

Welcome!



Who am I?



- I'm the guy you have to listen to for most of the term.
- Call me "Titus", in e-mail, in person, via chat...
- My several e-mail addresses all go to the same place.
- I always read e-mail (but don't always respond immediately).
- Please don't skype/chat me unless we arrange a time via e-mail. (Yes, very 1999 of me, I know)

Who is Heather?



- Heather Goldsby is your TA.
- She seems to be very nice, so far.
- We will post her contact information as well.
- Office hours (a dedicated time to meet OR e-meet with Heather) will probably be held Thursday sometime. Probably in the main BEACON area at MSU.

Rough schedule



- This is a 15 week course.
- We're going to have class every M/F from now until December 10th, with only two days off:
 - Labor Day (that's Monday)
 - Thanksgiving (Nov 26th)
- These dates are on the syllabus.

Attendance



- Formally, I must care about your attendance.
- In practice, I do not.
- However, if for some reason an entire remote site drops offline for a week, I may ask questions! Please do let me know if you know this is going to happen.

Homework etc.



- Homework will be a mix of, well, homework, and paper reading.
- The papers will be on Avida and the Lenski E. coli stuff, primarily.
- The homework will be on doing things computationally. We will endeavor to make it more “interesting” than “scary”. More on that in a bit.
- There will be a final project of some sort, but **no tests**.

Grading



- I am probably the easiest grader on the planet; my last grad level course, I gave out 22 “4.0”s and nothing lower.
- Heather seems nice, too.
- We’ll have to see how it works out.
- Note: if you don’t hand in your homework, there’s really nothing we can do to help you.
- Please do participate in the class, too.

Computational requirements



- For this course, you will need:
 - A computer.
 - Running Mac OS X, Linux, or Windows.
 - OK network access.
 - An Amazon Web Services account (they're free).
 - A credit card (req'd for AWS) – **but** that's only to backstop the educational grant \$\$ we received from Amazon.
- All software will be free.

Some personal things you need to know about me



- I will turn into a pumpkin, probably sometime in November.
- This is because we (mainly my wife) are having a baby, due ~Thanksgiving.
- I am hoping to have the last few weeks of the course be primarily *scientific presentations* by various (other) people.

Some personal things you need to know about me



- I hate Powerpoint for teaching.
- Unless I manage to get rid of all of the remote students, I must suffer through it.
- I'm also new to this distance teaching thing.
- Please let me know, privately, if there's something I need to change about how I'm speaking/moving/etc.

OK, so who am I and what's this course about?



- **1993-1997: Alife / Digital Life**
 - First implementation of Avida (with Ofria, Adami)
 - Followup work with Mark Bedau
- **1995, 1997-1999: Physical meteorology**
 - Took observations of moon, did computational analysis of data (look up “Earthshine”)
- **1997-2008: Developmental biology & regulatory genomics**
 - Experimental molecular biology of regulatory regions in sea urchin and chick
 - Genomics and regulatory genomics
- **2007: Metagenomics**

2008-present gets even more confusing....

What do all of these have in common?



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(You have to remove the exp molecular biology.)

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All of them involve analyzing lots of data, computationally.

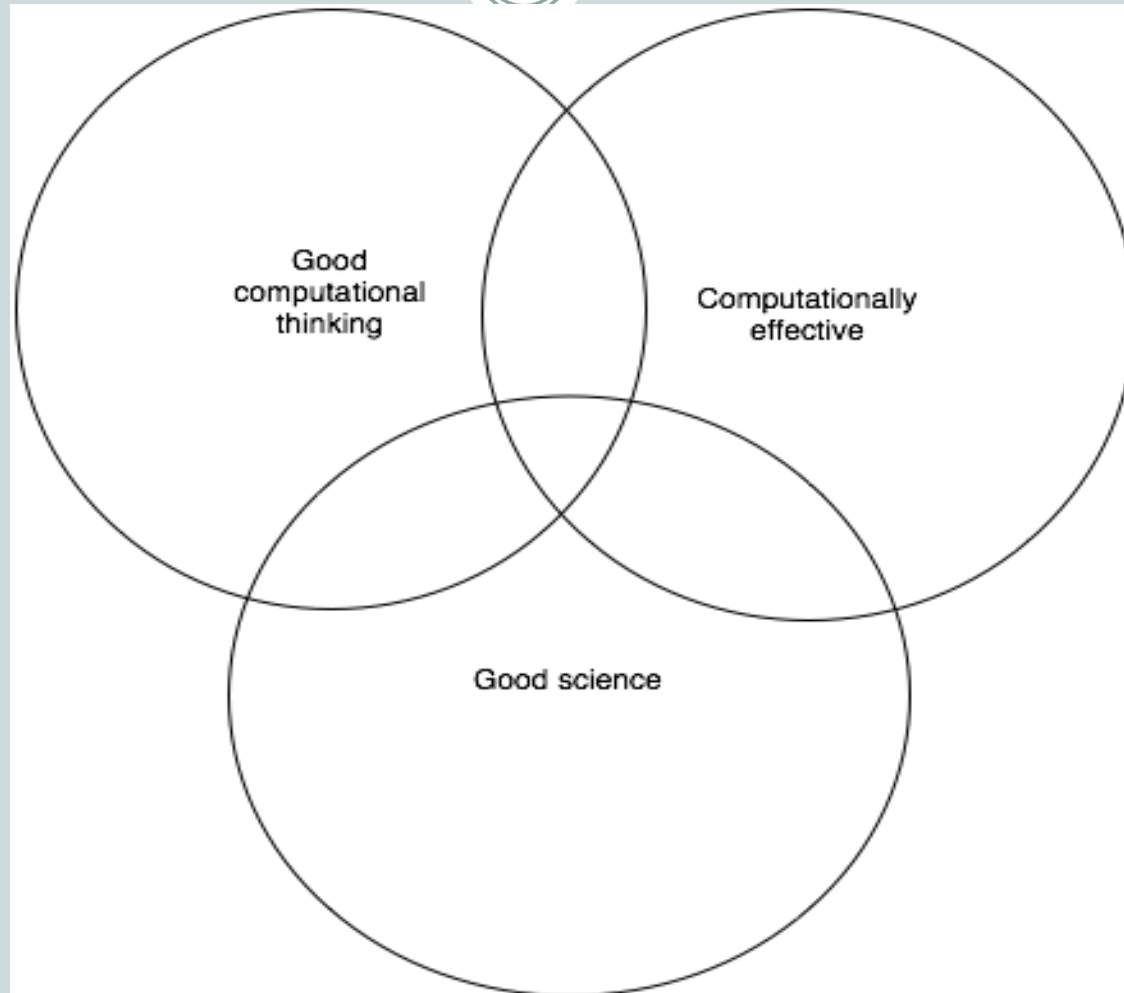
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What's my point?



- I'm not just narcissistic.
- Computational data analysis and computational *thinking* about problems is broadly applicable.
- It can be a substantial component of a career.
- It's fairly rare to find people who are good at thinking computationally, good at using computers, and good at science.

Thinking vs doing vs science



At the end of this course...



- You will be able to do Real Experiments with Avida.
- You'll be able to work with very large sequence data sets.
- You'll be about 50% of the way to being able to pick up any command line program and just ... use it.
- I can't teach you programming but I can show you the way.

What are my goals for this course?



- Avoiding abject failure.
- More specifically, I want to:
 - Walk you through a bunch of the silly details necessary to use remote computers effectively.
 - Walk you through a bunch of the silly details necessary to run Avida.
 - Walk you through a bunch of the silly details necessary to analyze the Lenski resequencing data (BIG data...)
- I also want to:
 - Develop your intuition about what is *possible* and what is *easy*, computationally speaking.
 - Increase your **informed** skepticism about computational results.
 - Get you thinking about how to integrate computation into your research perspective.

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Fundamental-ish questions:



- Does the computation work as intended?
- Does it address the scientific question?
- Does it answer the question?
- Does the answer make sense?
- Would we be able to tell if the answer was right?

A list of additional topics I plan to cover



- Reliability of computational solutions
- Stochasticity and randomness (intentional and not)
- How to do computational science in your sleep
- How to systematically (ab)use other people's computers
- Computational complexity
- Practical issues of computer use
- Data and source code management
- Some simple scripting/programming.

Course Web site



<http://ged.msu.edu/courses/2010-fall-cse-891/>

Skype chat demo



Skype voice demo



Skrbl demo



Initial assignment



By next Friday:

Sign up for an Amazon Web Services account
(aws.amazon.com).

You will need a credit card and a phone number, but
the account itself is free.

Any questions?

