Using games for research-based learning

Jérôme Waldispühl
McGill University
Montreal, Canada
How much time are we spending playing video games?

3,000,000,000 hours / week
1,700,000 one year full-time jobs
“I’m not wasting time, Ma, I’m helping science”
(mcgill news, 2011)
Game-with-a-purpose in Biology
- Phylo DNA alignments (2010)
- Ribo RNA alignments (2015)
- Open-Phylo (2013)
- Phylo-EDU (2014)
Visualizing & Manipulating Sequence alignments

http://www.codoncode.com/aligner/
Phylo DNA Puzzles

Turn the multiple sequence alignment problem into a casual tile-matching game.
The 3 Pillars of Phylo

**Why?** Fundamental problem in molecular biology.

**What?** Well-defined problem proven difficult for computers.

**How?** Casual tile-matching game that maximizes accessibility.

http://thegoddamn90s.com
Whole-genome multiple alignment calculated with computers

Database of interesting puzzles

Extract dubious alignment region

Reinsertion into original alignment + Evaluation

Video game:
- Computers
- Tablets

http://phylo.cs.mcgill.ca
http://ribo.cs.mcgill.ca
Open-Phylo: Give Science Back to the People

Submit problems

Solve problems

http://www.scicinemuseum.org.uk/

Kiko Villasenor for http://east.pax.com

* From Biomed central blog
Open-Phylo Interface

Geneticist can login, upload alignments and manage puzzles.
Phylo for teachers

Welcome jerome (logout)

You administrate the following exam. Your users will need your event ID to register at http://phylo.cs.mcgill.ca/teaching/student/. If needed, you can update the specifications of your exam. Please, do not forget to delete it once completed.

<table>
<thead>
<tr>
<th>Event ID</th>
<th>CRI+workshop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam Period</td>
<td>2014-03-23</td>
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**Instructions**

This is a simple demo for the CRI workshop. Play any game as you wish to participate!

**Email**

jerome.waldispuhl@mcgill.ca

[Update] [Delete]

Performance and statistics of your users can be downloaded in a CSV data file.

**User Report**

basic

[Download Report]

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Phylo-EDU: Protocol

• Instructor registers a class and obtain an event ID
• Instructor provide instructions and timeframe
• Instructor passes ID to participants
• Participants use the ID to register
• Participants play
• Instructor monitor the group using an dedicated interface
3D Genome Browser

http://3dgb.cs.mcgill.ca
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Contact: Jérôme Waldispühl
jeromew@cs.mcgill.ca