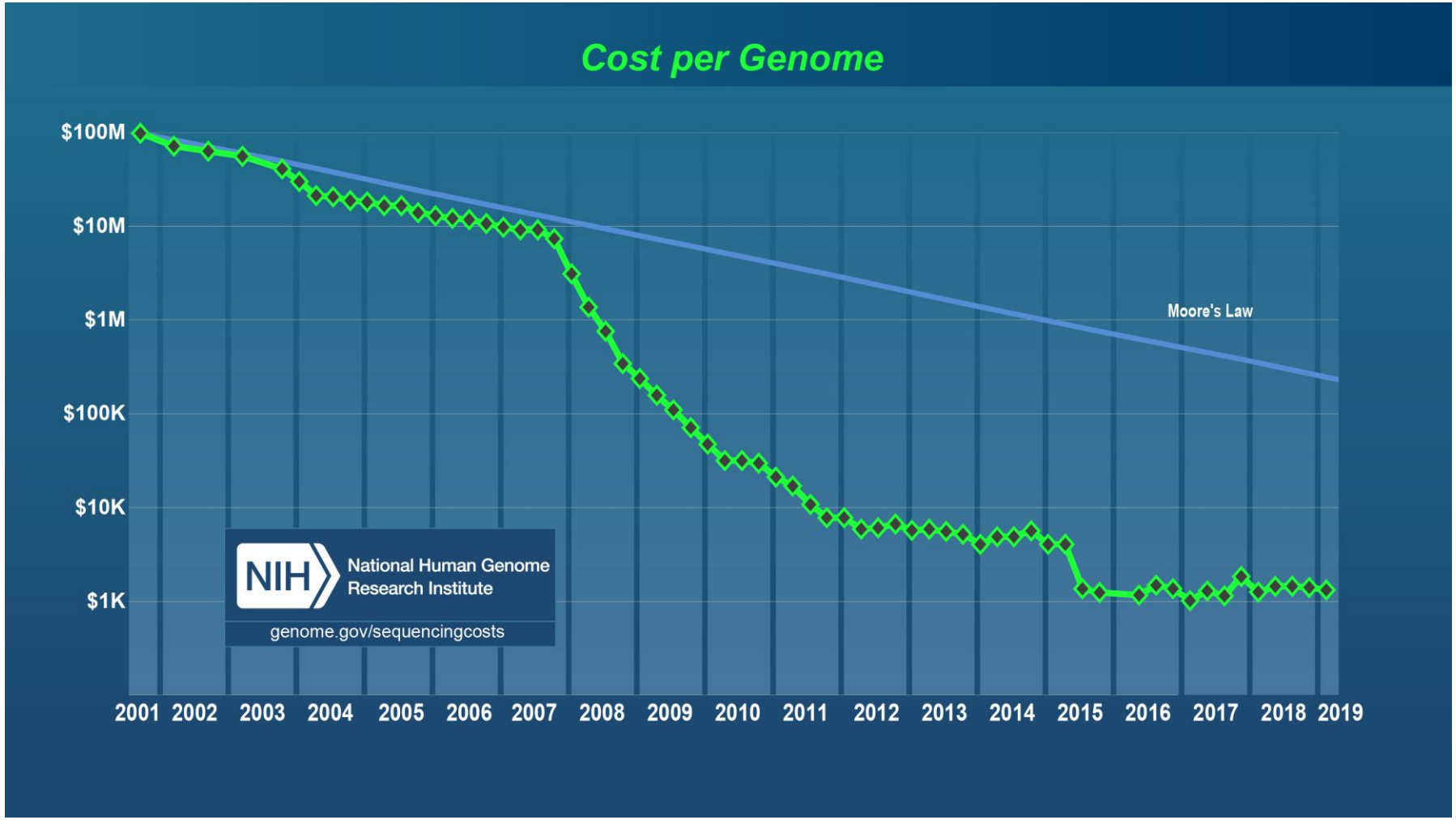

Welcome!
Marine Genomics

What is Marine Genomics?

Using genomic data to answer questions about the evolutionary biology of marine organisms.

Genomic data is becoming more and more accessible (== cheaper)



Major evolutionary questions in Marine Biology

What limits range size? Is there local adaptation at a species range limits?

What influences patterns of gene flow and migration and how does gene flow and migration impact selection or local adaptation?

What are the primary selective factors shaping phenotypic variation?

What is Marine Genomics?

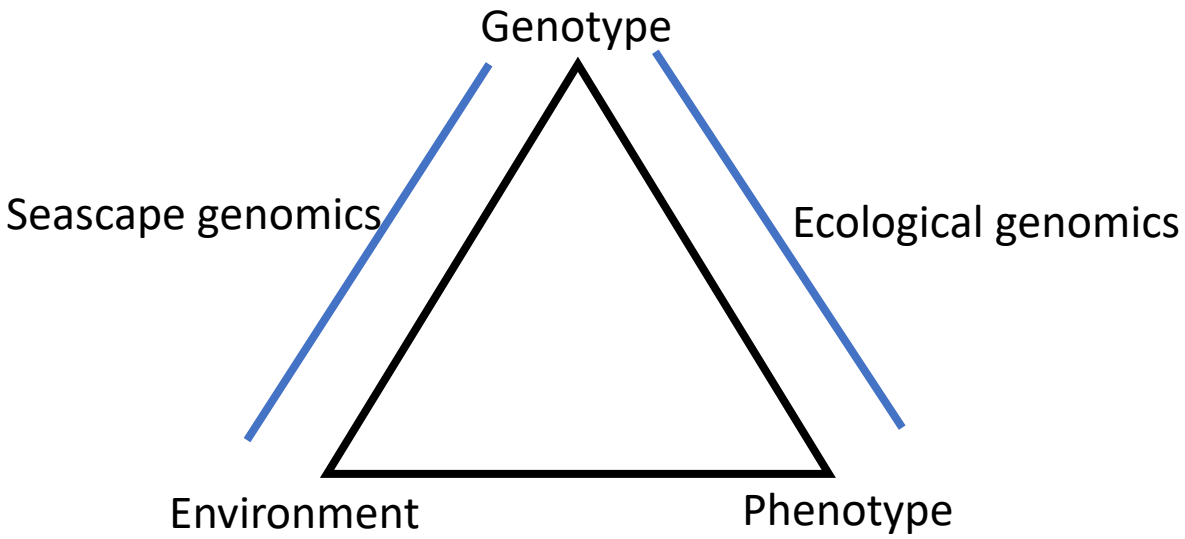


Figure modified from: https://link.springer.com/article/10.1007/s11295-013-0596-x

MOLECULAR ECOLOGY

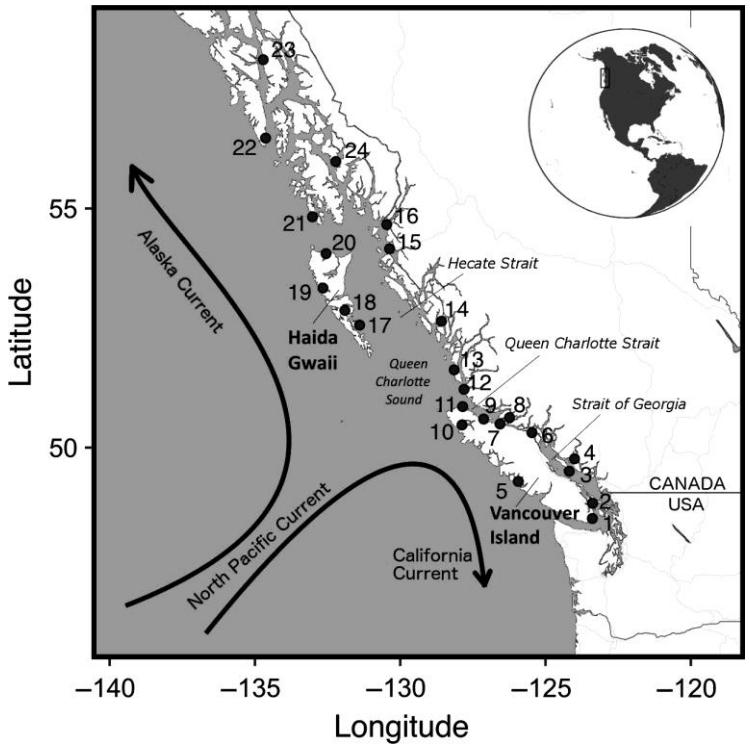
ORIGINAL ARTICLE | Full Access |

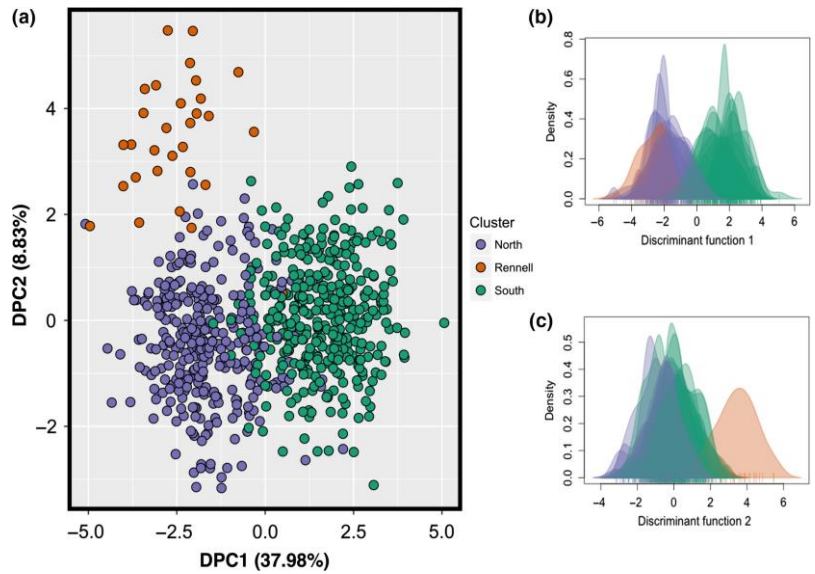
Asymmetric oceanographic processes mediate connectivity and population genetic structure, as revealed by RADseq, in a highly dispersive marine invertebrate (*Parastichopus californicus*)

Amanda Xuereb, Laura Benestan, Éric Normandeau, Rémi M. Daigle, Janelle M. R. Curtis, Louis Bernatchez, Marie-Josée Fortin

First published: 14 April 2018 | https://doi.org/10.1111/mec.14589 | Citations: 35

UC-eLinks





Mar Biotechnol (2017) 19:301–309
DOI 10.1007/s10126-017-9751-y

ORIGINAL ARTICLE

A Genome-Wide Association Study Identifies the Genomic Region Associated with Shell Color in Yesso Scallop, *Patinopecten yessoensis*

Liang Zhao[1] · Yangping Li[1] · Yajuan Li[1] · Jiachen Yu[1] · Huan Liao[1] · Shuyue Wang[1] · Jia Lv[1] · Jun Liang[2] · Xiaoting Huang[1] · Zhenmin Bao[1,3]

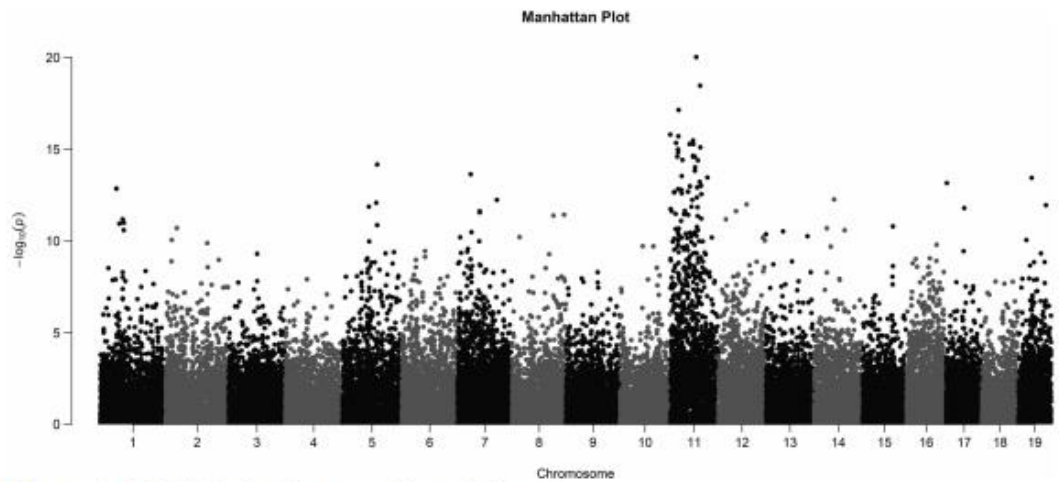


Fig. 2 Manhattan plot of –log10 (*P* value) for genome-wide association study

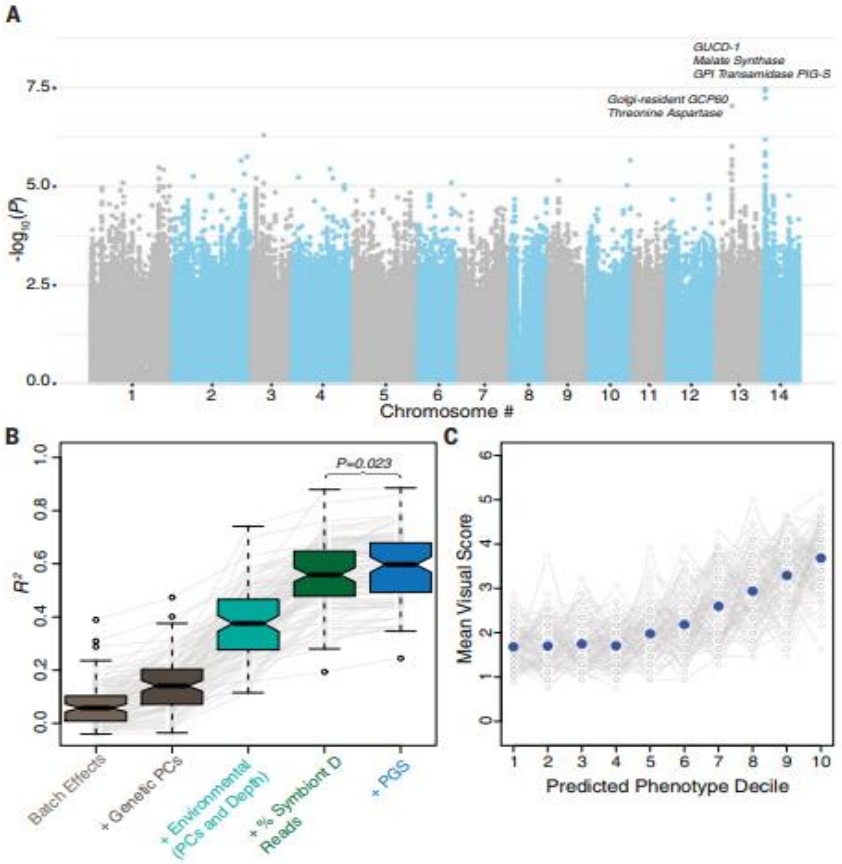
Fig. 1 Reddish-orange shell variant (**a**) and brown shell variant (**b**) of Yesso scallop, *Patinopecten yessoensis*

RESEARCH ARTICLE SUMMARY

CORAL GENOMICS

Population genetics of the coral *Acropora millepora*: Toward genomic prediction of bleaching

Zachary L. Fuller*, Veronique J. L. Mocellin, Luke A. Morris, Neal Cantin, Jihanne Shepherd, Luke Sarre, Julie Peng, Yi Liao, Joseph Pickrell, Peter Andolfatto, Mikhail Matz†, Line K. Bay*†, Molly Przeworski*†

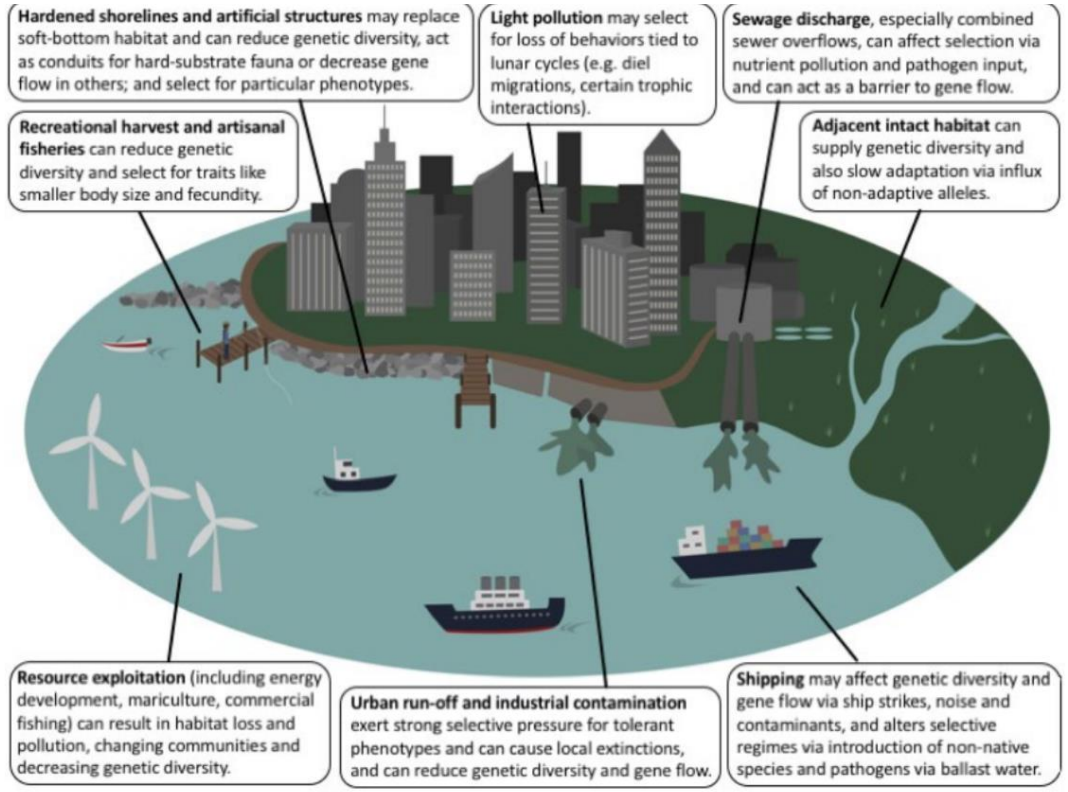


SPECIAL ISSUE REVIEW AND SYNTHESES

Evolutionary Applications Open Access WILEY

Evolutionary responses of marine organisms to urbanized seascapes

S. Elizabeth Alter[1,2,3] | Laraib Tariq[2] | James Keanu Creed[2,3] | Emmanuel Megafu[2]



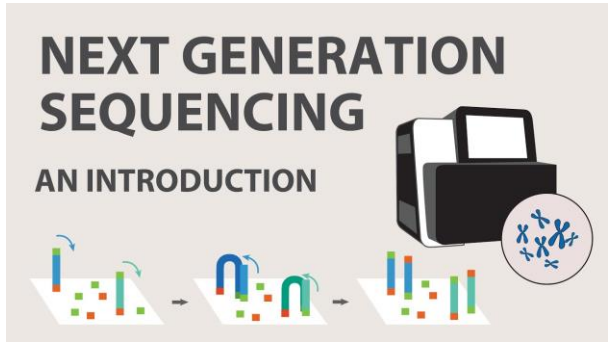
How do we do marine genomics?

Research idea/question

Design experiment

Lab experiment
Field collection scheme

Extract DNA/RNA



https://www.youtube.com/watch?v=jFCD8Q6qSTM&ab_channel=AppliedBiologicalMaterials-abm

Download data

Perform analyses

Present results at conference
Publish paper

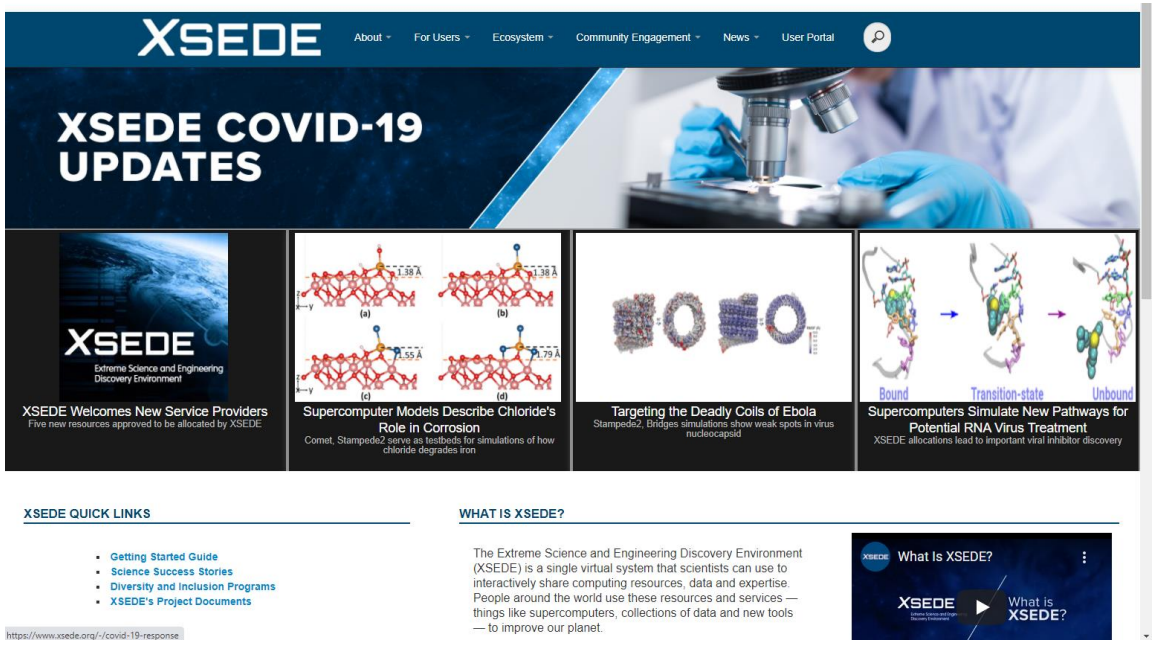
We use bioinformatics to answer these questions

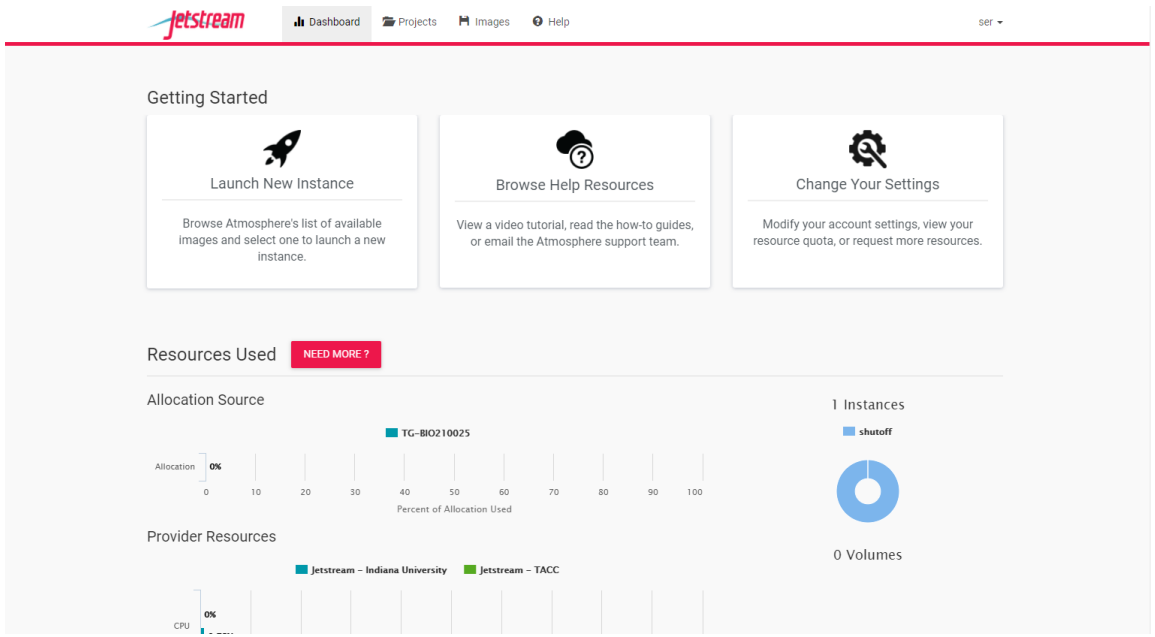
We'll cover two main areas

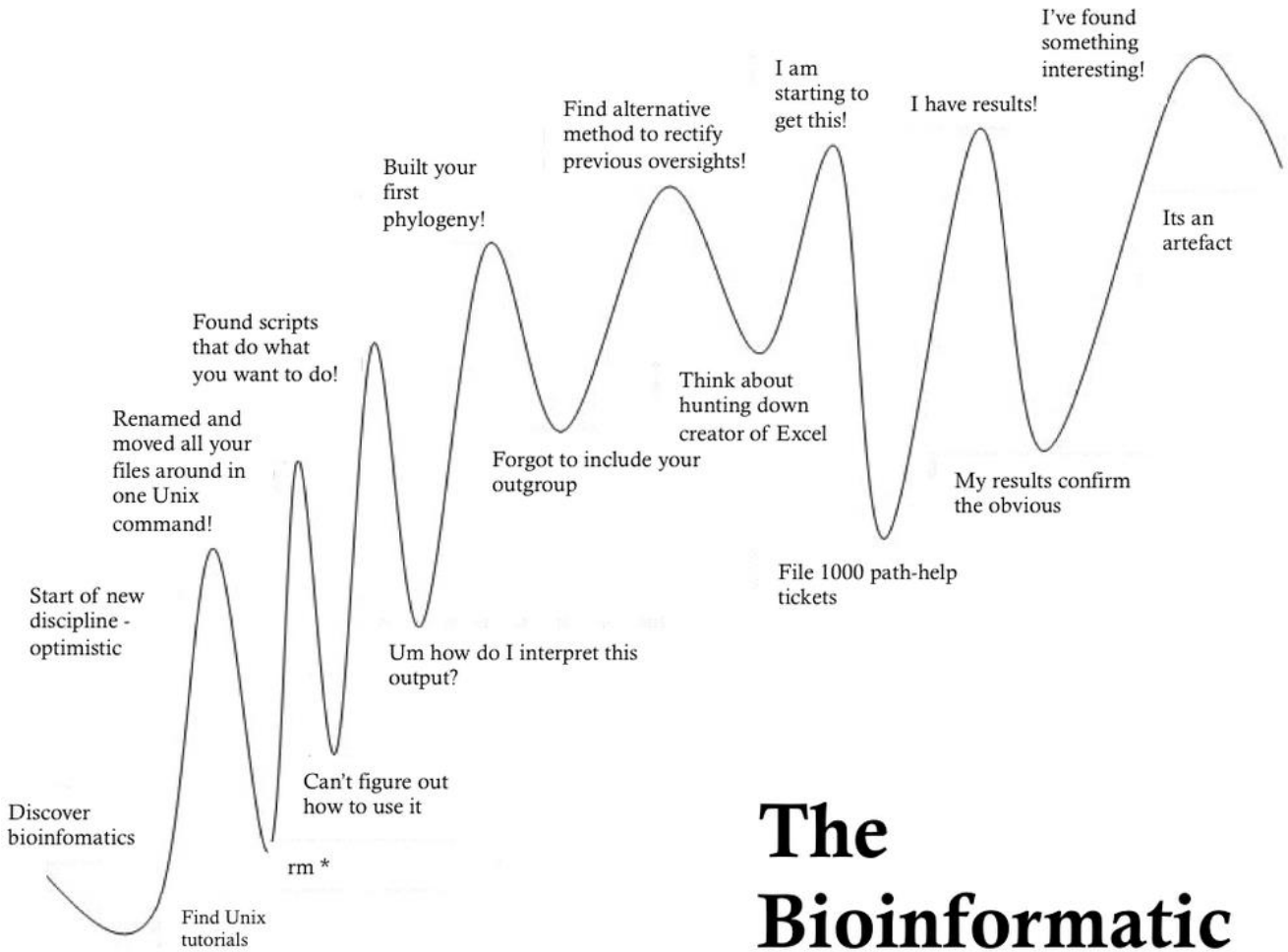
- The shell or Bash/UNIX
- R

Many of these analyses are very computationally intensive

Jetstream via xsede

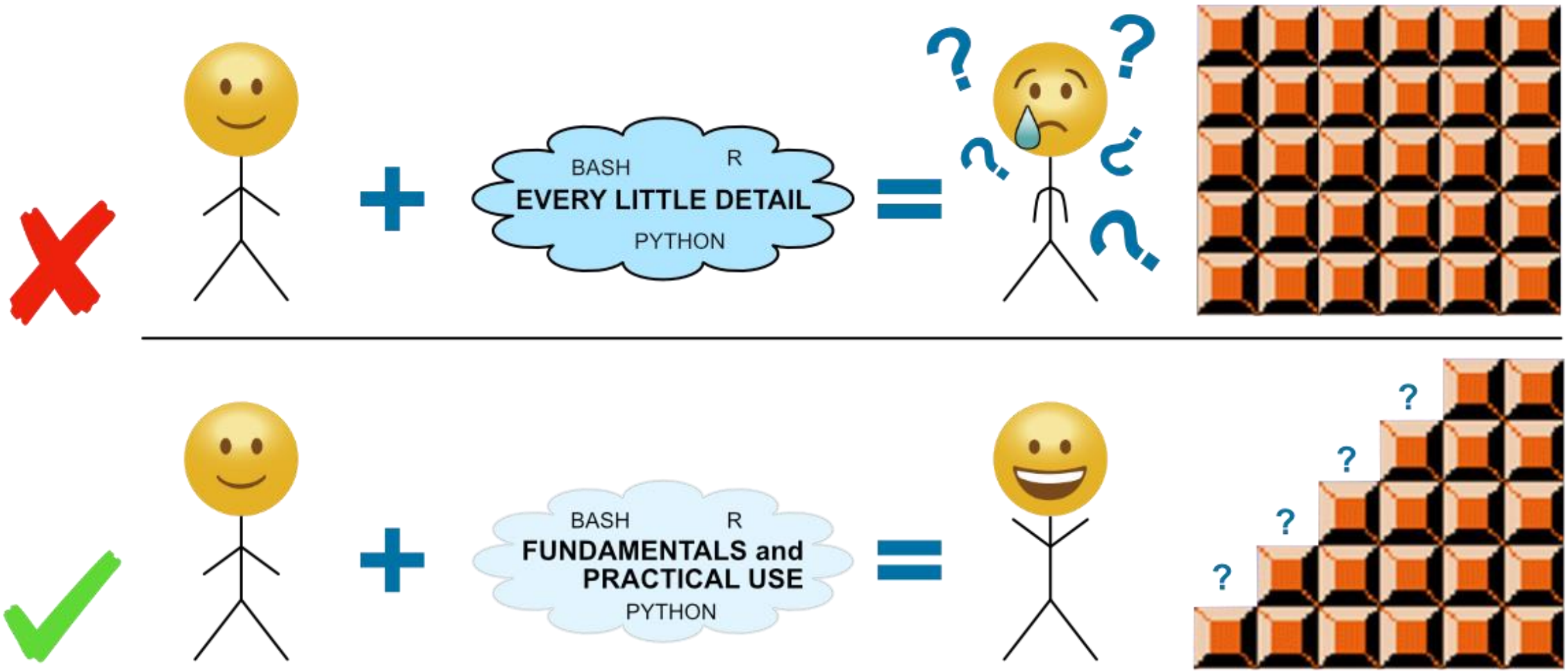






The Bioinformatic learning curve

Source: https://images.app.goo.gl/9Z2yoRSwwNG9iNhu6



Source: https://www.google.com/url?sa=i&url=https%3A%2F%2Fastrobiomike.github.io%2Fabout%2F&psig=AOvVaw0RKmkNIIBkA5hP7oX73zI2&ust=1616086599613000&source=images&cd=vfe&ved=0CAIQjRxqFwoTCOCYxe_lt-8CFQAAAAAdAAAAABAX

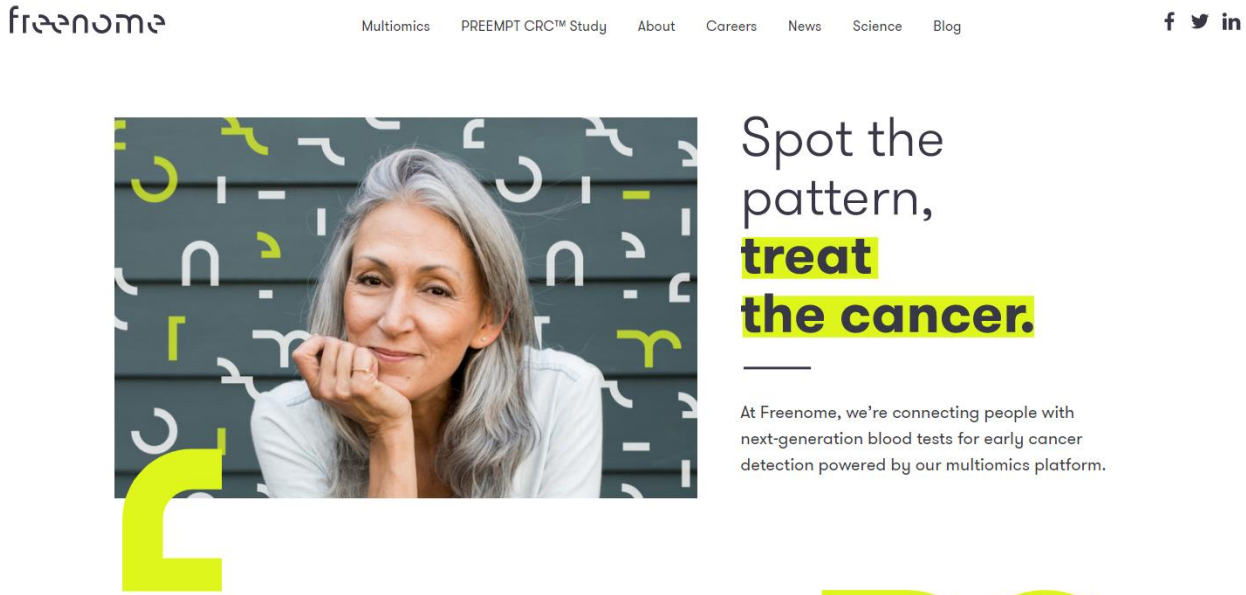
Why learn bioinformatics?

Gain many transferable skills!

- Data science
- Personalized medicine
- NGO agency scientist

Undergraduate degree

- Grad school
  - Postdoc
    - Professor
    - Research scientist in industry



Glossier.

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