Some applications of evolutionary biology

- Fighting antibiotic and pesticide resistance
- Controlling emerging diseases
- Using evolutionary strategies to design better drugs and vaccines
- Informing health care through a better understanding of human origins
- Improving quality and productivity for agriculture
- Helping to conserve biodiversity
- Predicting the effects of environmental change

Our mission

- To address grand challenge questions in evolutionary biology
- We do this by
  - Identifying areas ripe for conceptual synthesis
  - Supporting scholars pursuing synthetic research
  - Catalyzing collaborations among disciplines and institutions
  - Allowing the wealth of existing data and analytic tools to be fully utilized
NESCent activities

- Science and Synthesis
  - Host resident scholars
  - Host working groups and conferences
- Education and Outreach
  - Promote K-college evolution education
  - Disseminate the science from NESCent
- Informatics
  - Software development and promotion of interoperability
  - Provide training and support in evolutionary bioinformatics
  - Digital data sharing

Data sharing position paper

- Drafted by Michael Whitlock (editor, Am. Nat.)
- Proposes for journals to simultaneously require data sharing upon publication in a shared repository
- Current signatories
  - American Naturalist
  - Evolution
  - Journal of Evolutionary Biology
  - Molecular Ecology

A digital repository for published evolutionary biology data

- Synthesis
- Sharing
- Discovery
- Preservation
- Digital data sharing position paper
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Unique challenges of small science

- Data are heterogeneous and idiosyncratically structured
- Extensive and specialized metadata are required to understand the data
  - Metadata are not easily captured automatically
  - Burden rests on researcher
- Growth of specialized repositories (Genbank, Treebase, Morphbank, PaleoDB)

Journals represented to date

- American Naturalist*  
- Evolution*  
- Integrative & Comparative Biology*  
- Journal of Evolutionary Biology*  
- Molecular Biology and Evolution*  
- Molecular Ecology  
- Molecular Phylogenetics and Evolution  
- Systematic Biology*  

* society journals

The charge from stakeholders

- Preserve published data ASAP  
  - Primary purpose should be to allow repeated analysis  
  - Accept all formats and filetypes, including software code and simulation results  
  - Require minimal metadata for ease of deposition  
- Respect intellectual property  
  - Creative commons licensing: “Some rights reserved”  
  - Allow embargo at editors discretion  
  - Require citations  
- Be financially self-sustaining  
  - Cannot be fully dependent on NSF or page charges
DRIADE project phases

- Phase I
  - Immediate preservation

- Phase II
  - Ease of deposition
  - More sophisticated retrieval
  - Integration into the journal submission process
  - Handshaking with specialized repositories

- Phase III
  - Incorporate emerging technologies for community-added value and data reuse

Digital data preservation, sharing, and discovery: Challenges for small science communities in the digital era

- Community adoption
- Financial sustainability
- Intellectual property
- Technical infrastructure
- Data lifecycle management
- Emerging technologies

Plan for the morning

- 1-2 minute introductions
  - Only for those not giving background talks
  - What brings you here?
- Lightning talks
  - Ahrash Bissell, Leesa Brieger, Paul Jones, Michael Nelson, Oya Rieger, Gail Reinhardt, Stuart Weibel
- Charges to breakout groups
  - Jane Greenberg