CyVerse DNA Subway

Classroom-friendly Bioinformatics

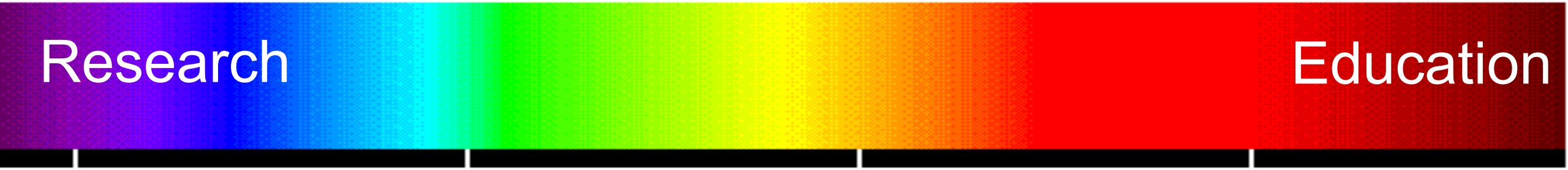
THE UNIVERSITY OF ARIZONA

TACC
TEXAS ADVANCED COMPUTING CENTER

CSH Cold Spring Harbor Laboratory

UNCW

Challenge – bringing students into the fold

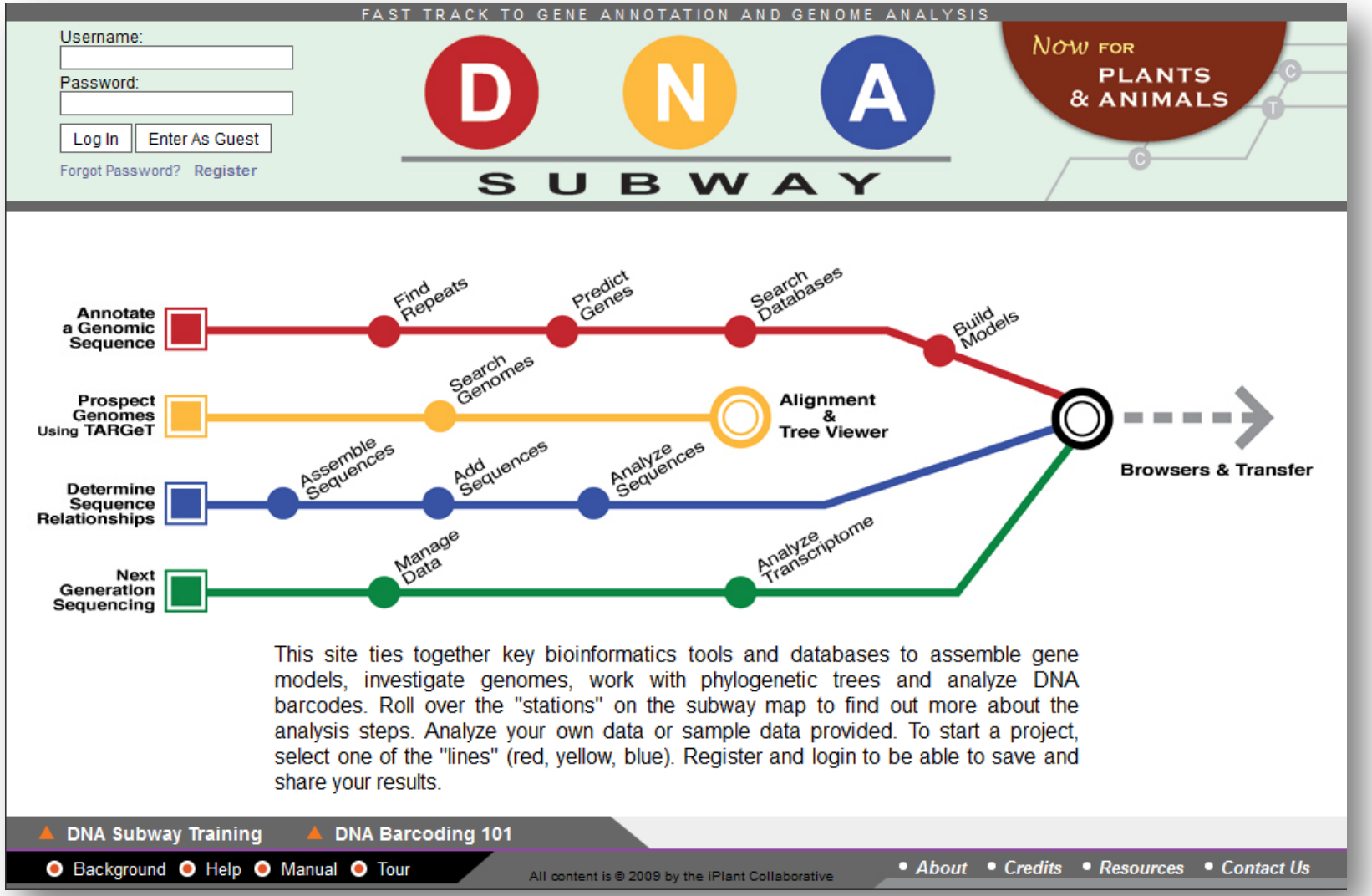


Students can work with the same data at the same time and with the same tools as research scientists.

Can you navigate the tools?

What are your challenges in teaching bioinformatics in the classroom?

Take the Subway



DNA Subway

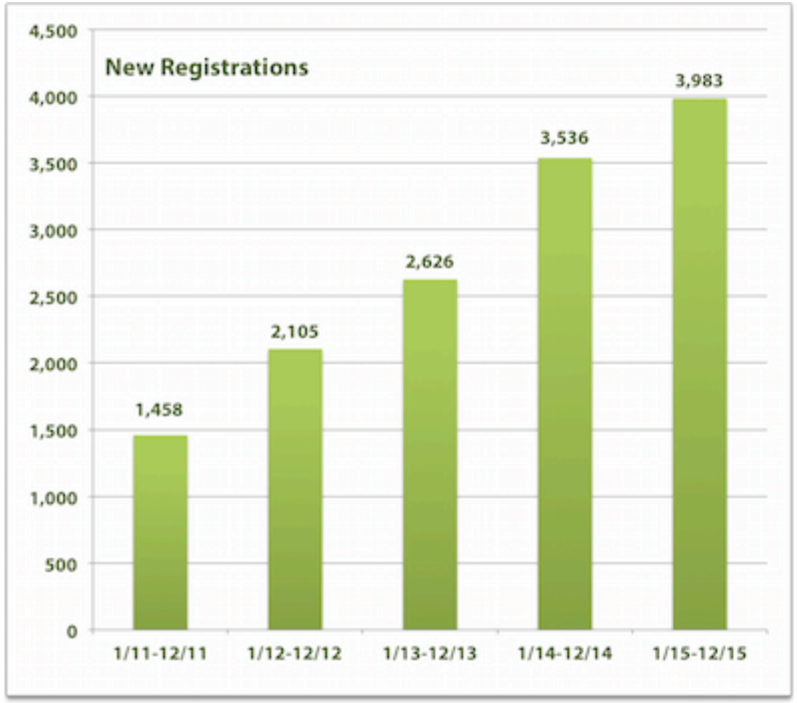
Classroom friendly bioinformatics

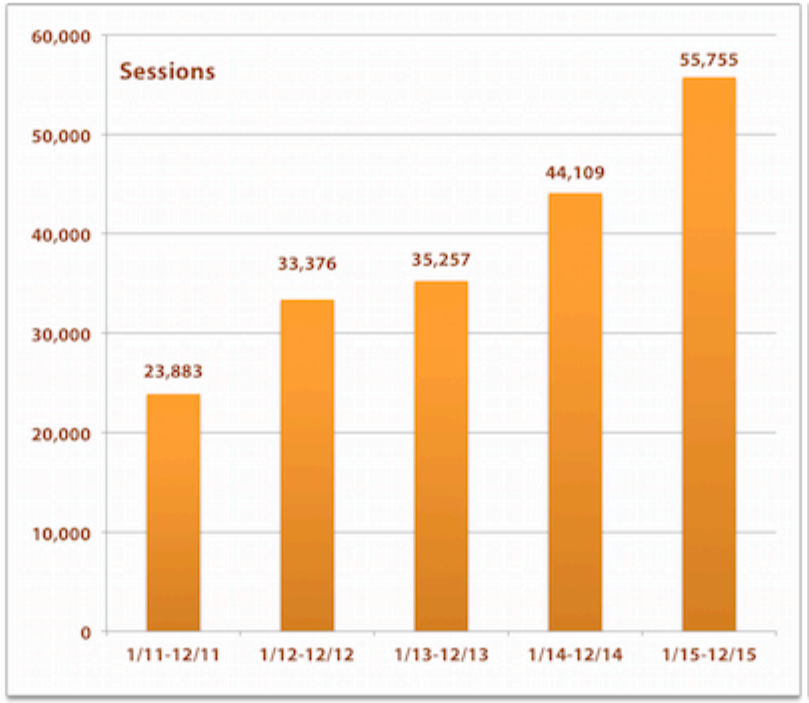
Faculty identified guiding requirements that shaped the development of CyVerse educational platforms:

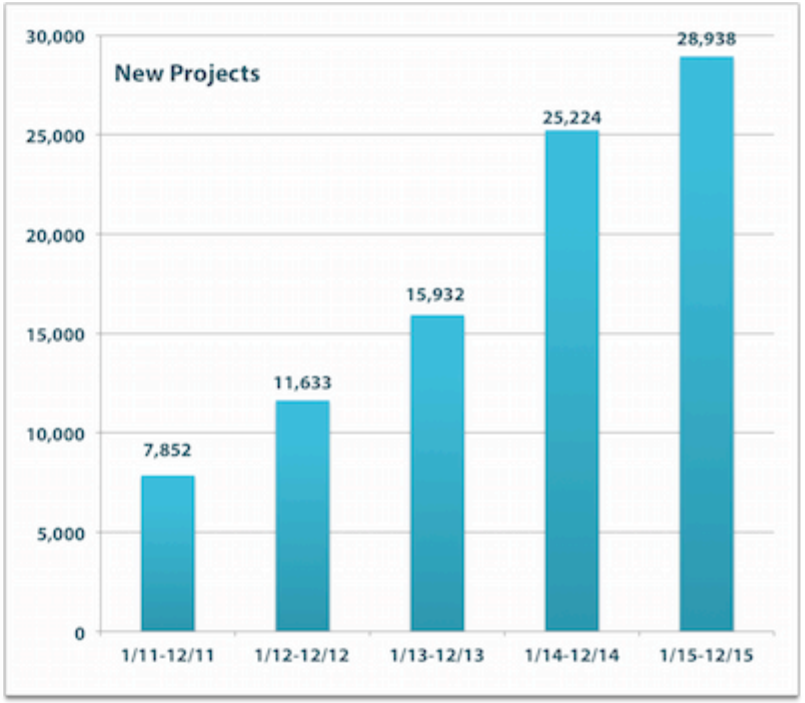
- *Mix lecture and lab* – have a wet bench "hook"
- *Student-scientist partnerships* – someone has to care about the data
- *Co-investigation* – projects should potentially lead to publications
- *Scale* – platforms should support projects multiple classrooms can join.

DNA Subway

Classroom friendly bioinformatics







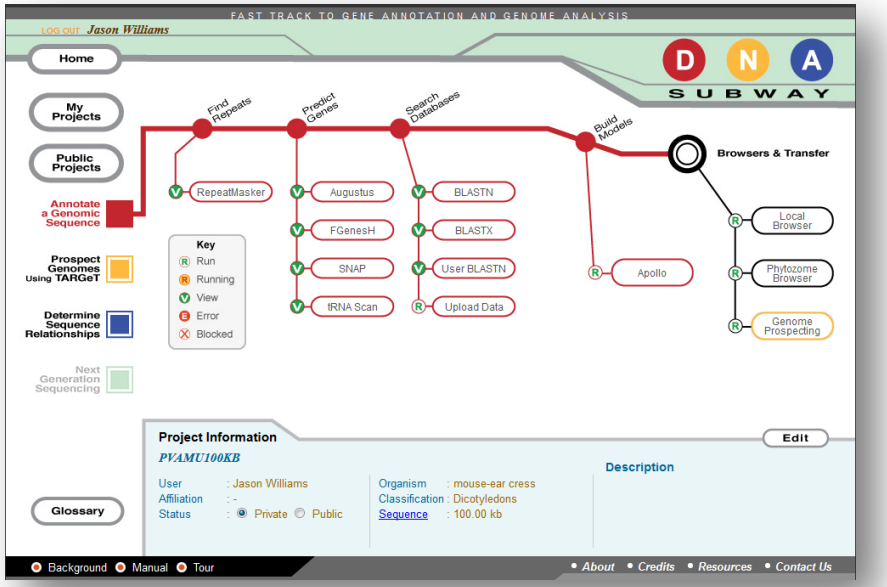
More than 13,000 users

More than 28,000 student projects in 2015

DNA Subway

Red Line: Genome annotation

Red Line

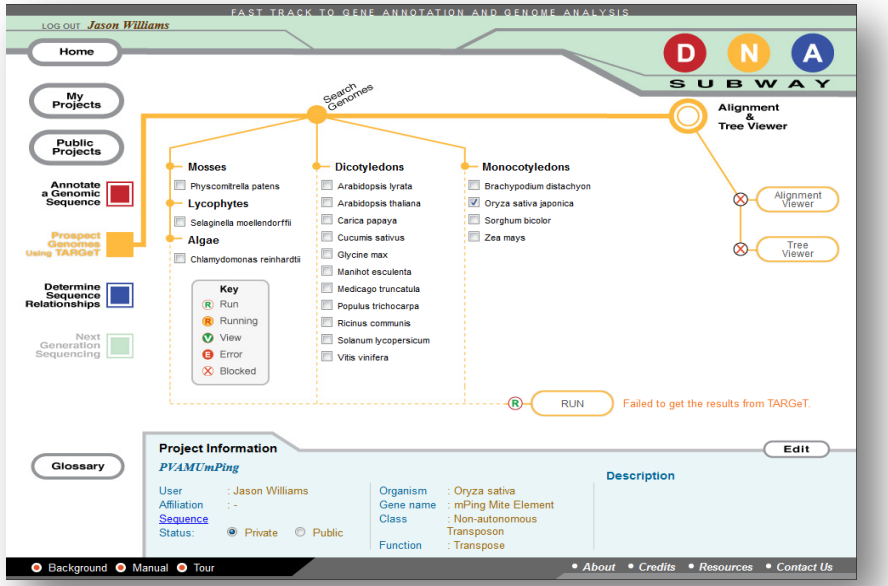


- Analyze up to 150 KB of DNA sequence
- De novo gene prediction
- Construct evidence-based gene models
- Visualize genome sequence in browser

DNA Subway

Yellow Line: Genome prospecting

Yellow Line

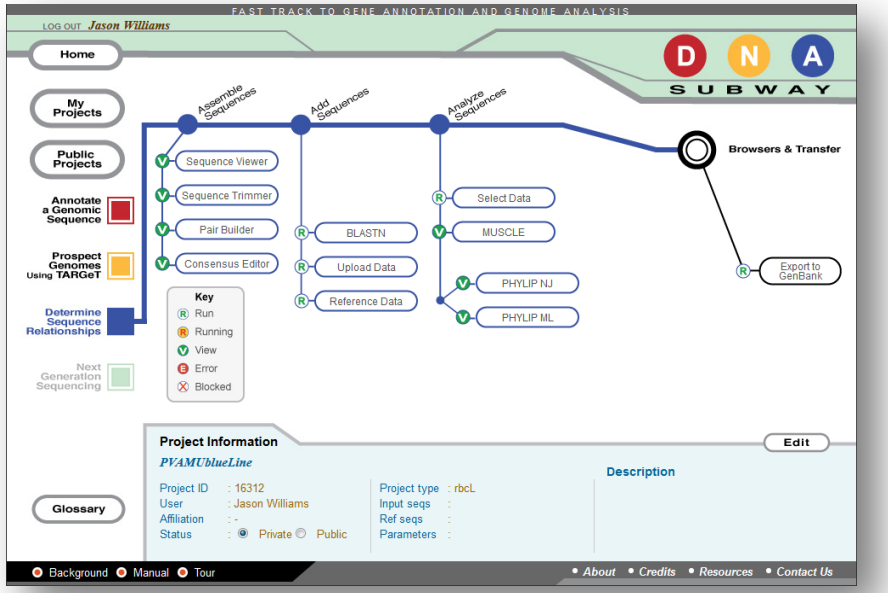


- Analyze DNA or protein sequence
- Search plant genomes using TARGeT
- Explore gene duplications, transposons, and non-coding sequences not detectable in conventional BLAST searches

DNA Subway

Blue Line: DNA barcoding, and phylogenetics

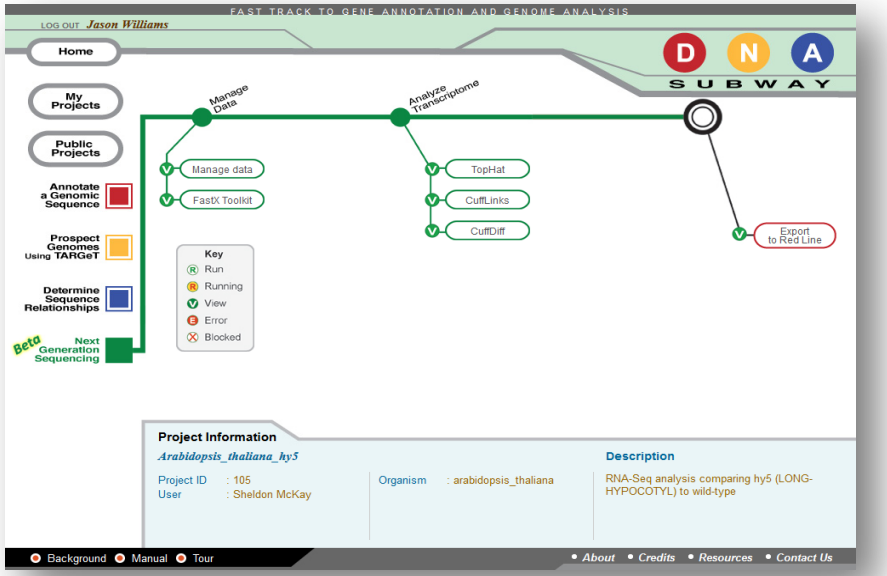
Blue Line



- Analyze DNA or protein sequence
- Search plant genomes using TARGeT
- Explore gene duplications, transposons, and non-coding sequences not detectable in conventional BLAST searches

DNA Subway

Green Line: Transcriptome analysis



Green Line

- Examine RNA-Seq data for differential expression
- Use High-performance computing to analyze complete datasets
- Generate lists of genes and fold-changes; add results to Red Line projects

CYVERSE

Transforming Science Through Data-driven Discovery

CyVerse Executive Team

THE UNIVERSITY OF ARIZONA®

Parker Antin
Nirav Merchant
Eric Lyons

TACC
TEXAS ADVANCED COMPUTING CENTER

Matt Vaughn

CSH Cold Spring Harbor Laboratory

Doreen Ware
Dave Micklos

NSF CyVerse is supported by the National Science Foundation under Grant No. DBI-0735191 and DBI-1265383.