HEALTH
UNIVERSITY OF UTAH

DEPARTMENT OF RADIOLOGY AND IMAGING SCIENCES

Informatics and Biomedical Data Science Training at the University of Utah

Incorporating Data Science Modules into Existing Informatics Courses

UCAIR

UTAH CENTER FOR ADVANCED IMAGING RESEARCH

INFORMATICS AND DATA SCIENCE

- Just like many other disciplines, what we now call “data science” seems to have always been a part of informatics
- Angst all around
  - E.g. “50 Years of Data Science”
- Shift of emphasis? Changed opportunities?
  - Knowledge engineering ⇨ Discovery from Data

OUR APPROACH AT THE UNIVERSITY OF UTAH

- **Aim 1:** Enhance and Enrich Faculty Development through formal and informal training on data science techniques as well as through pedagogical coaching.
- **Aim 2:** Create Case Study Data Science Modules for use in our courses that apply hands-on data science activities to case studies using real-world data sets.
  - Develop Case Studies models using real-world data sets.
  - Adapt Case Studies to targeted DBMI classes

5^2 MODEL OF MODULE DEVELOPMENT

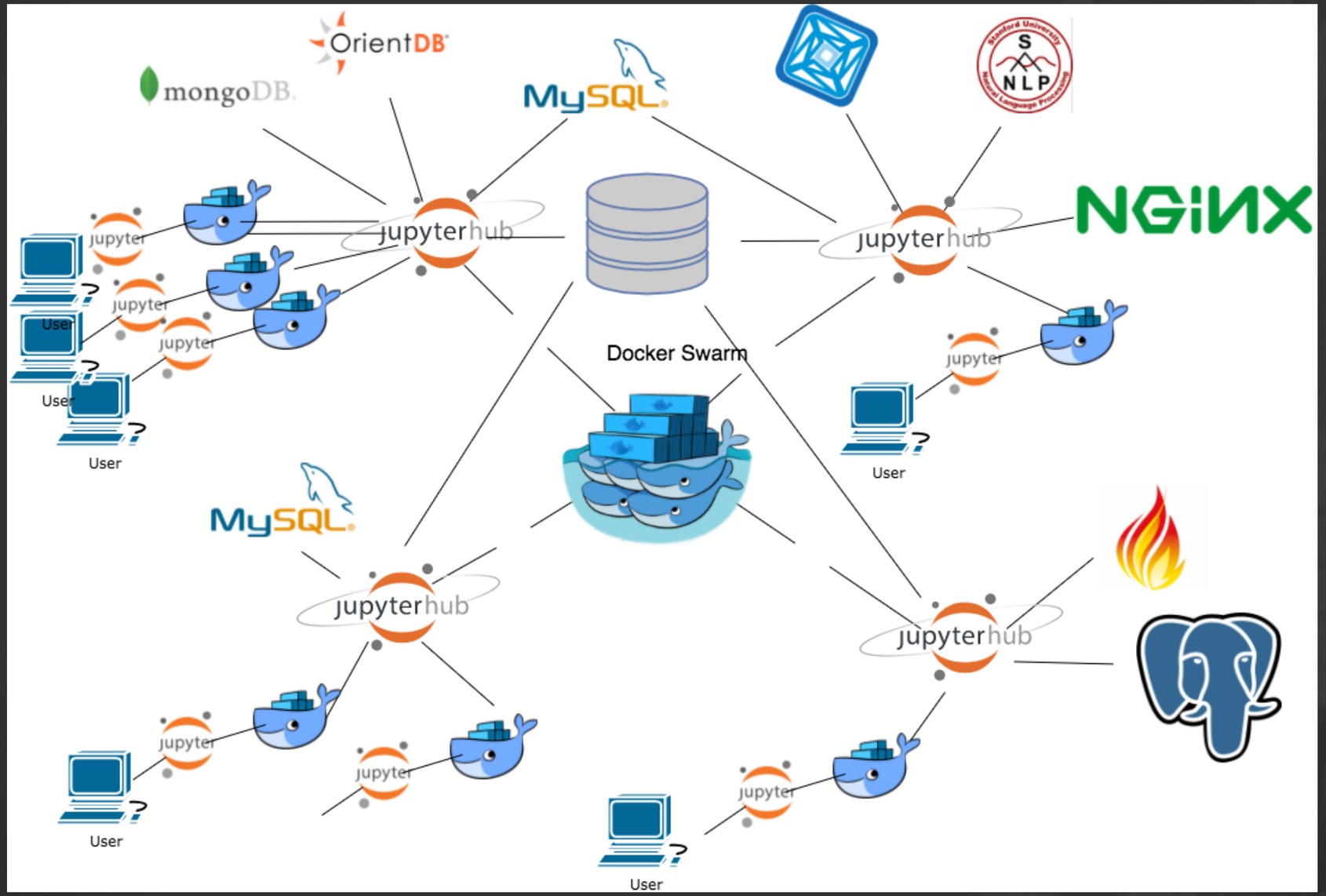
- Clinical context--a description of the case study and its context
- Resources--tools, papers, websites, news stories relevant to the case study
- Pedagogical materials--slides, videos, and demos to teach knowledge related to the case study
- Exercises--guided exercises for students to learn about and apply data science techniques
- Reflection--an assignment for reflecting on the results of the case study

- Domain Knowledge
- Computation
  - Version control; data access, wrangling, transformation, etc
- Visualization
  - Scripting, interactive visual analytics
- Analytics
- Standards

DESIGN DECISIONS

- Python (some R, JavaScript)
- Git
- Jupyter notebooks
- Cloud Computing
  - Centralized resources/minimize concerns with student computers
  - Facilitate remote learning

INFRASTRUCTURE



"ONION MODEL"

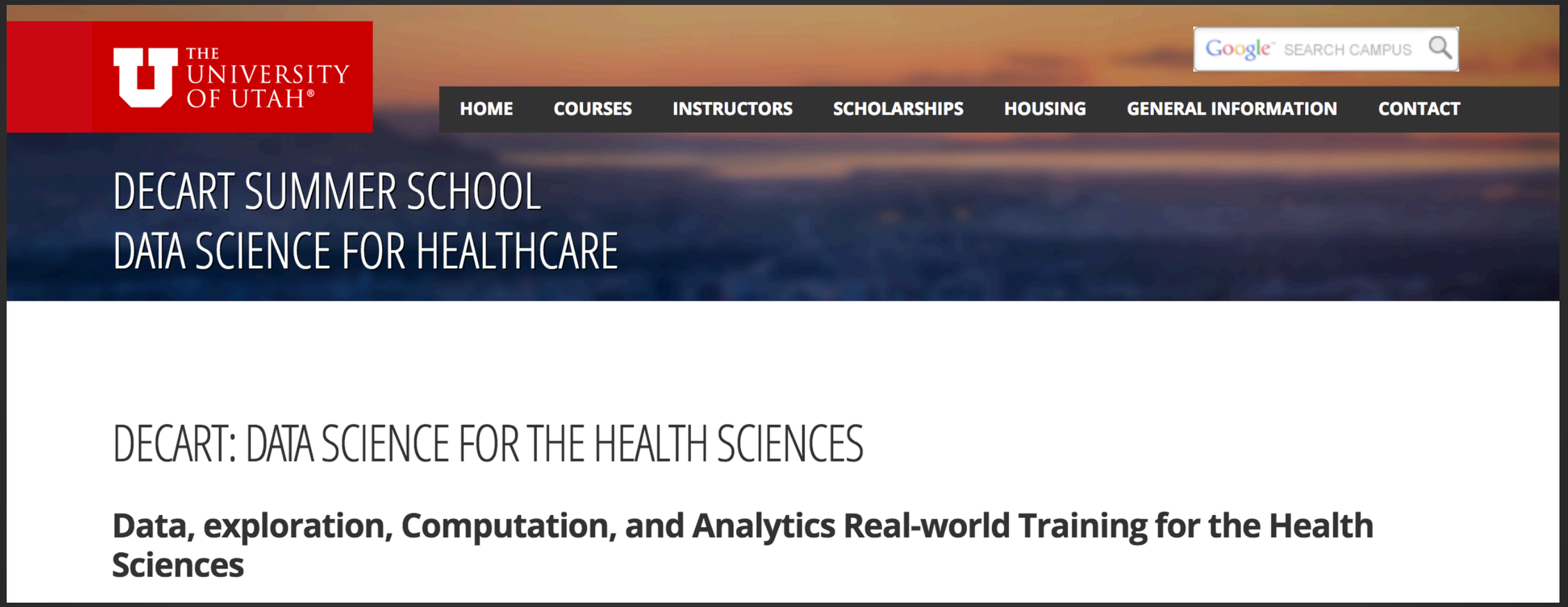
- Each Module Facilitates Different Levels of Exploration
  - Use widgets to explore data
  - Guided Scripting
  - Suggested explorations

BIOINFORMATICS EXAMPLE

- Galaxy Workflow
- Jupyter Notebooks within Galaxy
- Command line implementation

EXAMPLE MODULES (WORKS IN PROGRESS)

- NLP (MIMIC)
- ECG (Physionet)
- Flu Transmission (Public Utah Data)


THE UNIVERSITY OF UTAH®
Google SEARCH CAMPUS
HOME
COURSES
INSTRUCTORS
SCHOLARSHIPS
HOUSING
GENERAL INFORMATION
CONTACT
DECART SUMMER SCHOOL
DATA SCIENCE FOR HEALTHCARE
DECART: DATA SCIENCE FOR THE HEALTH SCIENCES
Data, exploration, Computation, and Analytics Real-world Training for the Health Sciences