Network for Integrating Bioinformatics into Life Science Education

NIBLSE Leadership Team

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niblse.org
Network for Integrating Bioinformatics into Life Science Education

Rationale

Bioinformatics is increasingly central to the life sciences and hence should be integrated into undergraduate life science education.

Established NIBLSE in 2014 with NSF RCN Incubator grant
Overall Objectives

1. Establish network to integrate bioinformatics into undergraduate life sciences education
2. Develop set of core bioinformatics competencies for UG life science students
3. Organize & vet curricular materials and professional development resources
4. Identify assessment tools aligned with the core competencies
State of the Network

• Current membership: 140+ members
• NSF RCN-UBE grant (2015-2020)
• Networking venues:
  – Website on the QUBES platform: https://niblse.org
  – National conferences (Next: October 2019)
  – Working committees (RRC, AVC, etc.)
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NIBLSE Core Competencies

• Rationale: Provide a framework for integrating bioinformatics into life science education
• Goal: Generate an evidence-based set of core bioinformatics competencies
• Methodology:
  – >1200 survey responses
  – Solicited syllabi
  – Expert feedback
NIBLSE Core Competencies*

1. Explain the **role of computation and data mining** in addressing hypothesis-driven and hypothesis-generating questions within the life sciences

2. Summarize **key computational concepts**, such as algorithms and relational databases, and their applications in the life sciences

3. Apply **statistical concepts** used in bioinformatics

4. Use **bioinformatics tools** to examine complex biological problems in evolution, information flow, and other important areas of biology

5. **Find, retrieve, and organize** various types of biological data

6. Explore and/or **model biological interactions**, networks and data integration using bioinformatics

7. Use **command-line bioinformatics tools** and write simple computer scripts

8. Describe and manage **biological data types, structure, and reproducibility**

9. Interpret the **ethical, legal, medical, and social implications** of biological data

*Sayres et al., 2018 PLoS One [https://doi.org/10.1371/journal/pone.0196878](https://doi.org/10.1371/journal/pone.0196878)
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NIBLSE Learning Resource Collection

Objective

Simplify access to learning resources for integrating bioinformatics into the life sciences

Mediated by the Resource Review Committee
# NIBLSE Learning Resource Collection

- Hosted by QUBES
- Currently 30+ vetted resources

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Assessment Tools

Objective
Identify assessments that align with the core competencies
Mediated by the Assessment Validation Committee

New objective
Develop assessments that align with the core competencies
Assessment Tools

• Developing assessment instruments normed and linked to the Core Competencies
• Preparing tip sheet for assessment in emerging interdisciplinary disciplines
Next Steps for NIBLSE

• Provide faculty training opportunities
  – Faculty Mentoring Network (QUBES)

Bring Bioinformatics to Your Biology Classroom

Overview

Using bioinformatics strategies to solve biology problems in introductory courses
Next Steps for NIBLSE

• Provide faculty training opportunities
  – Faculty Mentoring Network (QUBES)
• Better understand barriers to integration
Barriers to Integration

95% of survey respondents agreed that bioinformatics should be integrated into the life science curriculum, but only 36% reported achieving integration.
Barriers to Integration

• Original survey included several open-ended questions about barriers to integration
  – “In your opinion, what do you think are the most important challenges currently facing those educating undergraduate life scientists in bioinformatics?”
Barriers to Integration*

* Williams et al. bioRxiv (http://dx.doi.org/10.1101/204420)
Opportunities with NIBLSE

See niblse.org to learn more

• Become a member
• Explore & comment on collection resources
• Contribute materials to the collection
• Help to improve a resource (Incubator)
• Join a future Faculty Mentoring Network
• Attend October 2019 Conference
Special Thanks

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