Introduction to Bioinformatics course: IBT_2017

Staff Training
Day 1 Part 3
Why IBT?
Why IBT?

The Need
Basic Bioinformatics training for Molecular Biologists

‘need for basic bioinformatics training for individuals entering the discipline, or for those who need a basic foundational understanding of bioinformatics before moving on to more complex areas’ – H3ABioNet Education & Training Working Group
Leon (bioinformatics user)

Leon is on his second postdoctoral fellowship, working on quorum sensing in bacteria. “I’m using a combination of transcriptomics, proteomics and metabolomics to understand these pathogenic changes better” he explains. “I end up with big spreadsheets of protein or gene IDs and I’m trying to piece together which signaling pathways are involved in flipping to the pathogenic state”. He has been on an introductory Unix course but is much more comfortable with GUIs than with the command line. “I just have a visual brain”, he says.
Bioinformatics User

- Typical activities
  - Obtaining ethical approval: 30%
  - Prepping samples: 20%
  - QA and data analysis: 15%
  - Interpretation of results: 5%

- Distribution of time between bench-work and computational work
  - 40% bench-work
  - 60% computational work

- Preference for using GUI vs command line
  - GUI: 90%
  - Command line: 10%
Bioinformatics User

Bioinformatics Curriculum Guidelines: Toward a Definition of Core Competencies

Lonnie Welch¹, Fran Lewitter², Russell Schwartz³, Cath Brooksbank⁴, Predrag Radivojac⁵, Bruno Gaeta⁶, Maria Victoria Schneider⁷

http://journals.plos.org/ploscompbiol/article?id=10.1371/journal.pcbi.1003496

Drivers
- Understanding what makes a usually harmless bacterium pathogenic in the lungs of people with cystic fibrosis

Goals
- QA of -omics data
- Statistical analysis of data
- Data integration and pathway analysis

Pain points
- Lack of access to departmental compute farm
- Sporadic to non-existent access to bioinformatics support
Skills-based curriculum

• **Learning Objective:** knowledge learned without implementation (content covered in the lecture component of contact sessions)

  vs.

• **Learning outcome:** measurable - skills gained (covered in the practical assignment component of contact sessions)

• Important for participants to be able to go out and perform the analyses on their own after the course
- -> **web based applications**
Modules and primary trainers

• **Resources and databases** (16 hrs)
  - Shaun Aron, University of the Witwatersrand, South Africa
  - Nicola Mulder, University of Cape Town, South Africa

• **Linux** (12 hrs)
  - Amel Ghouila, Institute Pasteur de Tunis, Tunisia
  - Jean-Baka Domelevo Entfellner, University of the Western Cape, South Africa

• **Molecular evolution and Phylogenetics** (16 hrs)

• **Sequence alignment theory & applications** (12 hrs)
  - Jonathan Kayondo, Uganda Virus Research Institute, Uganda
  - Sonal Henson, International Centre of Insection Physiology and Ecology, Kenya

• **Multiple sequence alignment** (8 hrs)
  - Ahmed Mansour Alzohairy, Zagazig University, Egypt

• **Genomics** (16 hrs)
  - Colleen Saunders, University of the Western Cape, South Africa
  - Fatma Guerfali, Institute Pasteur de Tunis, Tunisia

Introduction to Bioinformatics online course: IBT
Staff Training | Kim Gurwitz
# Challenges

## Challenges in Africa

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<th>Lack of access to local Bioinformatics expertise</th>
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<tr>
<td>Lack of access to Bioinformatics training</td>
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<td>Internet access instability</td>
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## Action Plan

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<th>Distance learning</th>
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<td>Virtual classroom</td>
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<td>Online discussion forums</td>
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For more information on course logistics, watch video labeled: Day 1 Part 4