

Using Active Learning To Build A Foundation For Bioinformatics Training

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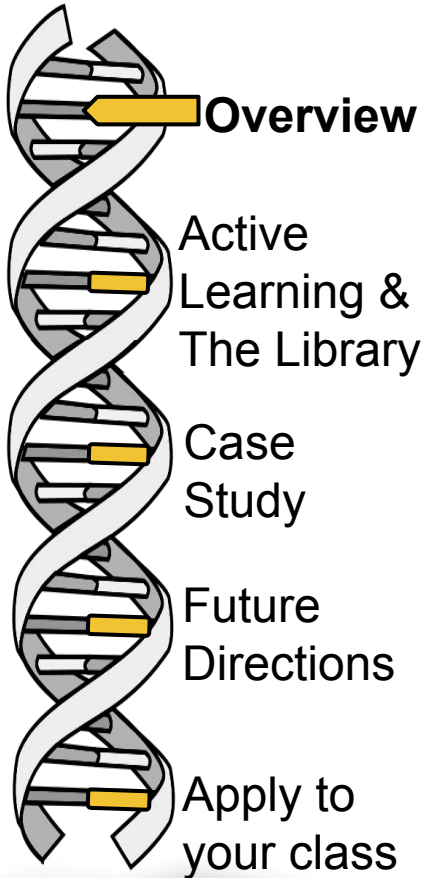
Transforming Libraries for Graduate Students

March 16-17, 2020

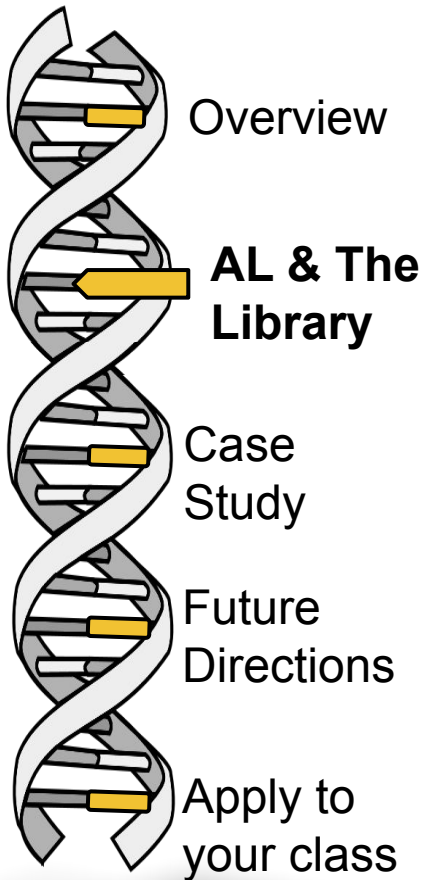


VCU Libraries

Overview



- Active learning & One-shot instruction
- Case Study: Bioinformatics
- Future Directions
- Application: Small actions = **big change**



Overview

AL & The Library

Case Study

Future Directions

Apply to your class

Active Learning (AL)

Historical Context in the Library

- Started exploring its use in the late 90s/early 2000s (Dabbour 1997, Keyser 2000, Lorenzen 2001)
- Detlor 2012: AL increased student perception of library resources AND librarian value



VCU

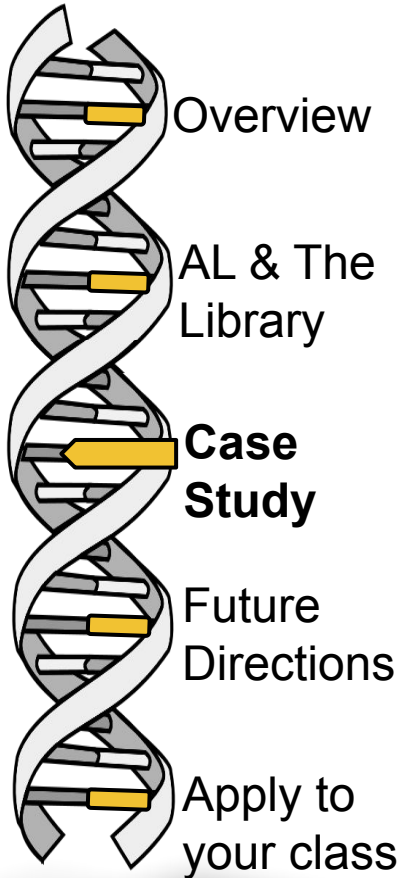
Libraries

Bioinformatics at VCUL



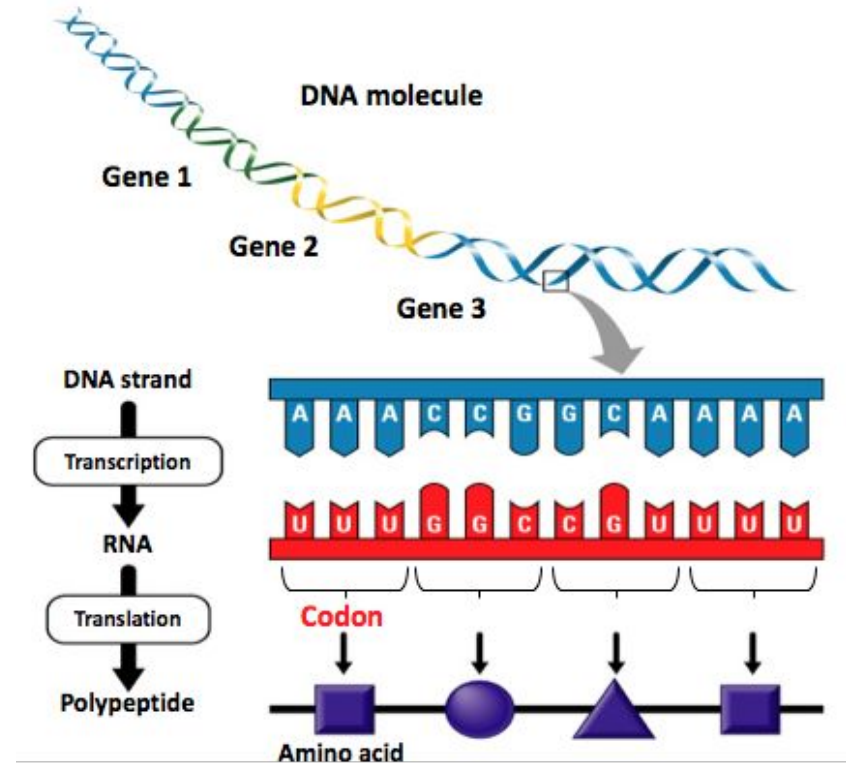
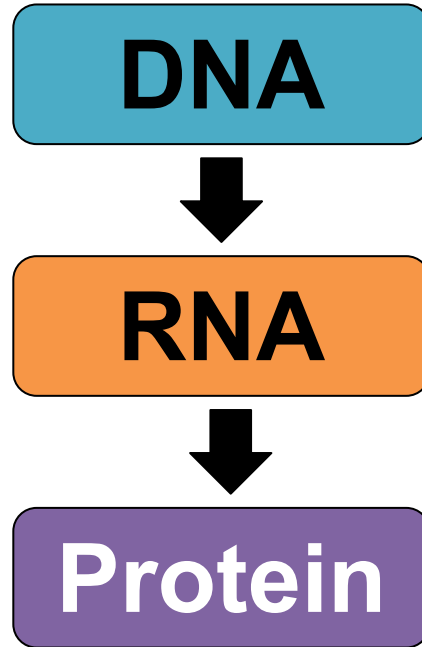
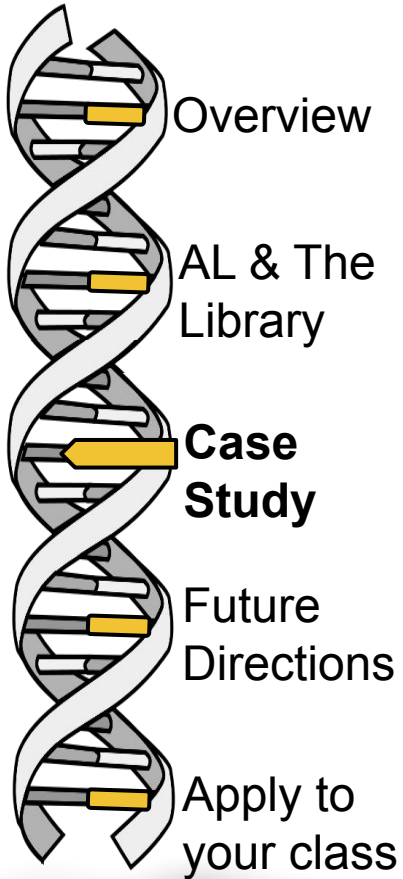
- Partnership with the Wright Center for Clinical and Translational Research
- Two training series
 - 8-week overview of available techniques
 - 5-session intensive week-long workshop on NCBI databases

Bioinformatics 102



- Advertised across campus
- Mix of undergraduates, graduates, and faculty attendees
- Utilize Google Forms to complete investigative exercises in each database
- **Consistent Challenge:** variety of expertise with molecular biology aspects of genetics

Fostering Shared Understanding



Fostering Shared Understanding

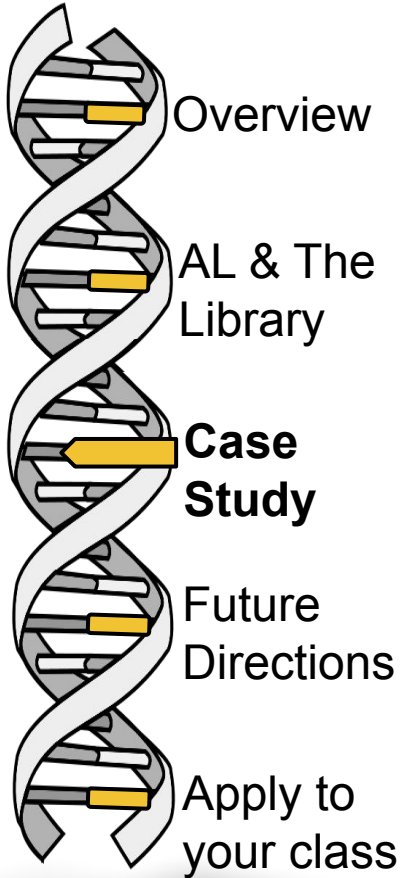
Open Access Resources



<https://www.hhmi.org/biointeractive>

**NATIONAL CENTER FOR
CASE STUDY TEACHING IN SCIENCE**

<http://sciencecases.lib.buffalo.edu/cs/collection/>

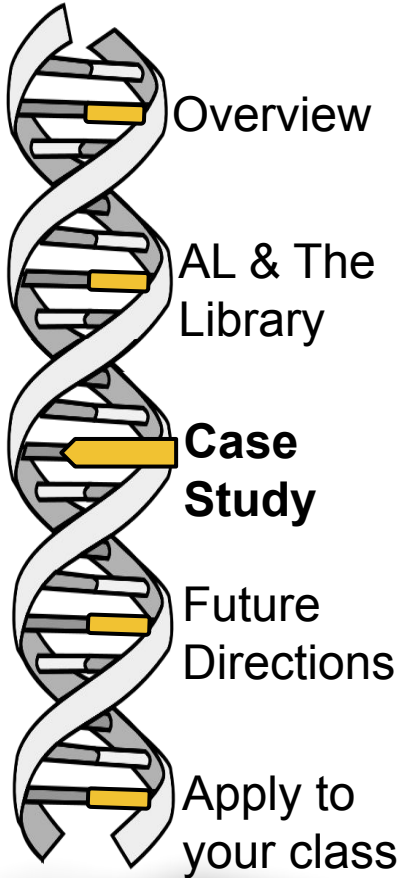


Fostering Shared Understanding

Other Resources



Science Education: Core and Advanced Biology



Activities to Promote Understanding



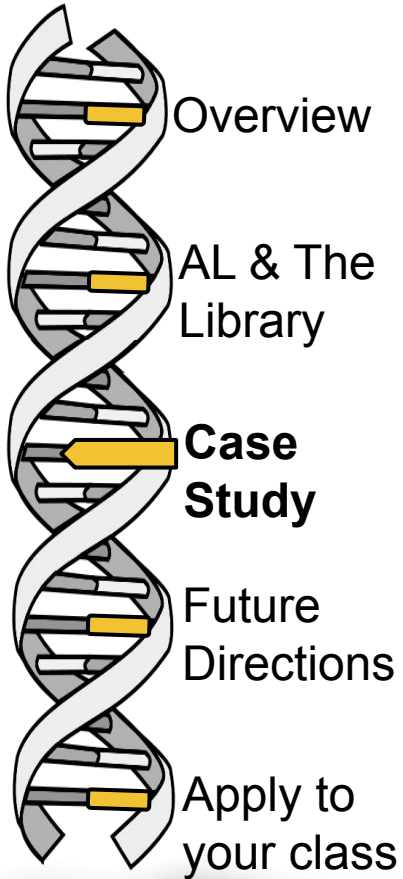
1. Card Sorting
2. Translation Puzzle(s)

codons		AGA									UUA						AGC					
		AGG									UUG						AGU					
	GCA	CGA					GGA			AUA	CUA				CCA	UCA	ACA			GUA		
	GCC	CGC					GGC		AUA	CUC					CCC	UCC	ACC			GUC		UAA
GCG	CGG	GAC	AAC	UGC	GAA	CAA	GGG	CAC	AUC	CUG	AAA		UUC	CCG	UCG	ACG			UAC	GUG		UAG
GCU	CGU	GAU	AAU	UGU	GAG	CAG	GGU	CAU	AUU	CUU	AAG	AUG	UUU	CCU	UCU	ACU	UGG	UAU	GUU		UGA	
amino acids		Ala	Arg	Asp	Asn	Cys	Glu	Gln	Gly	His	Ile	Leu	Lys	Met	Phe	Pro	Ser	Thr	Trp	Tyr	Val	stop
		A	R	D	N	C	E	Q	G	H	I	L	K	M	F	P	S	T	W	Y	V	

Figure 7-25 Essential Cell Biology, 4th ed. (© Garland Science 2014)



Reflection and Outcomes



- Increased classroom interaction
- Encouraged students to explore and refresh their understanding of a central concept
- Logically led to discussion of how the databases worked and which process they addressed
- Positive participant response: 86% (12/14) rated the exercises as Good or Excellent

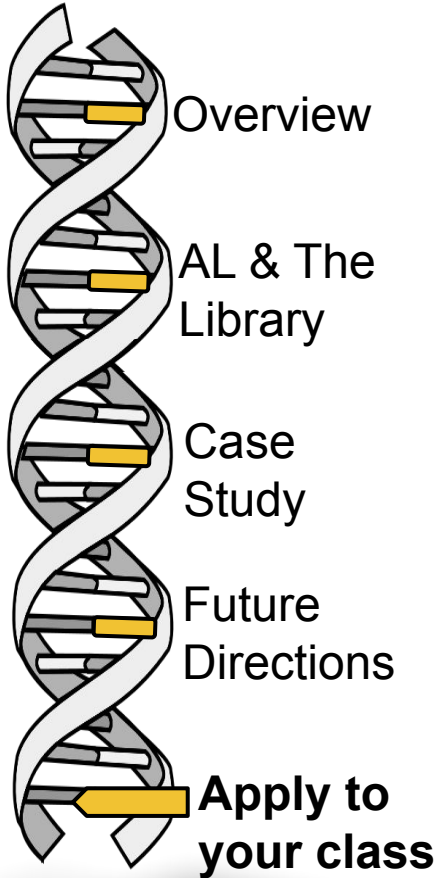
Next Semester: more!



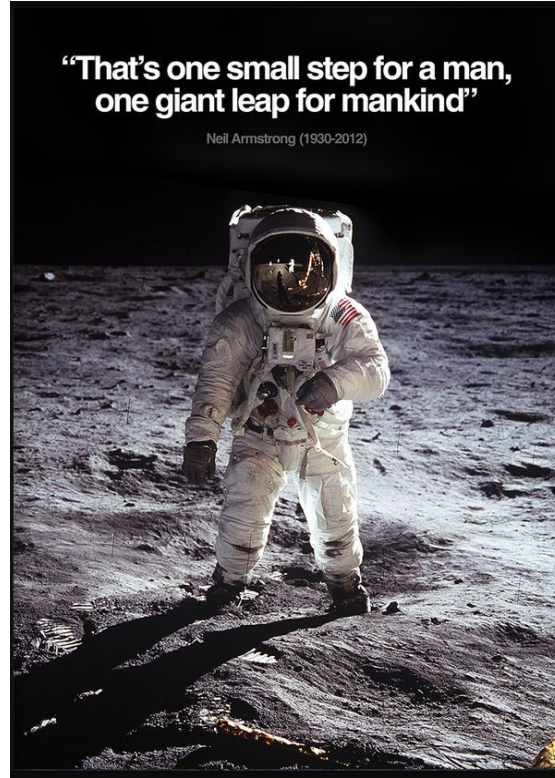
- These activities fostered a shared starting point for the workshop series.
- Participants indicated that they would like a more problem-based learning approach to the databases (including primer design)
- Investigate available open-access options and find one to adapt for our needs.



Application



Small actions =



Big change



Your efforts may not always work



Tweak

Try Again

Sometimes it is best to try something else

An ineffective active learning exercise can negatively impact student attitudes

Reassess

Questions?

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