperatures (in degrees Celsius) are plotted with respect to a 1980-1999 baseline.*
Gavin Schmidt

science.nasa.gov/earth/climate-change/study-confirms-climate-models-are-getting-future-warming-projections-right/

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The Path to Newton

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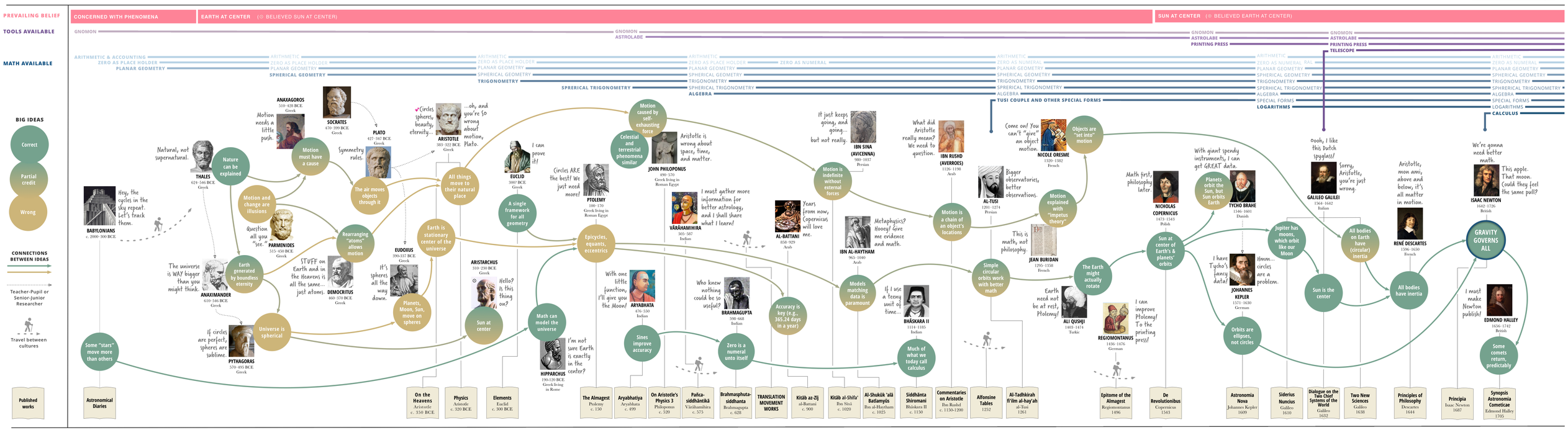
predictionx.org

The Path to Newton



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demo: path-to.org or LabXchange™ Science and learning–connected.

“When Knowledge Conquered Fear”

"When Knowledge Conquered Fear" is the third episode of the American documentary television series Cosmos: A Spacetime Odyssey. It premiered on March 23, 2014 on Fox, and premiered on March 24, 2014 on National Geographic Channel. [Wikipedia]. IMDB link Reproduced without permission—please do not distribute.

The Path to Newton

PREVAILING BELIEF | CONCERNED WITH PHENOMENA | EARTH AT CENTER (☉ BELIEVED SUN AT CENTER)

TOOLS AVAILABLE

GNOMON

GNOMON
ASTROLABE

MATH AVAILABLE

ARITHMETIC & ACCOUNTING
ZERO AS PLACE HOLDER
PLANAR GEOMETRY
SPHERICAL GEOMETRY

ARITHMETIC
ZERO AS PLACE HOLDER
PLANAR GEOMETRY
SPHERICAL GEOMETRY
TRIGONOMETRY
SPRERICAL TRIGONOMETRY

ARITHMETIC
ZERO AS PLACE HOLDER
PLANAR GEOMETRY
SPHERICAL GEOMETRY
TRIGONOMETRY
SPHERICAL TRIGONOMETRY
ALGEBRA

ARITHMETIC
ZERO AS PLACE HOLDER
ZERO AS NUMERAL
PLANAR GEOMETRY
SPHERICAL GEOMETRY
TRIGONOMETRY
SPHERICAL TRIGONOMETRY
ALGEBRA

BIG IDEAS

Correct

Partial credit

Wrong

CONNECTIONS BETWEEN IDEAS

Teacher-Pupil or Senior-Junior Researcher

Travel between cultures

Published works

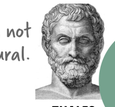
Hey, the cycles in the sky repeat. Let's track them.

BABYLONIANS
c. 2000–300 BCE

Some "stars" move more than others

Astronomical Diaries

Natural, not supernatural.



THALES
624–546 BCE
Greek

Nature can be explained

Earth generated by boundless eternity

The universe is WAY bigger than you might think.

ANAXIMANDER
610–546 BCE
Greek

If circles are perfect, spheres are sublime.

PYTHAGORAS
570–495 BCE
Greek

Universe is spherical

Motion and change are illusions

Question all you "see."

PARMENIDES
515–450 BCE
Greek

Motion needs a little push.

ANAXAGOROS
510–428 BCE
Greek

Motion must have a cause

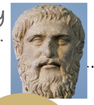
Rearranging "atoms" allows motion

STUFF on Earth and in the Heavens is all the same... just atoms.

DEMOCRITUS
460–370 BCE
Greek

SOCRATES
470–399 BCE
Greek

Symmetry rules.



PLATO
427–347 BCE
Greek

The air moves objects through it

Planets, Moon, Sun, move on spheres

It's spheres all the way down.

EUDOXUS
390–337 BCE
Greek

Earth is stationary center of the universe

Circles spheres, beauty, eternity...

ARISTOTLE
383–322 BCE
Greek

...oh, and you're so wrong about motion, Plato.

All things move to their natural place

Sun at center

ARISTARCHUS
310–230 BCE
Greek

Hello? Is this thing on?

Math can model the universe

HIPPARCHUS
190-120 BCE
Greek living in Rome

I'm not sure Earth is exactly in the center?

EUCLID
300? BCE
Greek

I can prove it!

A single framework for all geometry

Motion caused by self-exhausting force

Celestial and terrestrial phenomena similar

JOHN PHILOPONUS
490–570
Greek living in Roman Egypt

Aristotle is wrong about space, time, and matter.

Circles ARE the best! We just need more!

PTOLEMY
100–170
Greek living in Roman Egypt

Epicycles, equants, eccentrics

VĀRĀHAMIHIRA
505–587
Indian

I must gather more information for better astrology, and I shall share what I learn!

AL-BATTANI
858–929
Arab

Years from now, Copernicus will love me.

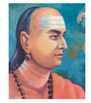
It just kee going, ar going

but not reall

Motion is indefinite without external forces

Accuracy is key (e.g., 365.24 days in a year)

With one little function, I'll give you the Moon!



ARYABHATA
476–550
Indian

Sines improve accuracy

Who knew nothing could be so useful?

BRAHMAGUPTA
598–668
Indian

Zero is a numeral unto itself

On the Heavens
Aristotle
c. 350 BCE

Physics
Aristotle
c. 320 BCE

Elements
Euclid
c. 300 BCE

The Almagest
Ptolemy
c. 150

Aryabhatiya
Aryabhata
c. 499

On Aristotle's Physics 3
Philoponus
c. 520

Pañca-siddhāntikā
Vārāhamihira
c. 575

Brahmasphuta-siddhanta
Brahmagupta
c. 628

TRANSLATION MOVEMENT WORKS

Kitāb az-Zīj
al-Battani
c. 900

Kitāb
Ibn

SUN AT CENTER (⊕ BELIEVED EARTH AT CENTER)

GNOMON
ASTROLABE
PRINTING PRESS

ARITHMETIC
ZERO AS PLACE HOLDER
ZERO AS NUMERAL
PLANAR GEOMETRY
SPHERICAL GEOMETRY
TRIGONOMETRY
SPRERICAL TRIGONOMETRY
ALGEBRA
TUSI COUPLE AND OTHER SPECIAL FORMS
LOGARITHMS

...oh, and you're so wrong about motion, Plato.

RISTOTLE
3–322 BCE
Greek

All things move to their natural place

Motion caused by self-exhausting force

Celestial and terrestrial phenomena similar

Aristotle is wrong about space, time, and matter.

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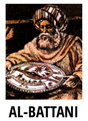


Years from now, Copernicus will love me.

AL-BATTANI
858–929
Arab

Metaphysics? Hooey! Give me evidence and math.

IBN AL-HAYTHAM
965–1040
Arab

Accuracy is key (e.g., 365.24 days in a year)

With one little function, I'll give you the Moon!

ARYABHATA
476–550
Indian

Who knew nothing could be so useful?

BRAHMAGUPTA
598–668
Indian

Zero is a numeral unto itself

If I use a teeny unit of time...

BHĀSKARA II
1114–1185
Indian

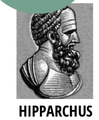
Much of what we today call calculus

Hello? Is this thing on?

ARISTARCHUS
310–230 BCE
Greek

Sun at center

Math can model the universe



I'm not sure Earth is exactly in the center?

HIPPARCHUS
190-120 BCE
Greek living in Rome

Sines improve accuracy

It just keeps going, and going... but not really.

IBN SINA (AVICENNA)
980–1037
Persian

Motion is indefinite without external forces

What did Aristotle really mean? We need to question.

IBN RUSHD (AVERROES)
1126–1198
Arab

Motion is a chain of an object's locations

Bigger observatories, better observations.

AL-TUSI
1201–1274
Persian

Simple circular orbits work with better math

This is math, not philosophy.

JEAN BURIDAN
1295–1358
French

Motion explained with "impetus theory"

Come on! You can't "give" an object motion.

NICOLE ORESME
1320–1382
French

Objects are "set into" motion

Earth need not be at rest, Ptolemy!

ALI QUSHJI
1403–1474
Turkic

The Earth might actually rotate

I can improve Ptolemy! To the printing press!

REGIOMONTANUS
1436–1476
German

Sun at center of Earth's & planets' orbits

Math first, philosophy later.

NICHOLAS COPERNICUS
1473–1543
Polish

With giant spendy instruments, I can get GREAT data.

Planets orbit the Sun, but Sun orbits Earth

TYCHO BRAHE
1546–1601
Danish

I have Tycho's fancy data!

Hmm... circles are a problem.

JOHANNES KEPLER
1571–1630
German

Orbits are ellipses, not circles

Jupiter has moons, which orbit like our Moon

Physics
Aristotle
c. 320 BCE

Elements
Euclid
c. 300 BCE

The Almagest
Ptolemy
c. 150

Aryabhatiya
Aryabhata
c. 499

On Aristotle's Physics 3
Philoponus
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Vārāhamihira
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Brahmasphuta-siddhanta
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c. 628

TRANSLATION MOVEMENT WORKS

Kitāb az-Zīj
al-Battani
c. 900

Kitāb al-Shifa'
Ibn Sīnā
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Al-Shukūk 'alā Batlamyūs
Ibn al-Haytham
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Siddhānta Shiromani
Bhāskara II
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Commentaries on Aristotle
Ibn Rushd
c. 1150-1200

Alfonsine Tables
1252

Al-Tadhkirah fi'ilm al-hay'ah
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Epitome of the Almagest
Regiomontanus
1496

De Revolutionibus
Copernicus
1543

Astronomia Nova
Johannes Kepler
1609

Siderius Nuncius
Galileo
1610

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PREDICTIONX

SUN AT CENTER (⊕ BELIEVED EARTH AT CENTER)

GNOMON
ASTROLABE
PRINTING PRESS
TELESCOPE
ARITHMETIC
ZERO AS NUMERAL
PLANAR GEOMETRY
SPHERICAL GEOMETRY
TRIGONOMETRY
SPHERICAL TRIGONOMETRY
ALGEBRA
SPECIAL FORMS
LOGARITHMS
CALCULUS
TUSI COUPLE AND OTHER SPECIAL FORMS

Zero is a numeral unto itself

Accuracy is key (e.g., 365.24 days in a year)

Models matching data is paramount

Much of what we today call calculus

Motion is indefinite without external forces

Motion is a chain of an object's locations

Simple circular orbits work with better math

Motion explained with "impetus theory"

Objects are "set into" motion

The Earth might actually rotate

Sun at center of Earth's & planets' orbits

Orbits are ellipses, not circles

Sun is the center

Jupiter has moons, which orbit like our Moon

All bodies on Earth have (circular) inertia

All bodies have inertia

GRAVITY GOVERNS ALL

Some comets return, predictably

BRAHMAGUPTA
598–668
Indian

IBN SINA (AVICENNA)
980–1037
Persian

AL-BATTANI
858–929
Arab

IBN AL-HAYTHAM
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Polish

TYCHO BRAHE
1546–1601
Danish

JOHANNES KEPLER
1571–1630
German

GALILEO GALILEI
1564–1642
Italian

RENÉ DESCARTES
1596–1650
French

ISAAC NEWTON
1642–1726
British

EDMOND HALLEY
1656–1742
British

Zero as a numeral unto itself
Brahmagupta
c. 628

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al-Battani
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Johannes Kepler
1609

Siderius Nuncius
Galileo
1610

Dialogue on the Two Chief Systems of the World
Galileo
1632

Two New Sciences
Galileo
1638

Principles of Philosophy
Descartes
1644

Principia
Isaac Newton
1687

Synopsis Astronomia Cometicae
Edmond Halley
1705

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The “Padua Rainbow” & The Path to Newton

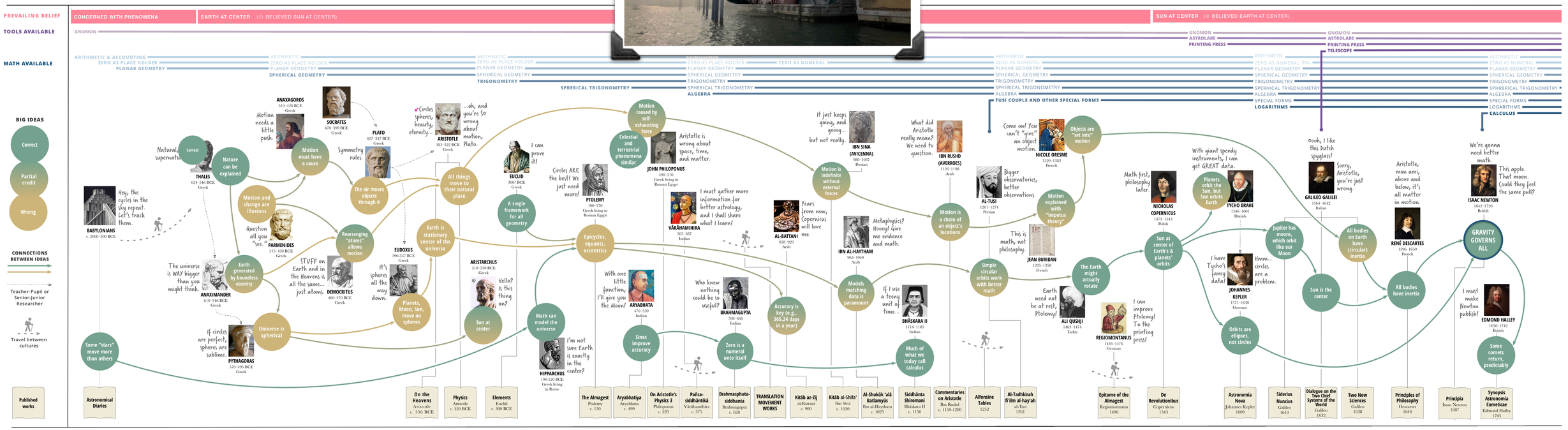
The “Padua Rainbow” & The Path to Newton

PREDICTIVE SYSTEMS

Phenomenon | Observation* | Data | Theory | Explanation | Prediction

The Path to Newton

PREDICTIONX



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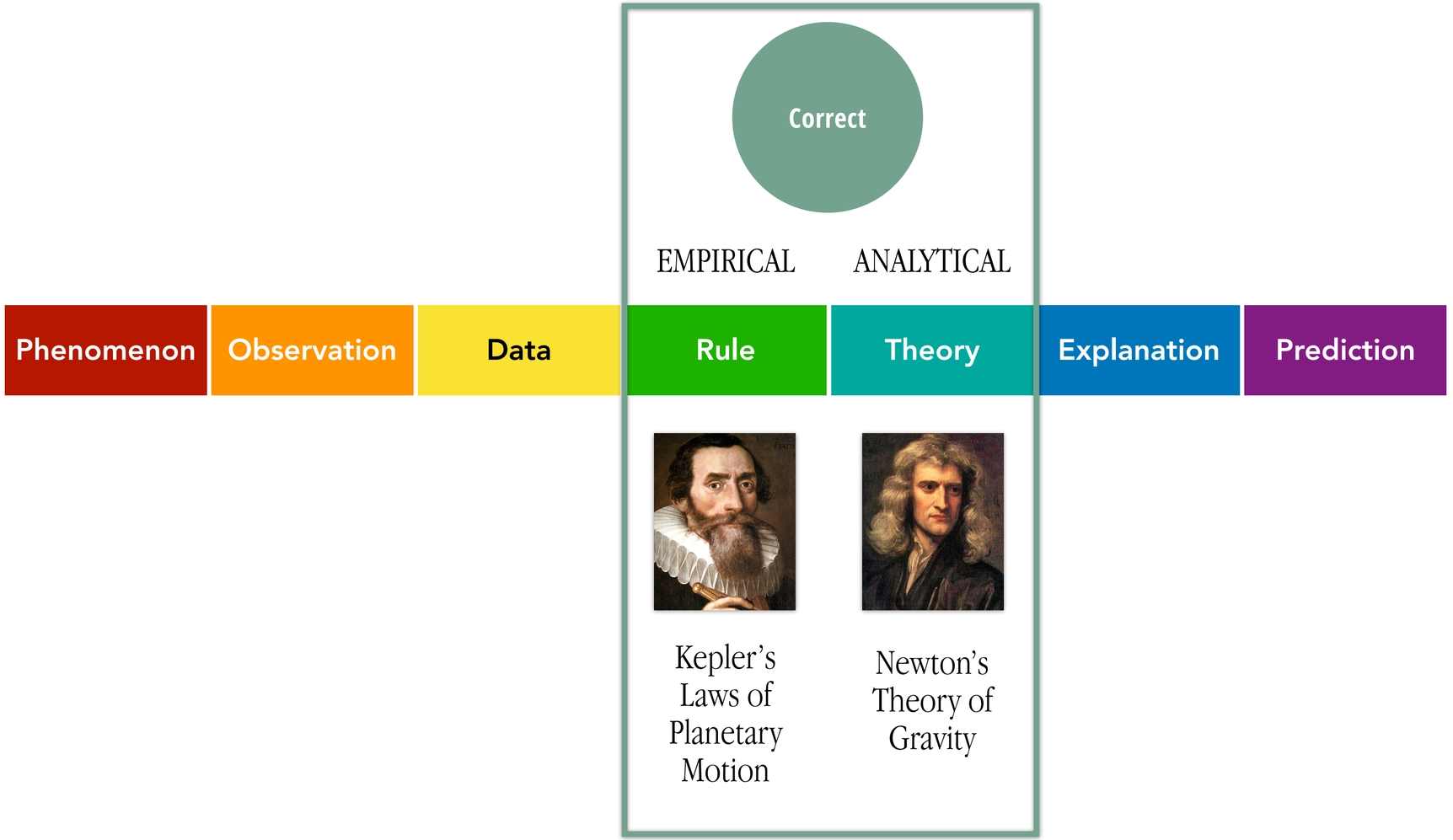
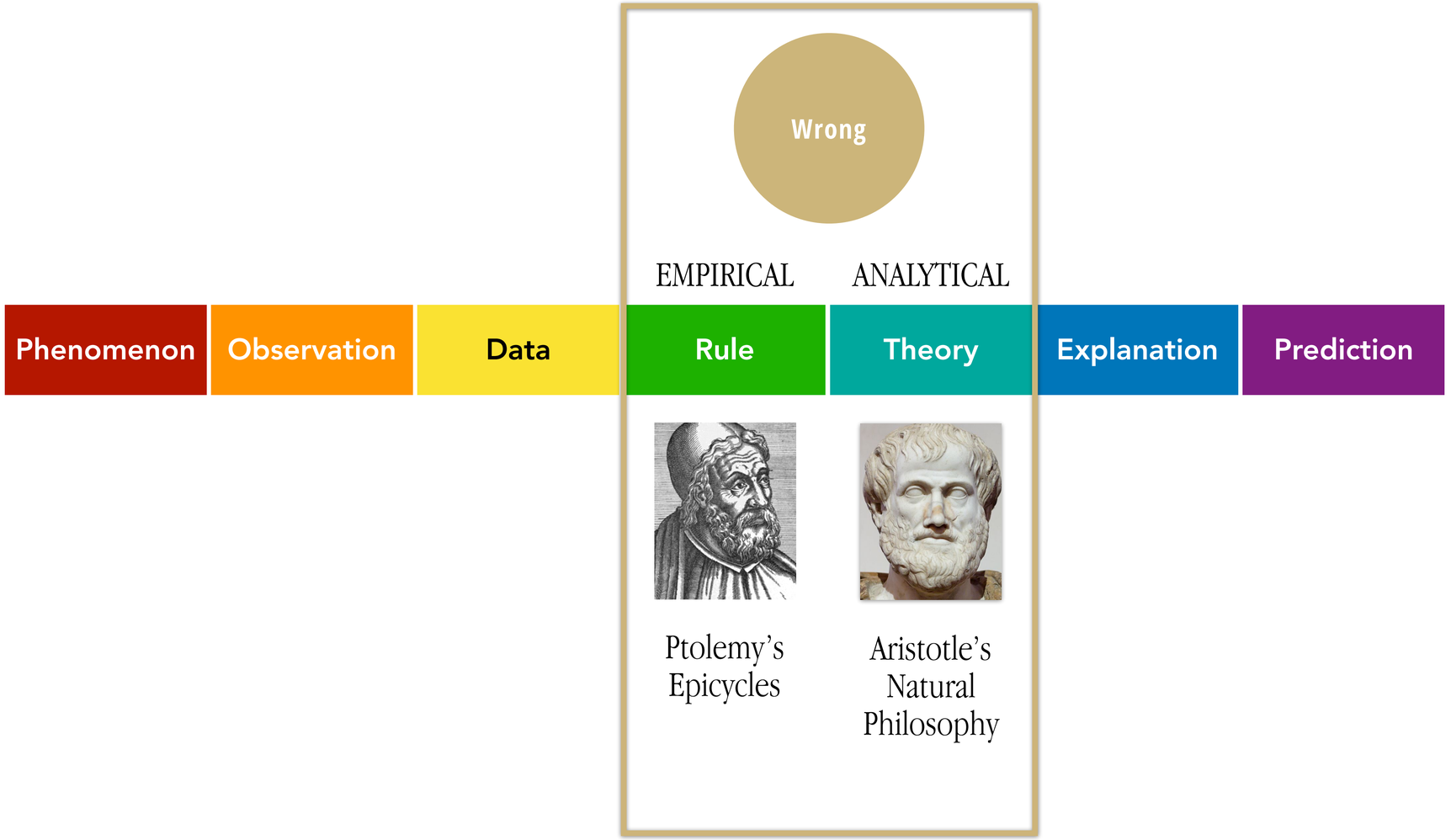
or, Experiment

The “Padua Rainbow” & The Path to Newton



The “Padua Rainbow” & The Path to Newton



Mendel

Phenomenon | Observation | Data | Rule | Prediction

Darwin

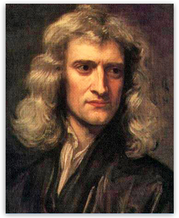
Phenomenon | Observation | Data | Theory | Explanation | Prediction

BIOLOGY

PHYSICS

Kepler

Phenomenon | Observation | Data | Rule | Prediction



Newton

Phenomenon | Observation | Data | Rule | Theory | Explanation | Prediction

Mendel *1865*

Phenomenon | Observation | Data | Rule | Prediction

Darwin *1859*

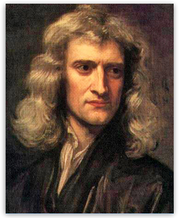
Phenomenon | Observation | Data | Theory | Explanation | Prediction

NO FULLY PREDICTIVE GENERAL THEORY

FULLY PREDICTIVE GENERAL THOERY

Kepler *1609*

Phenomenon | Observation | Data | Rule | Prediction



Newton *1687*

Phenomenon | Observation | Data | Rule | Theory | Explanation | Prediction

The Paths to Science

Path-to-Foundation

path-to-foundation.org

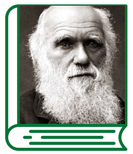
Science is so much more than equations and lab coats. It requires human creativity, ingenuity, argument, and persistence.

The goal of the Paths to Science is to deepen students,' scientists,' and the broader public's appreciation of science by telling stories of its history.

5 small books published by MIT Press, each including a narrative linked to a poster

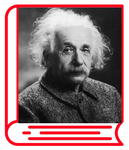
The MIT Press

The Path to Newton



The Path to Darwin

The Path to AI



The Path to Einstein

The Path to Modern Genetics

A growing consortium. . .

The Path-to Science Consortium

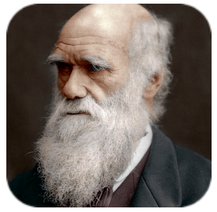
Università degli Studi di Padova

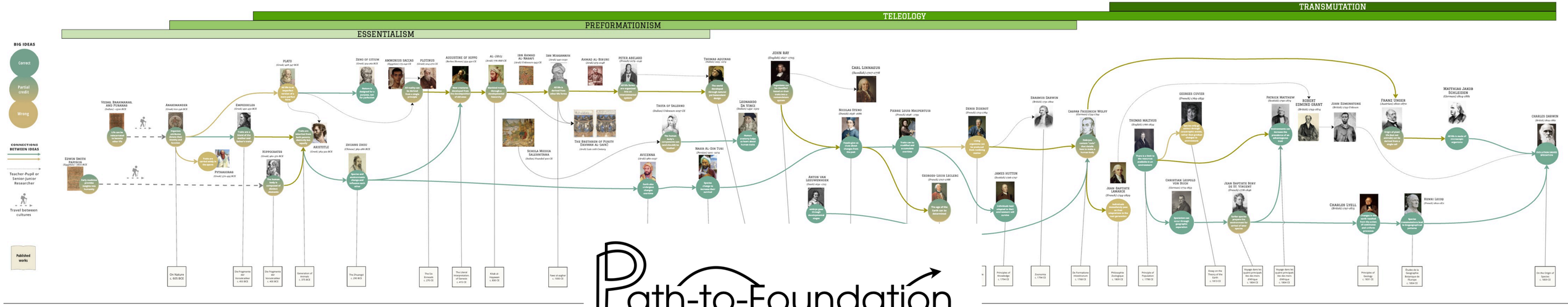
Harvard University

University of Oxford

The Path to Darwin, v. 0.1

Prof. Immaculata De Vivo & Mally Shan (Class of 24)





The Path to AI, v. 0.01

Simeon Sayer, Class of 22

Path to AI Threads - Data

Papyrus Scrolls (3000 BCE)
Clay Tablets (2000 BCE)
Parchment and Vellum (200 BCE)
Invention of Paper (105 CE)
Printing Press (1440)
Card Catalogs (late 19th century)
Magnetic Tape (1928)
Hard Disk Drives (1956)
Floppy Disks (1971) Compact Disc (CD) (1982) Solid State Drives (SSDs) (2009) Cloud Storage (2006 - present)

Path to AI Threads – Human History

Artificial beings created by Gods (1600 BCE)
Designing mechanical humanoid figures (8th - 14th century)
Considering the design for automotive machines (1400)
"beginning of science-fiction (1800s)"
AI is featured in films (1950s - present)
AI is shown to be dangerous in films (1950s - present)

Path to AI Threads - Algorithms

Birth of graph theory (1736)
Boolean Algebra (1847)
Evolution of graph theory (1845 - 1990s)
Game Theory (1928-1944)
Linear Threshold Unit Model (1943)
Prediction Calculus (1956)
Logic Theorist (1956) Decision trees (1970s)
Transformer Paper (2018)

The FUTURE of the Future

20th century

How good does Chat GPT think it is at Prediction?

ChatGPT 4o

how good are LLMs at predicting the future?

Large language models (LLMs) like GPT are not inherently designed to predict th
they generate text based on patterns in the data they've been trained on
historical information, facts, and language use up to a certain poi
important limitations to consider when evaluating how g re:

1. **Lack of Foresight:** LLMs don't have direct y can make projections based on past trends e predictions and often lack the nuance and real-t ecasting.
2. **Limited Contex** specific point (in the case of GPT, until 2023) opments, research, or events beyond that point through external tools or browsing functions.

LMs can discuss likely future outcomes by extrapolating from existing , scientific advancements, societal trends). However, this type of "future on" is speculative and should be treated as such.

3. **No Access to Real-Time Data:** Without real-time access to data or current news (except via special integrations), LLMs cannot make dynamic, informed predictions about ongoing events, limiting their ability to predict near-term futures.

In fields like technology or science, where change follows observable trends, LLMs can offer educated guesses, but these shouldn't be confused with precise forecasting. Human expertise, specialized models, and real-time data analysis are typically more reliable for future prediction tasks.

Good answer! It knows it's bad.

How good is Chat GPT at Prediction?

pen tomorrow

Since I don't have access to real-time i… predictive capabilities, I can't tell you what will specifically happen t… …ny events that are planned or cyclical, such as weather patterns, s… …s, or known astronomical phenomena, can be anticipated ba… …l-time or near-term information, you could check reliable source… …eather services, or event schedules.

…more broadly about trends or events tomorrow, LLMs can only speculate based on … knowledge about trends, not specific occurrences.●

It knows its limitations!

How good is Chat GPT at helping you learn?

Prompt
Write a 3 paragraph summary of how modern weather forecasts are made..

ChatGPT 4
Modern weather forecasts are made using a combination of sophisticated t… of data, and complex mathematical models. The process begins with data collection. Mete… a variety of sources including weather satellites, radar systems, weather stations, and ocean b… cial role, providing real-time images of weather systems from space, while radar systems offer … tion. Ground-based weather stations measure local temperature, humidity, wind speed, an… nd buoys collect data about ocean conditions. All this data provides a comprehensive picture o… tmosphere at various levels.

The collected data is then fed into ad… to simulate the atmosphere's behavior. These models, known as numerical weather prediction (N… x equations to describe the physics and dynamics of the atmosphere. They divide the Earth's at… ensional grid system, allowing meteorologists to analyze data at different altitudes and geogra… els then compute how these atmospheric variables will change over time, based on the laws of … NWP models run by different meteorological organizations worldwide, each with its own stren… on short-term weather predictions, while others are designed for longer-term forecasts.

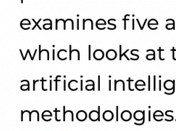
…terpret the output from these models to create weather forecasts. This step involves human expertise, …onsider model predictions, historical weather patterns, and their understanding of local geography and … also compare different models and consider their respective track records for accuracy. Forecasts are continually … as new data comes in and models are rerun, leading to more accurate predictions. This process enables …teorologists to forecast not just the likelihood of rain, snow, or sunshine, but also more complex weather phenomena like hurricanes, tornadoes, and heatwaves. The result is the weather forecasts that the public receives, ranging from immediate short-term forecasts to longer-range predictions that can help in planning and preparing for various weather conditions.

This is ASTONISHINGLY good!

Modern Prediction

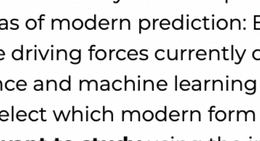
Prediction is everywhere in the modern world, making up essential aspects of almost every part of our lives. From checking the weather on your phone, knowing when you will arrive to work, to longer term predictions of the success of your stock portfolio and your personal health goals. This section of the course examines five areas of modern prediction: Earth, Health, Wealth, Space, and the Future of the Future -- which looks at the driving forces currently changing our own conceptions of prediction, including artificial intelligence and machine learning -- to give learners a picture of the state of modern predictive methodologies. Select which modern form of prediction you want to study first by **clicking on an image of the topic you want to study** using the interactive menu below.

This site contains our prediction videos uploaded on YouTube; to enjoy them in their full format with video annotations and useful links, check out our **Modern Prediction cluster on LabXchange**.



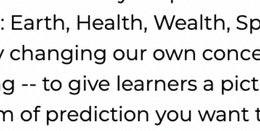
EARTH

Study the complex modeling that has defined humanity's comprehension of climate change and the future of our planet in Earth.



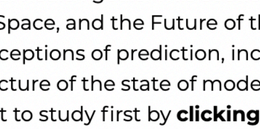
HEALTH

Discover the incredible modern advancements in global health prediction -- using technology to make humanity healthier from mobile health to genomics, and possibly altering what it means to be human.



SPACE

Learn about modern astronomical prediction, with cutting edge simulations now defining the field of astronomy and contributing to a monumental change in our understanding of the universe.



WEALTH

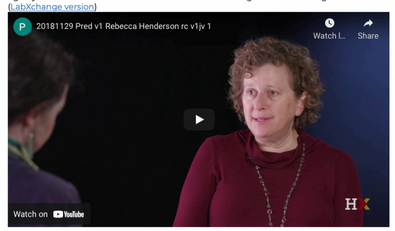
Understand the rapidly changing modern state of wealth prediction, pulling on innovative fields such as behavioral economics to comprehend the inherent difficulty of predicting markets.

FUTURE OF THE FUTURE

How will prediction change as technology further develops? How will artificial intelligence influence our ability to understand uncertainty? These questions and others are touched on by philosophers and scientists in the Future of the Future.

Corporations and Climate with Rebecca Henderson:

Alyssa speaks with Harvard University Professor Rebecca Henderson about organizational rigidity as an essential barrier to overcome in order to mitigate climate change. (LabXchange version)

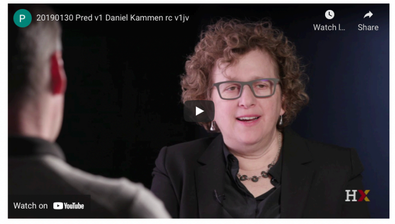


Climate Policy with Gina McCarthy:

Alyssa speaks with former head of the EPA Gina McCarthy about the future of climate and the role of prediction in policymaking. (LabXchange Version)

The Future of Energy with Dan Kammen:

Alyssa speaks with UC Berkeley's Professor of Energy Dan Kammen about climate change and the future of energy on Earth. (LabXchange Version)



Predicting Health, and Earthquakes with Susan Murphy and Brendan Meade:

Alyssa speaks with earthquake predictions expert Prof. Brendan Meade and mobile health researcher and statistician Prof. Susan Murphy. This interview looks at the power of technology in guiding humanity's future health outcomes in a variety of ways. (LabXchange Version)

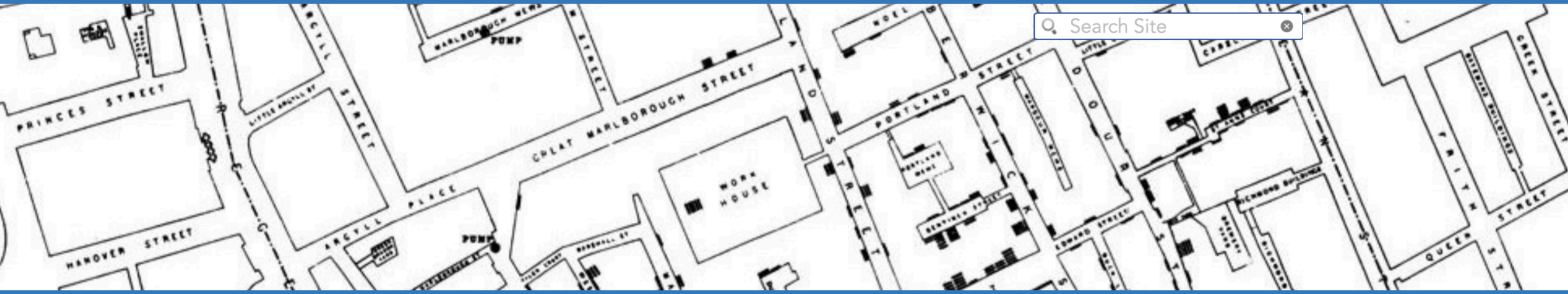
The Future of Climate Prediction by Michael Foley:

Read this essay by Alyssa's teaching fellow Michael Foley on the use of models in climate science to predict the future of Earth's climate and the outcomes of human-caused climate change:

Climate change predictions have taken on an increasingly important role in national and international decision making given that the current economic and social course would lead to catastrophic warming. Given that many sectors of society contribute to climate change and the whole world will experience its impacts, such predictions must consider the domains of both physical laws and human interactions. Addressing #health, #wealth, and #earth in the shadow of climate change is a daunting task, and responses to climate change effects and predictions have ranged from aggressive mitigation to proactive or reactive adaptation.

The Prediction Project

The Past and Present of the Future



Prediction Essentials

Take a look at the essential elements of the course, including the framework for predictive systems.

→

Omens & Oracles

Gain insight into prediction as a human venture by studying the most ancient forms of prediction in Omens and Oracles.

→

Rise of Theory

Learn how humanity moved from mystical divination practices to genuine, scientific theories to explain natural phenomena.

→

Modern Prediction

Discover the cutting edge predictive methods and modeling from preeminent experts across many fields.

→

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