# CyVerse Discovery Environment

## Web-based bioinformatics and data

# Download Slides and Follow Along

mcbios.readthedocs.org

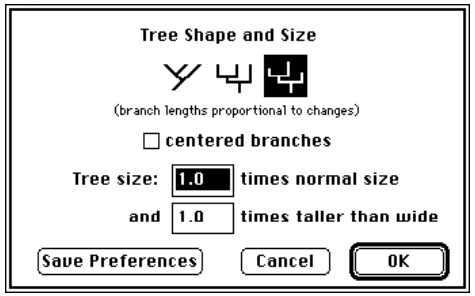
# Welcome to the Discovery Environment

A Simple Interface to Hundreds of Bioinformatics Apps, Powerful Computing, and Data

# Discovery Environment Overview

## A bench-biologist's view on the evolution of computing

- **It can be difficult to keep up!**
- **Investing in newer 'better' tools and resources is expensive.**



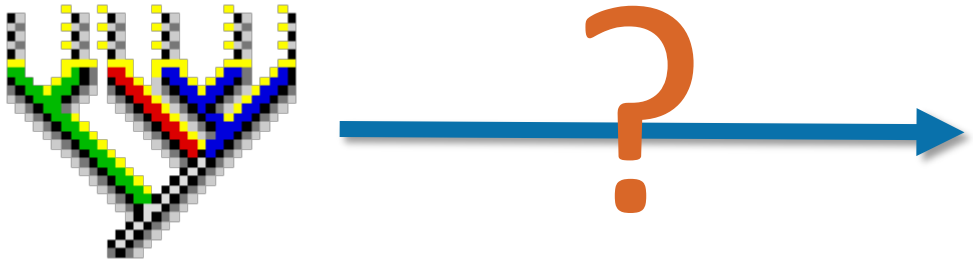
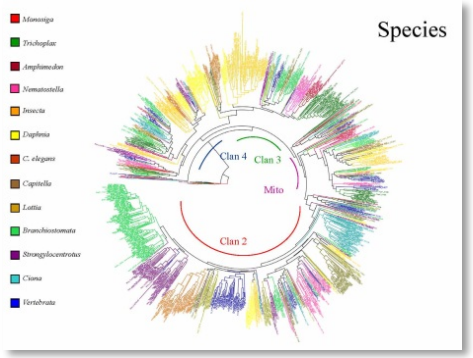
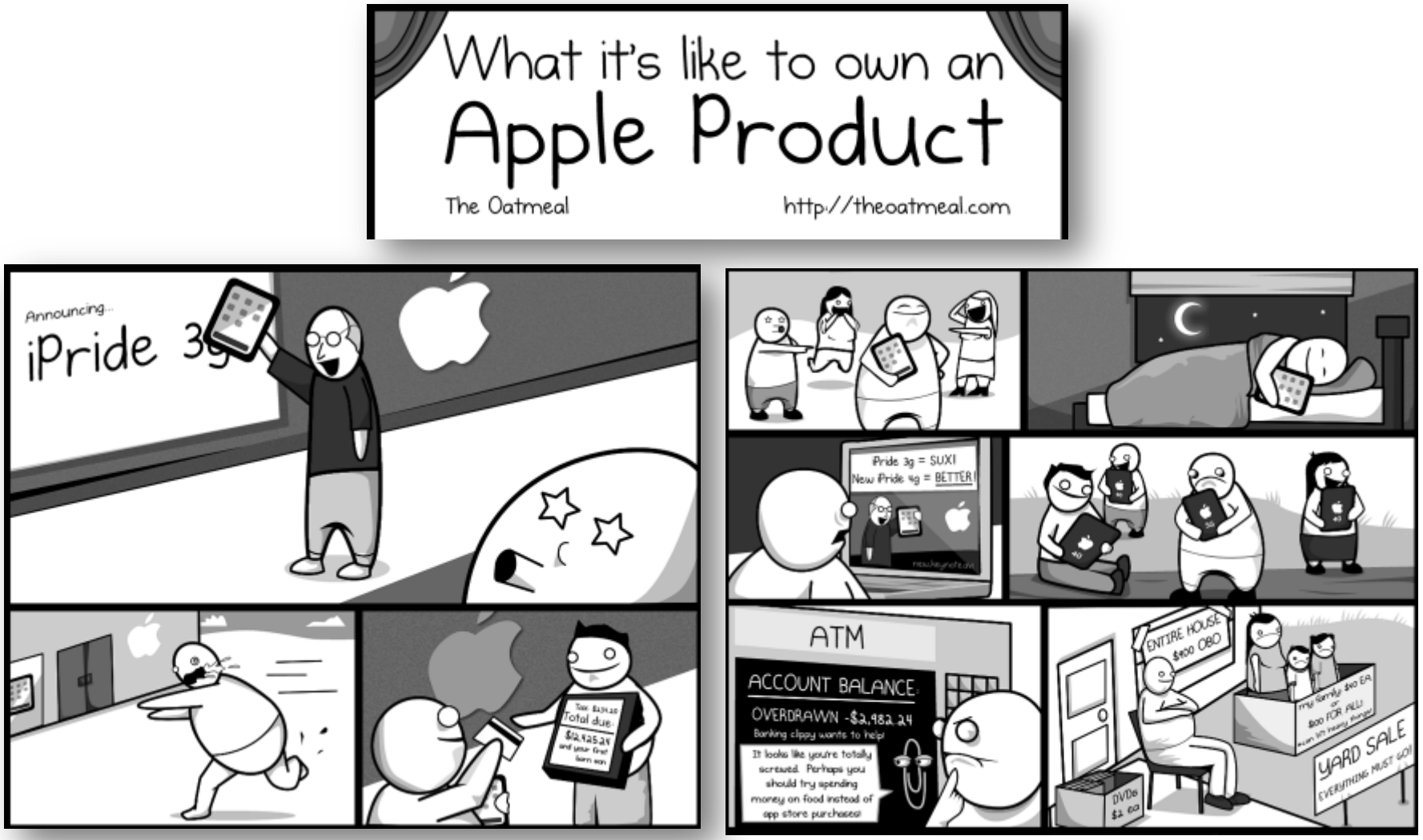



Image From: http://www.wired.com/wired/archive/17.01/ff_mac_viewer.html



# Discovery Environment Overview

## The costs of keeping up with technology

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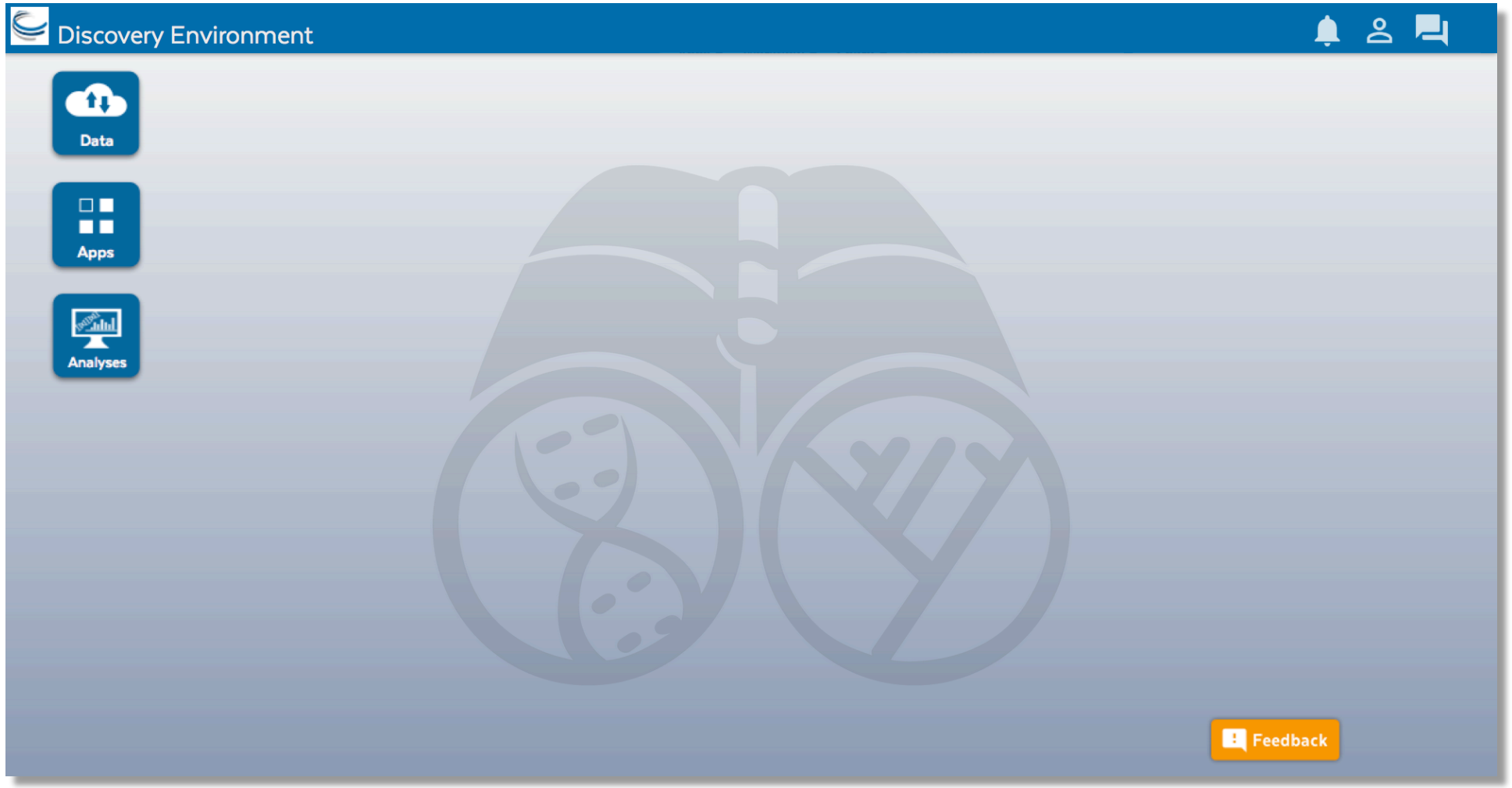
# Discovery Environment Overview

## Access your computational science through a single portal



# Discovery Environment Overview

## Benefits

### Get Science Done

- Use hundreds of bioinformatics Apps without the command line
- Add your own applications – an extensible, scalable platform

### Reproducibility

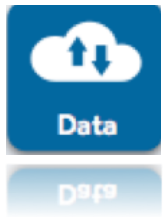
- Create and publish Apps and workflows so anyone can use them
- Analysis history and provenance – "avoid forensic bioinformatics"

### Productivity

- High-performance computing – not dependent on your hardware
- Manage a secure data repository and share data easily

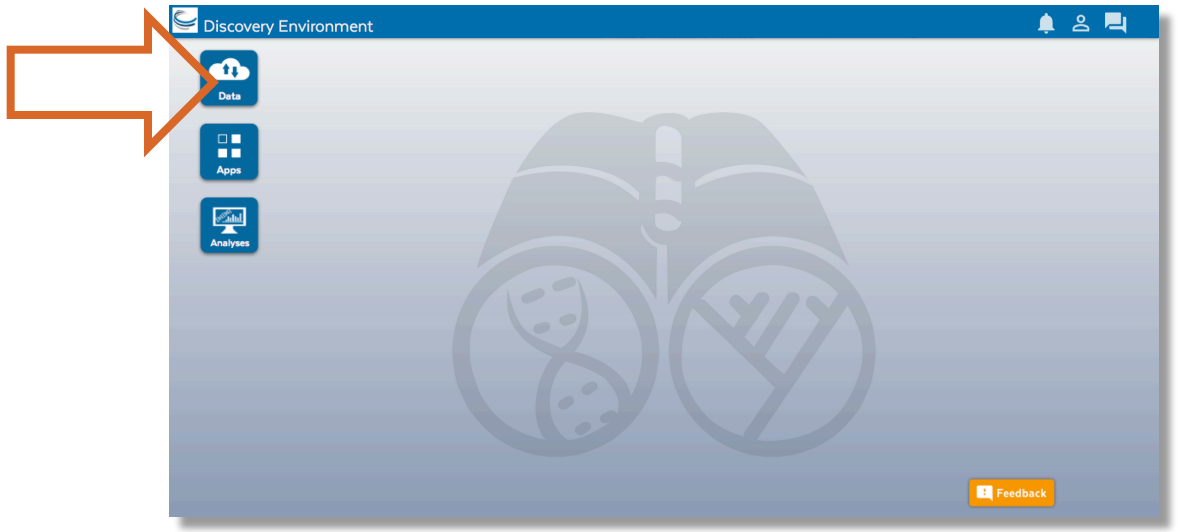
# Discovery Environment Overview

## Manage data




## Data

- Upload / Download files and folders
- Share files via URL (Public Links)
- Share files/folders with other users

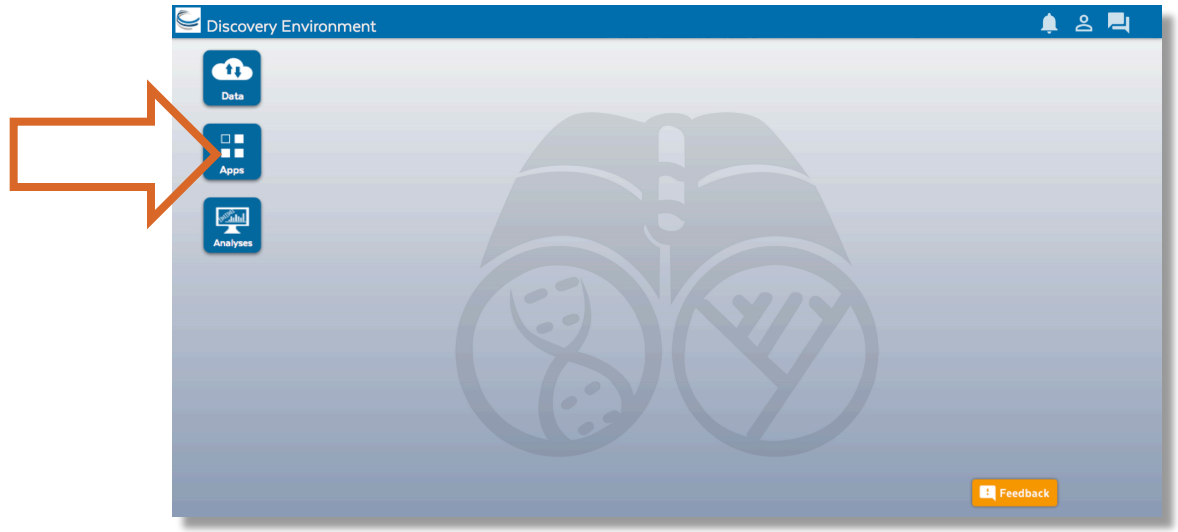


# Discovery Environment Overview

## Analyze data and customize Applications

### Apps

- Run hundreds of bioinformatics Apps
- Build automated workflows
- Modify Apps or integrate new ones

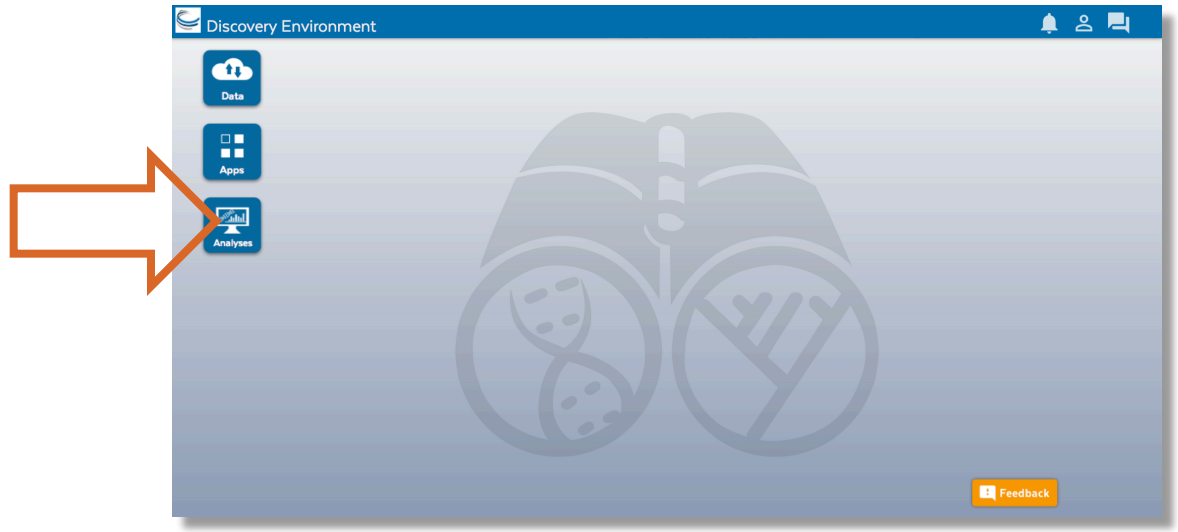


# Discovery Environment Overview

View history, find results, reproduce analyses, optimize parameters

## Analyses

- Monitor job status and find results
- Cancel jobs or re-launch jobs
- Detailed job history



# Discovery Environment Overview

## Hands-on demo: Create a multiple alignment

**By the end of this demo you should be able to:**

- Navigate the components of the DE
- Access and manipulate data (upload, download, move, etc.)
- Run an analysis
- Track your analysis and see your results

# Discovery Environment Overview

## Hands-on demo: Create a multiple alignment

1. Find a file in the Community Data folder

2. Download a small file of unaligned DNA sequences

3. Upload a small file

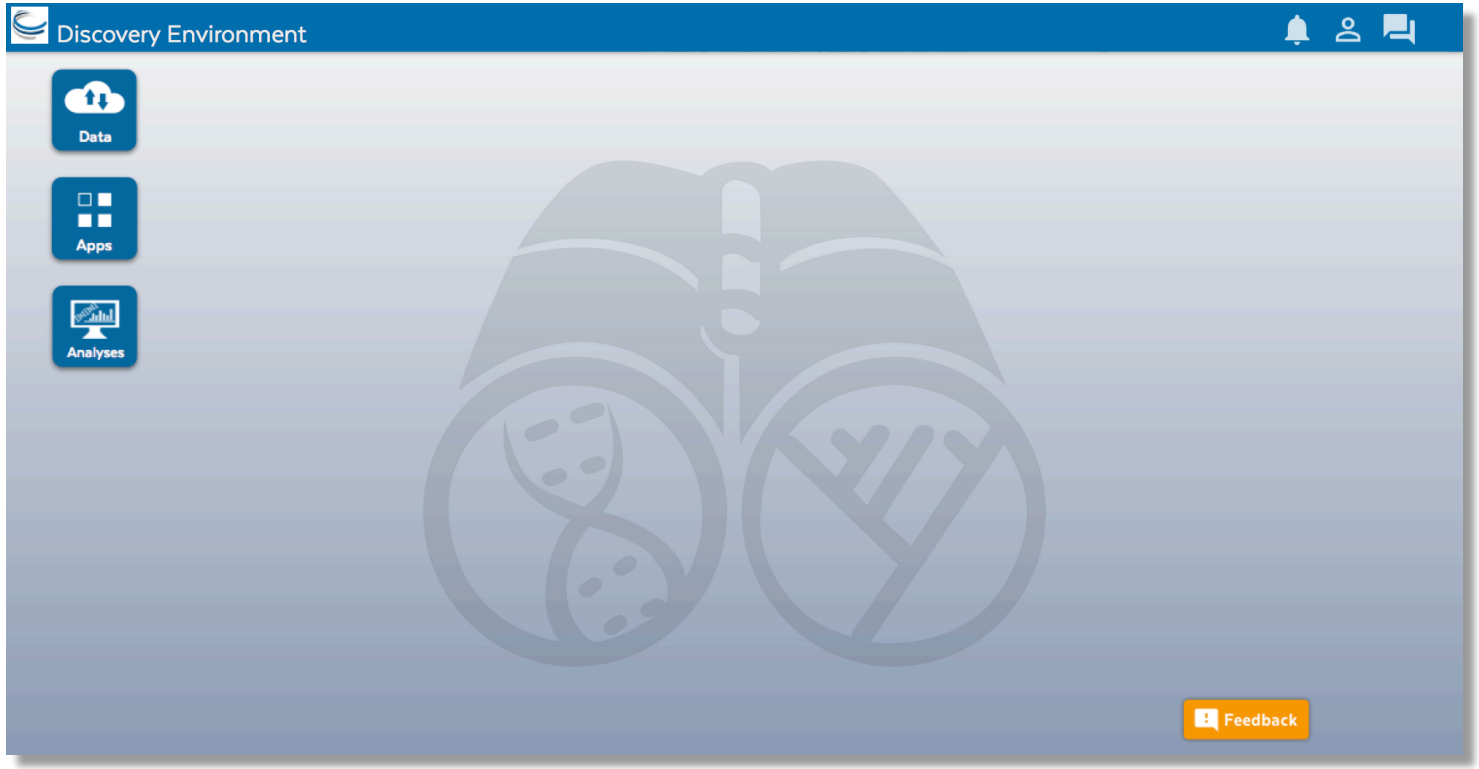
4. Use the MUSCLE App to align the sequences

5. Monitor the job status and export its parameters

6. View results

# Discovery Environment Overview

## Built for bioinformatics best practices: data stewardship, reproducibility, reliability

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William Stafford Noble

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The Importance of Reproducible Research in High-Throughput Biology: Case Studies in Forensic Bioinformatics

author: Keith A. Baggerly, Graduate School of Biomedical Sciences, University of Texas Health Science Center at Houston
published: Oct. 11, 2010, recorded: September 2010, views: 5487

Tan *et al. BMC Genomics* 2010, **11**(Suppl 4):S27
http://www.biomedcentral.com/1471-2164/11/S4/S27

BMC Genomics

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# Discovery Environment Overview

## User perspectives and possible applications

### Bench Scientist

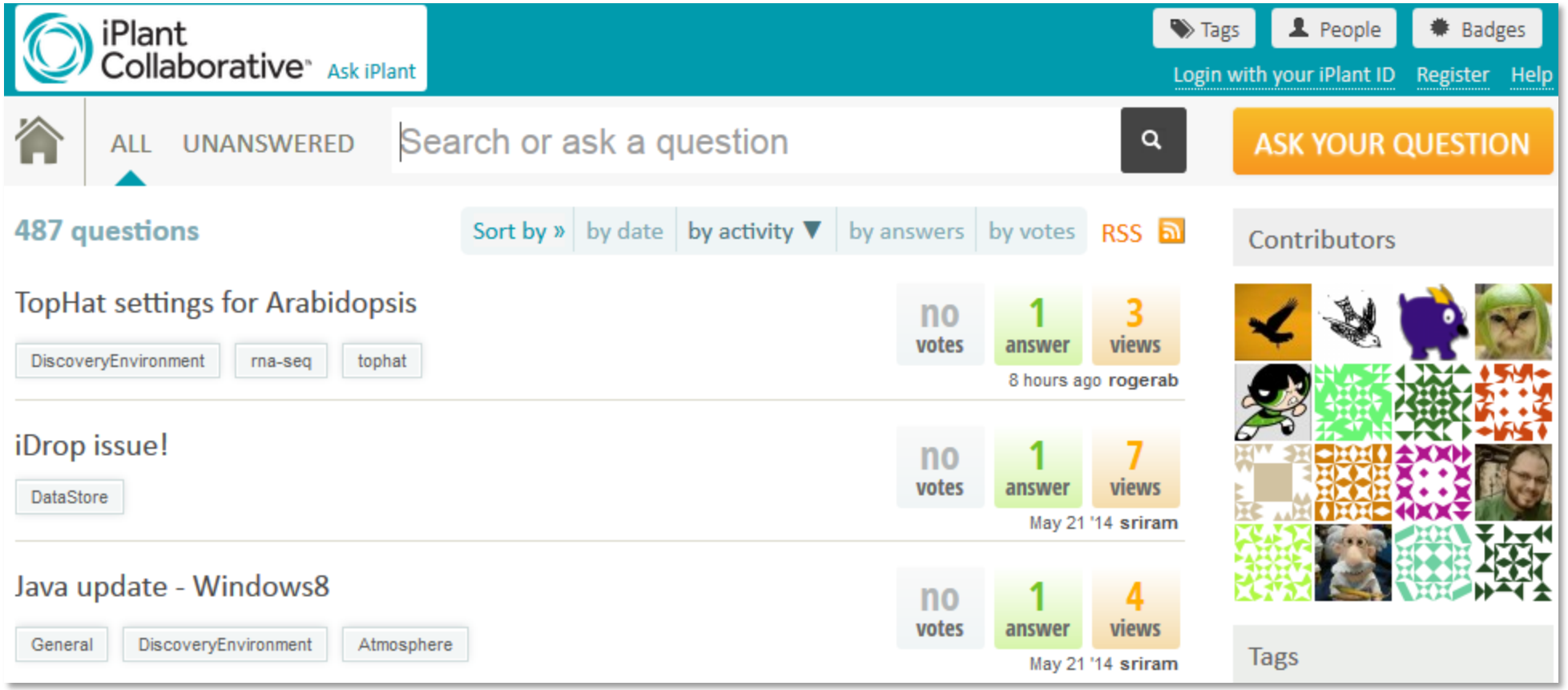
- Does most of his data uploads/downloads/sharing here
- He pushes results from his lab's workflow into a common folder

### Bioinformatician

- Installed an HPC application here so that anyone can use it
- Creates custom applications with default parameters exposed

### Core Facilities

- Developed a workflow to QC and Filter reads for his users
- Teaches about genome assembly with examples in the DE

Images from personas based on: Bioinformatics Curriculum Guidelines: Toward a Definition of Core Competencies
PLOS Biology DOI: 10.1371/journal.pcbi.1003496

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