ICACDS 2021 - 5th International Conference on Advances in Computing and Data Sciences

April 23-24, 2021, Nashik, Maharashtra, India (Online)
Inauguration Ceremony

An-epoch-making example for the importance of data; and the richness of the concept of data

Tuncer Ören, Ph.D.
Emeritus Professor of Computer Science
University of Ottawa
Ottawa, Ontario, Canada
https://www.site.uottawa.ca/~oren/

We'll see:

1. How "**data**" has been influential
   to change the interpretation
   of the place of the Earth (hence humans)
   in the Universe,
   long before the term data is coined?

2. Another example about the **richness** of the concept of data.

Some dates from
the online dictionary of etymology:

The term exists	since
Data	**1640**
Data processing	1954
Database	1962
Data-entry	1970

Models of the universe:

1. **Geocentrism** (Britannica)

(The role of data)

Earth is the center of the Universe
& the sun rotates around the earth
(from the 4th century BC until the 17th century)

2. **Heliocentrism** (Britannica)

(For the sake of completness) The Sun is the center of the Universe
& the Earth and planets revolve around the sun

3. **Contemporary view**

1. Geocentrism

(Earth is the center of the Universe)

(from the 4th century BC until the 17th century)

1. Geocentrism: (Two great philosophers):

View of the classical Greece:

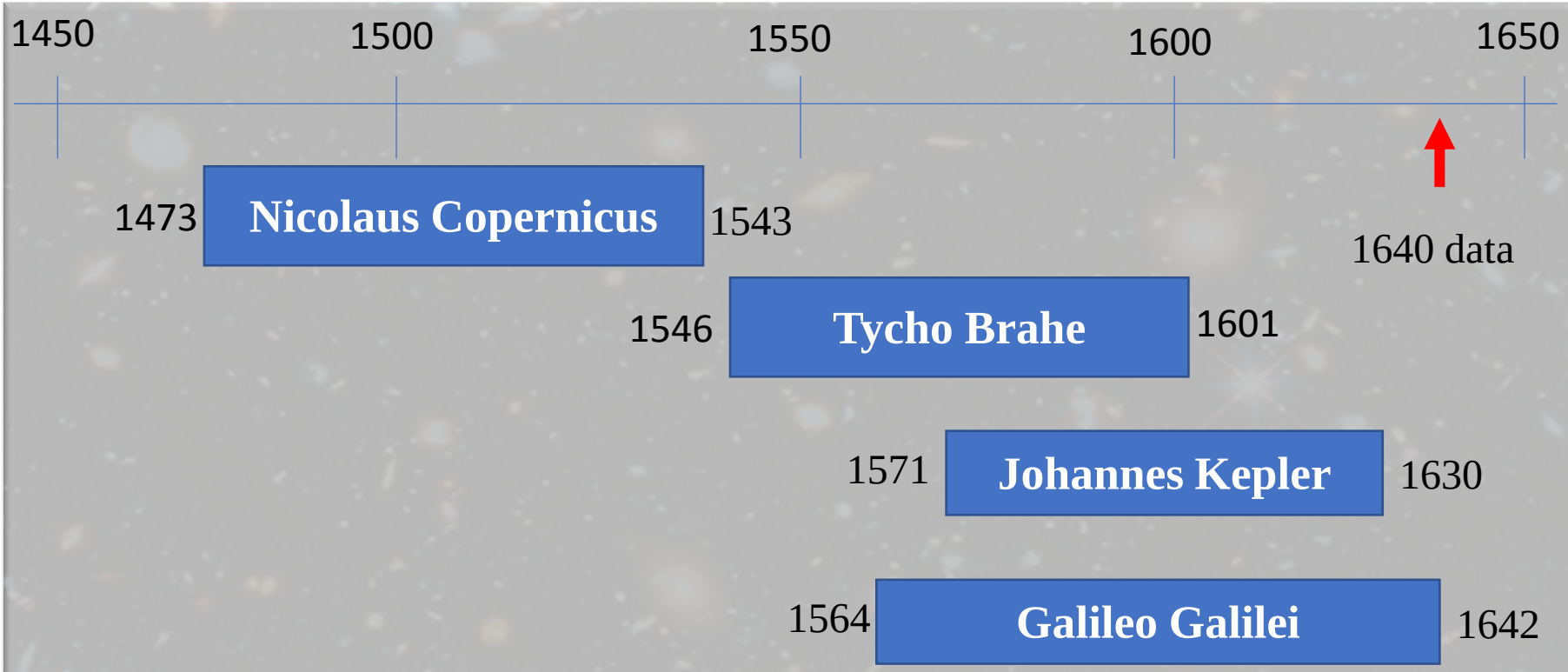
Aristotle (384 BC – 322 BC) (Aristotelian physics)

View of the Roman Egypt:

Claudius Ptolemy (c. 100 AD – c. 170 AD)

2. **Heliocentrism** (is the astronomical model in which the Earth and planets revolve around the Sun which is at the center of the Universe.)

Some great scientists:



Timeline Models of the Universe (Preceden) 1/2

(Tyco Brahe's and Galileo's roles are added by Ören)

Aristotle 384 BC - 322 BC	Makes his **Geocentric** model of the Universe. Widely accepted throughout the whole of Europe for next millennium
Aristarchus 310 BC - 230 BC	Makes an alternate to Aristotle idea and makes the first **Heliocentric** model but is largely **rejected due to lack of proof** (**i.e., lack of observed data**. Ören)
Ptolemy 90 AD - 168 AD	Improves on Aristotle design with the idea of epicycles to explain planetary motion.
Copernicus 1473 - 1543	Proposes the **Heliocentric** model with **measurements and proof** to back himself up **but due to Church influence** Ptolemy's model continued to be used.

Tycho Brahe
1546 - 1601

Kepler
1571 - 1630

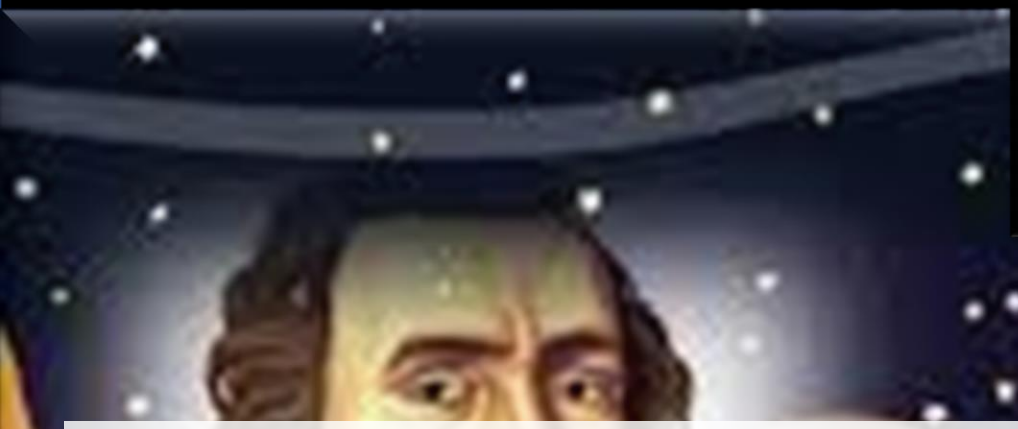
Tycho Brahe (1546 - 1601)

Tycho Brahe, "Danish astronomer whose work in developing astronomical instruments and in **measuring** and fixing the positions of stars paved the way for future discoveries.

His **observations**—the *most accurate* possible before the invention of the telescope—included a comprehensive study of the solar system and accurate positions of more than 777 fixed stars."

(Britannica)

Johannes Kepler
(1571 - 1630)



"…moved to Prague in 1600, to work under the supervision of the great Danish astronomer Tycho Brahe."

"Kepler was sufficiently conscious of the change of perspective he was introducing into astronomy. Hence, he decided to announce this in the full title of the work: *New Astronomy Based upon Causes or Celestial Physics Treated by Means of Commentaries on the Motions of the Star Mars from the* ***observations*** *of Tycho Brahe*."

Stanford Encyclopedia of Philosophy

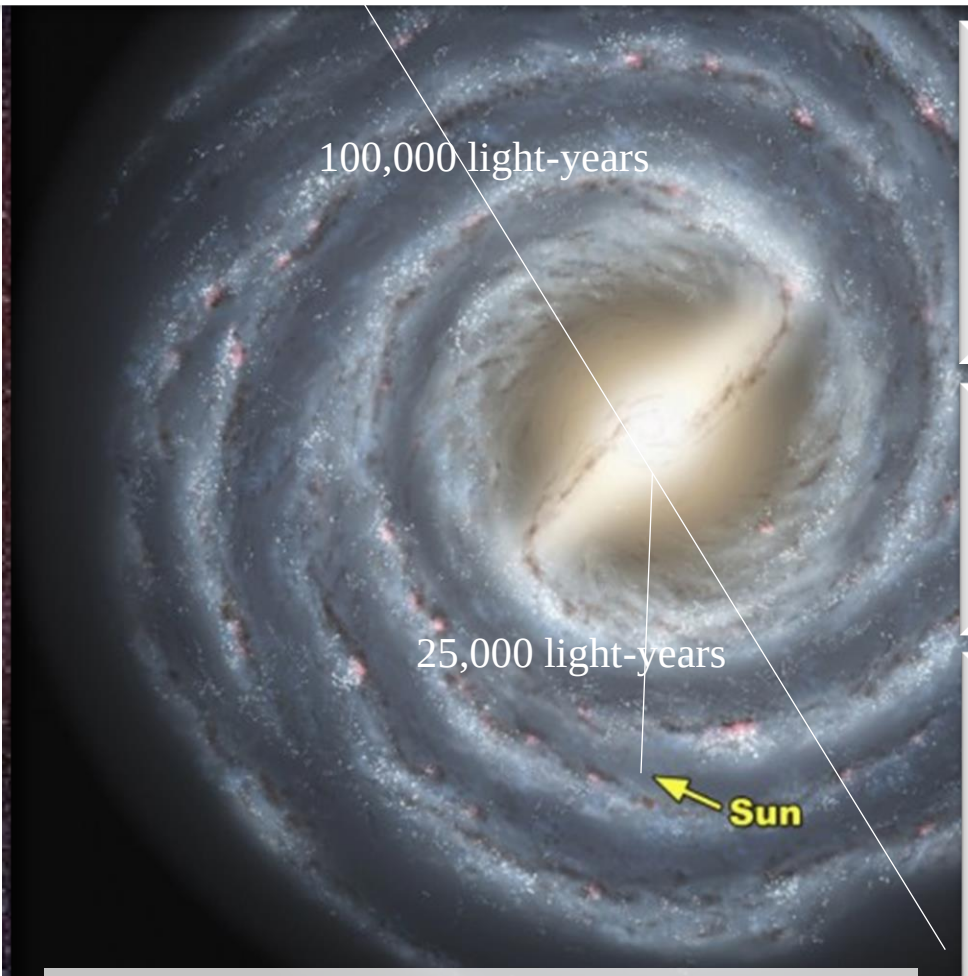
Timeline Models of the Universe (Preceden) 2/2

(Tyco Brahe's and Galileo's roles are added by Ören)

Copernicus 1473 - 1543	Proposes the **Heliocentric** model with measurements and proof to back himself up **but due to Church influence** Ptolemy's model continued to be used.
Tycho Brahe 1546 - 1601	His observations—the most accurate possible before the invention of the telescope—included a comprehensive study of the solar system (Britannica).
Johannes Kepler 1571 - 1630	(Based on the observations of Tycho Brahe) Kepler found that Planets rotate around the sun not in a circle but in an ellipsis. He also founded several laws to help back his claim
Galileo Galilei 1564 – 1642	"Galileo discovered many things: with the telescope that he made. … **He was sentenced by the Holy Office of the Inquisition for his defense of the Copernican views**. (Stanford Encyclopedia of Philosophy) ***(Data which is necessary in rational thinking was not sufficient under the circumstances!)***
Newton 1642 - 1727	By building upon ideas of Copernicus, Kepler and Galileo. Newton managed to describe why planets follow the path they go through the law of **universal gravitation**.

Models of the universe: 3. Contemporary view

The sun is about 25,000 light-years from the center of the galaxy, and the Milky Way is at least 100,000 light-years across.



"our solar system--Earth and all--whirls around the center of our galaxy at some 220 kilometers per second, or 490,000 miles per hour."
Scientific American

"It takes our Sun approximately 225 million years to make the trip around our Galaxy. This is sometimes called our 'galactic year'".
Astronomical Society of the Pacific

"The galaxies in our neighborhood are also rushing at a speed of nearly 1,000 kilometers per second towards a structure called the Great Attractor, a region of space roughly 150 million light-years ... away from us."
Scientific American

And the universe continues to expand.

2. Now a few words about the **richness** of the concept associated with **data**

- An English-Turkish dictionary of informatics of mostly contemporary concepts is being developed by the Turkish Informatics Society (TBD).
- Currently, the dictionary has about 11 000 terms.
- There are over 1000 terms which contain the term data.

In the following two slides, filtered from the above mentioned dictionary, the first and last 100 terms containing the term data are listed as **a testimony of the richness of the concept data**.

abstract data
abstract data type
accelerometer data
acceptable data
accepted data
accessible data
adaptation in data-centric control
adaptive data analysis
adaptive data analysis computation
adequate data
administrative data processing
advanced data guarding
all data
alphanumeric data
ambiguous data
analog data
analog data channel
analog input data
anomalous data
anonymized data
anonymous data
application performance data
applied data science
applied digital data system
arbitrary dataset
assessed data
assessment of real-system data
audit data
auditable data
authenticated data
authentication data
authoritative data
authoritative data source
auto data tips
automatic data processing
automatic data protection
available data
average data rate
behavior database
behavioral data
big and huge data
big data
big data analytics
big data analytics for social networks
big data application
big data application in IS (Information System)
big data application provider
big data architecture
big data center
big data ecosystem
big data engineering
big data ethics
big data for social networks
big data framework
big data framework provider
big data fusion
big data in medicine
big data model
big data paradigm
big data processing
big data scientist
big data security
big data service
big data startup
big data system
big data workflow
big data-oriented computing
big data-oriented content
binary data
biological database
biometric data
bivariate data
blockchain database
Boolean data
Boolean data model
bulk data transmission
business big data analytics
business data mining
business data processing
business transactions for large-scale data
calibrated data
calibration data
cellular data
cellular digital packet data
certification data
certified data
citizen data
citizen data processed by government agencies
citizen data processed by public-sector
cloud data portability
cloud datacenter
cloud service customer data
cloud service derived data
cloud service provider data
coarse data
cold data storage
commercial customer data
committed data rate
common database
complete data

secondary data

secure data transmission

security for big data

self-aware adaptation for analyzing big data

semantic data

semantic data model

semantic metadata

semantically augmented metadata

semantically rich metadata

semi-structured data

Senior Database Administrator

sense data

sensitive data

sensor data

sensor database

sensory data

sensory data conversion

shared data

shared secret data random variable

significant data

simulated data

simulated data acceptability

simulation data

simulation data management

simulation-based data mining

single instruction/multiple data

single program/multiple data

single sample data

smooth data

social data mining

software description database

source data

sparse data

spatial data modeling

specific data

static data

static database management system

stationary data

statistical data

statistical data compression

stolen data

stream data

streaming data

structured data

synchronous data

synchronous data link control

synthetic data

synthetic environment data

target data

targeted data

technical data

temporal database

terabits-per-second data link

terahertz data network

test data

testing data

testing data set

text data

theoretical data

therapeutic data

time-indexed data

time-management data

time-series data

trace data

traceability data

training data

training data-set

trust for big data

ubiquitous data management

unaggregated data

unambiguous data

unbiased data

uncertain data

unpredictable data

unpredicted data

unstructured data

updated data

useless data

User Data Protocol (UDP)

user datagram protocol

validation data

validation data requirements

verbal data

verbalized data

verification data

very large database

video database

virtual data room

virtual database

virtual database manager

virtual datacenter

virtual private database

virtualized datacenter

visualization of data

warehousing sensor data

warehousing stream data

Web and data mining

Web data management

Web of Data

Thank you
for your kind attention