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Queen's University

Field Methods in Ecological and Environmental Genomics

Queen's University Biological Station, May 2018

Introductions

Name

University and education background

Current Research (or Research Interests)

Future Goals (short-term and long-term)

Groups

1. Team Assignments (1 vehicle per team?)
2. Make up a name for your team
3. Which team member speaks the most languages?

Team ???

Megan, Hanna, Alex

Team ???

Jennifer, Beatrice, Patrick

Team ???

David, Shannon, Abneet

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Rapid Evolution
in novel environments

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Ecology & Evolution in the Anthropocene

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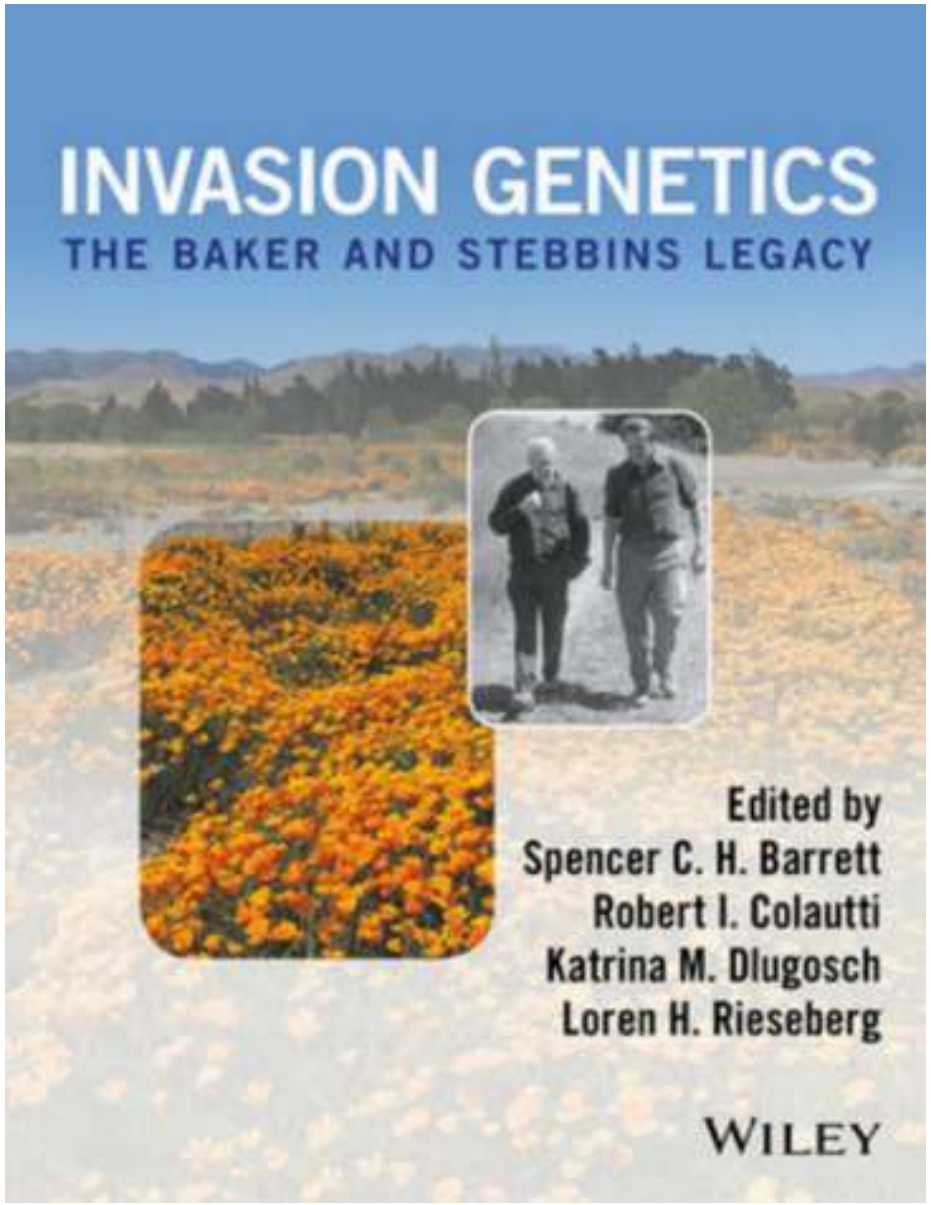
Environment --> Natural Selection --> Genome Evolution

Photos by Ed Burtynsky

Invasion Genetics



"Invasion genetics of the spiny waterflea"
– Colautti et al. 2005

"Invasion genetics is a relatively new discipline that investigates patterns of genetic variation in populations of invasive species and their ecological and evolutionary consequences."
– SCH Barrett 2016

Ecological and environmental genomics

"**Invasion genetics** is a relatively new discipline that investigates patterns of genetic variation in populations of invasive species and their ecological and evolutionary consequences."
– SCH Barrett 2016

Ecological & environmental genomics investigate patterns of genome-wide variation in natural populations or species communities, to address ecological and environmental questions.

Discussion: What are some interesting questions for eco-env genomics?

eDNA & DNA barcodes for environmental monitoring

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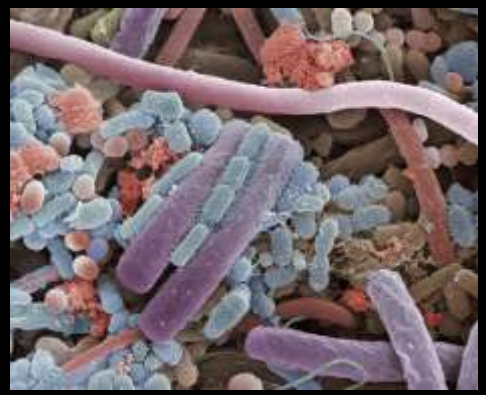
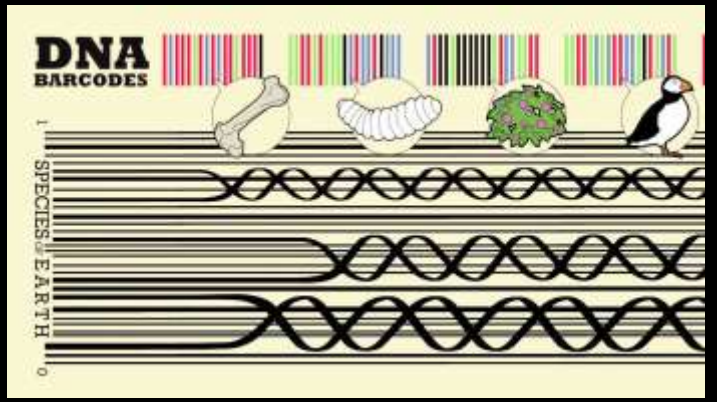


Barcode of Life Project

www.boldsystems.org



https://www.youtube.com/watch?v=ZImiXgU6bCk

Metagenomics of microbiomes

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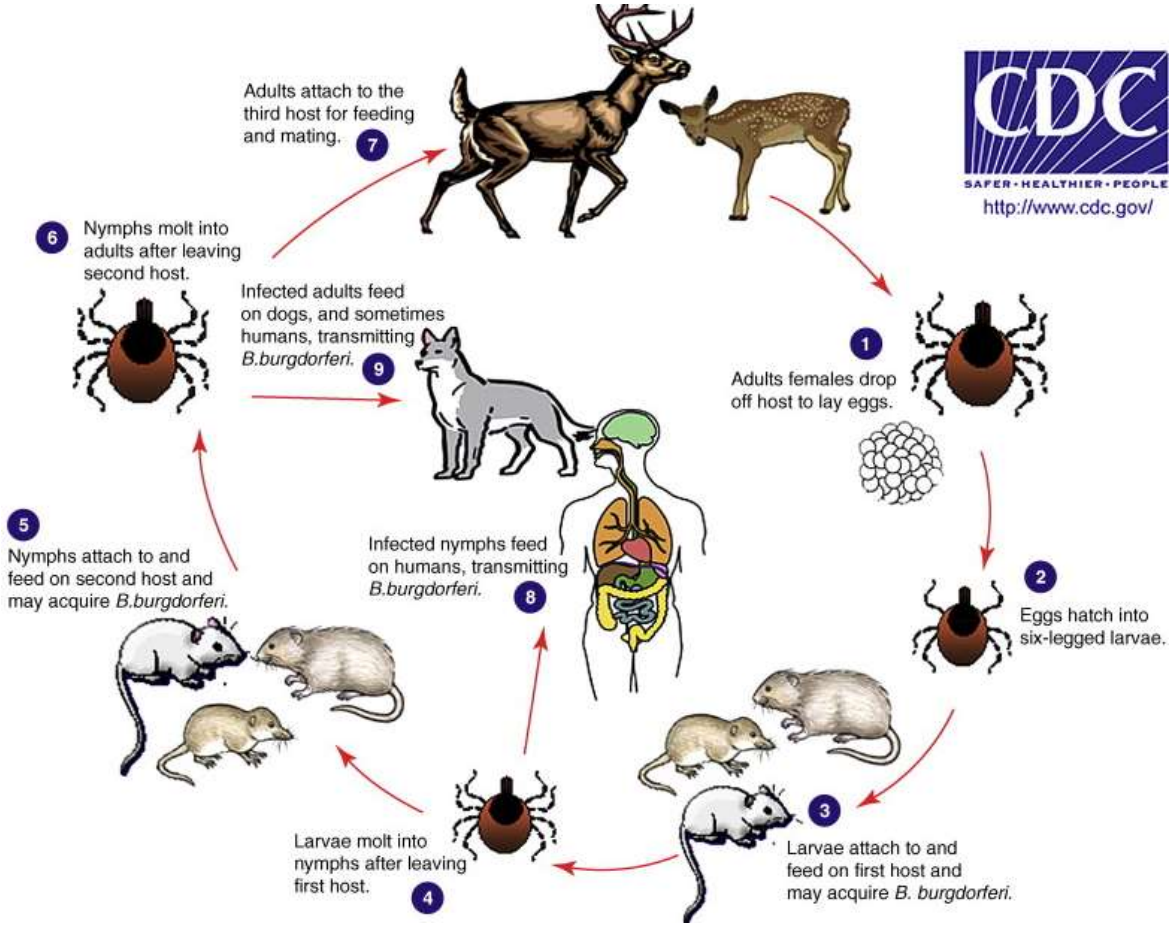
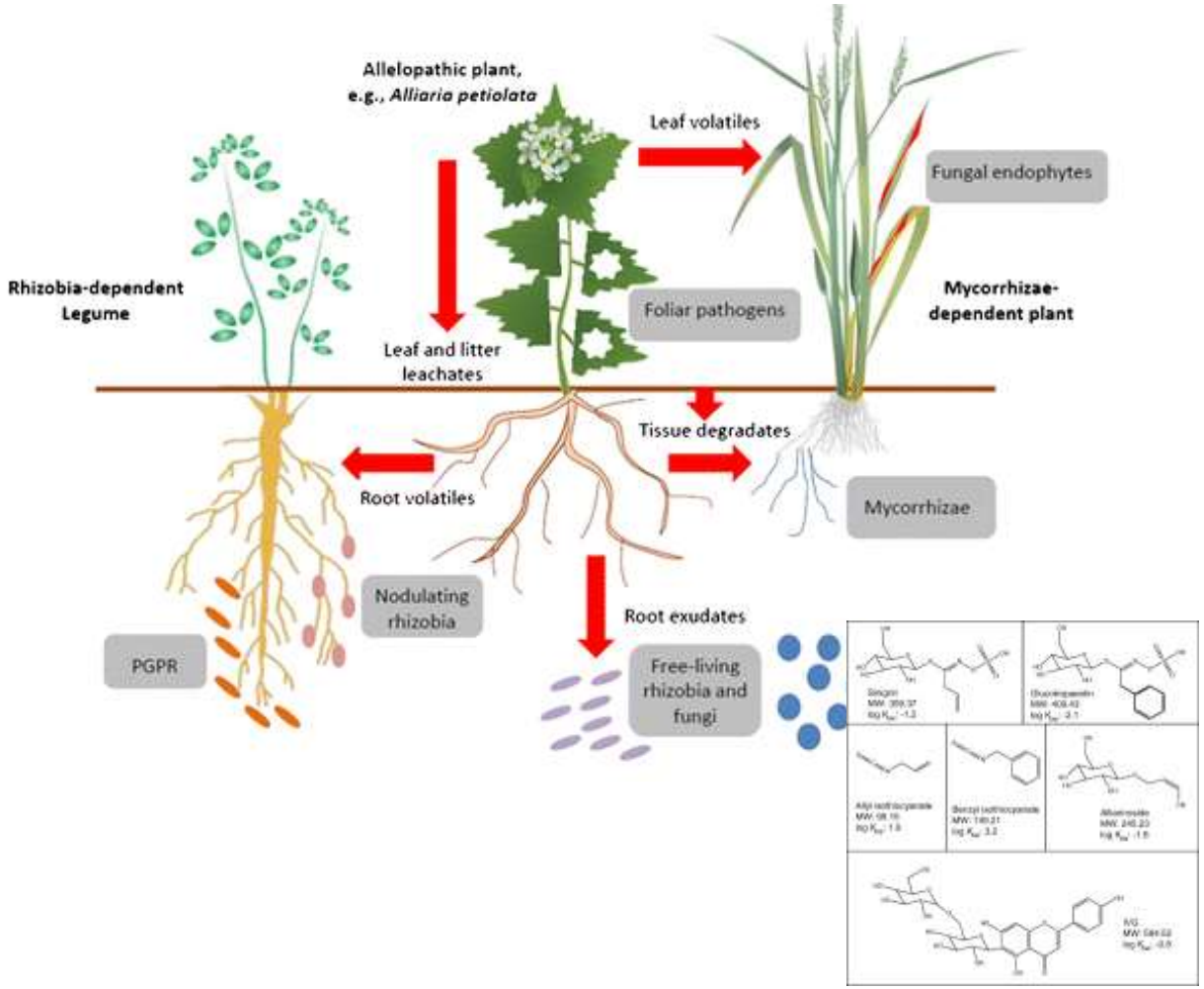
Disease Ecology



Soil Microbiome



Rapid evolution of *Lythrum salicaria*

Muzz Abdur-Razak

Sierra Klueppel

Eugene Sit

Population genomics of Alliaria petiolata

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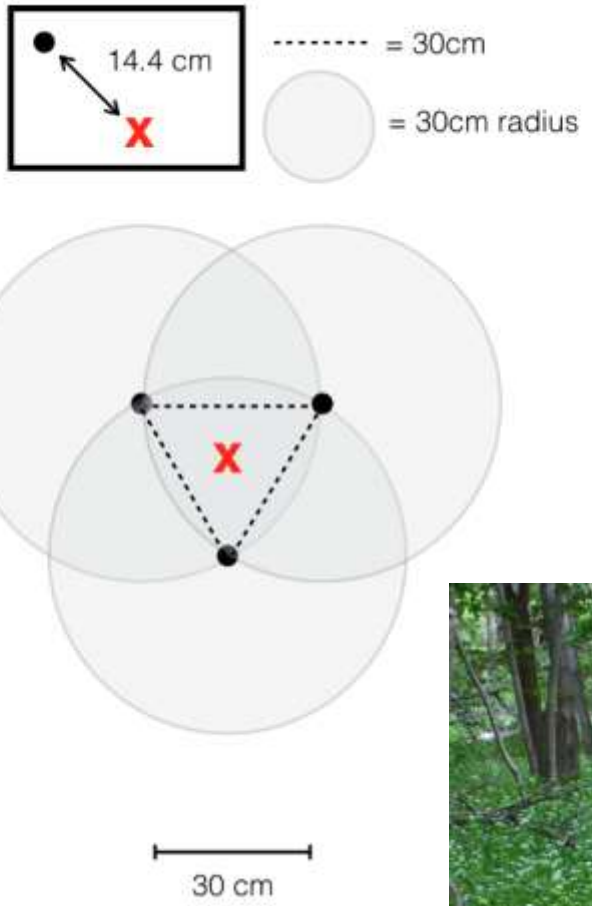

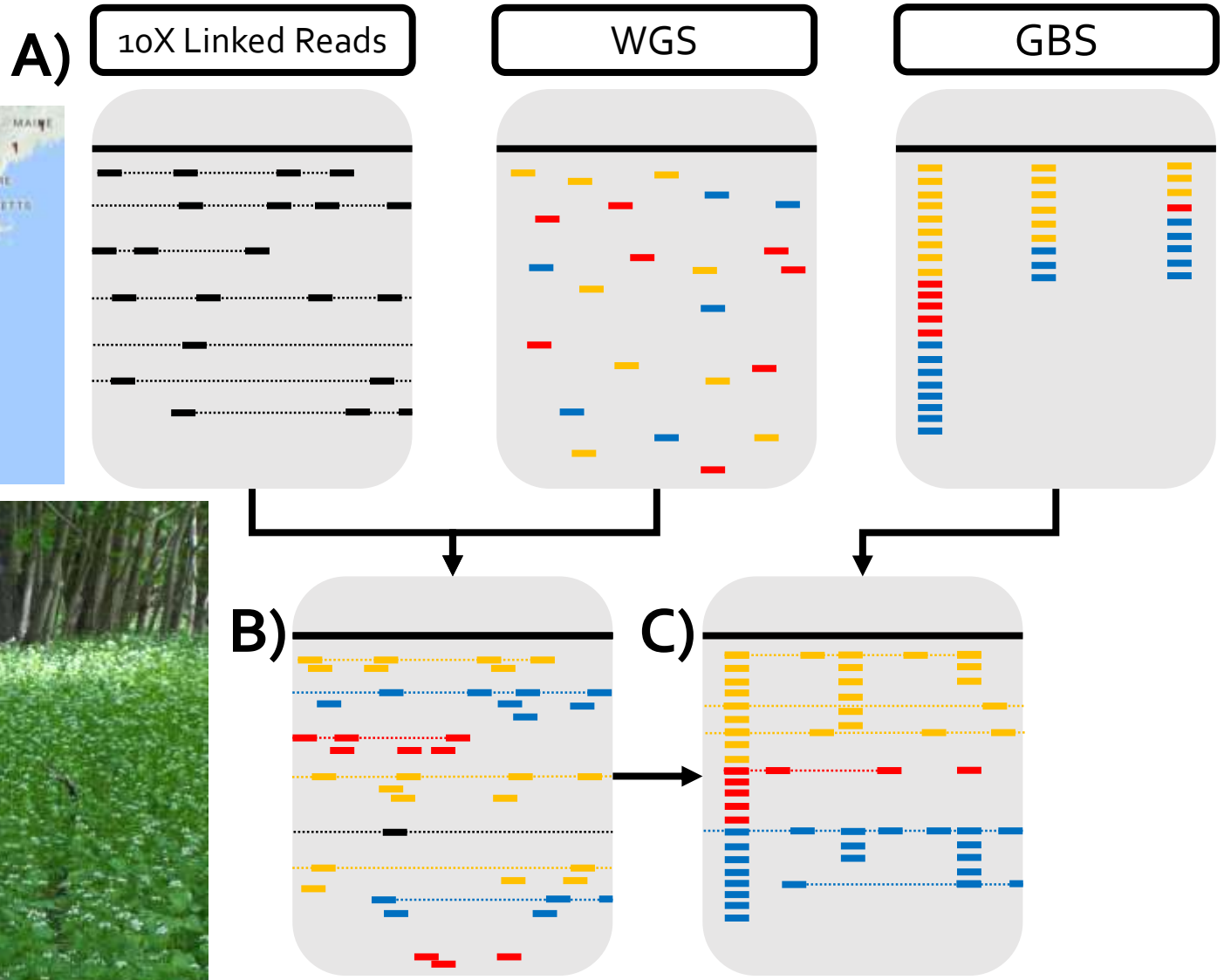

Our approach – 3 pillars

1. **Learn by doing**
    - Field Activities
    - Hands-on tutorials
2. **Emphasis on transferrable skills**
    - Coding
    - Experimental Design
    - Data Science! (collect → manage → visualize → analyze → report)
    - Communication
    - Teamwork
3. **Cumulative learning** – each day builds on previous activities/tutorials

QUIZ – What are the three pillars of our approach?

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1.

2.

3.

About QUBS

Website: qubs.ca

Properties: qubs.ca/facilities/properties

Bathymetry: qubs.ca/resources/bathymetry

Soil and geography: qubs.ca/resources/soils-geology

***Maps: qubs.ca/resources/maps**

***Species lists: qubs.ca/resources/species-lists**

***Fowler Herbarium: fowlerherbarium.ca**