BlastEd

An Exemplar for Interdisciplinary Learning and Curriculum Development

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My approach

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- particular $\longrightarrow$ generic
  - anecdotal, personal
  - over-generalized, over-stated
  - but (I hope) good for generating some discussion
- Some questions interspersed along the way

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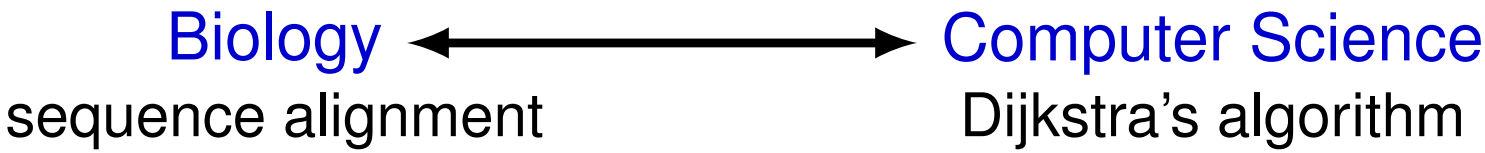
Humor alert: This talk will contain one riddle and one joke.

What is BLAST?

- BLAST = Basic Local Allignment Search Tool
  - computational tool for finding portions of two genetic sequences that (approximately) match up
- Most referenced scientific paper in 1990's
- An example of Computational Biology:



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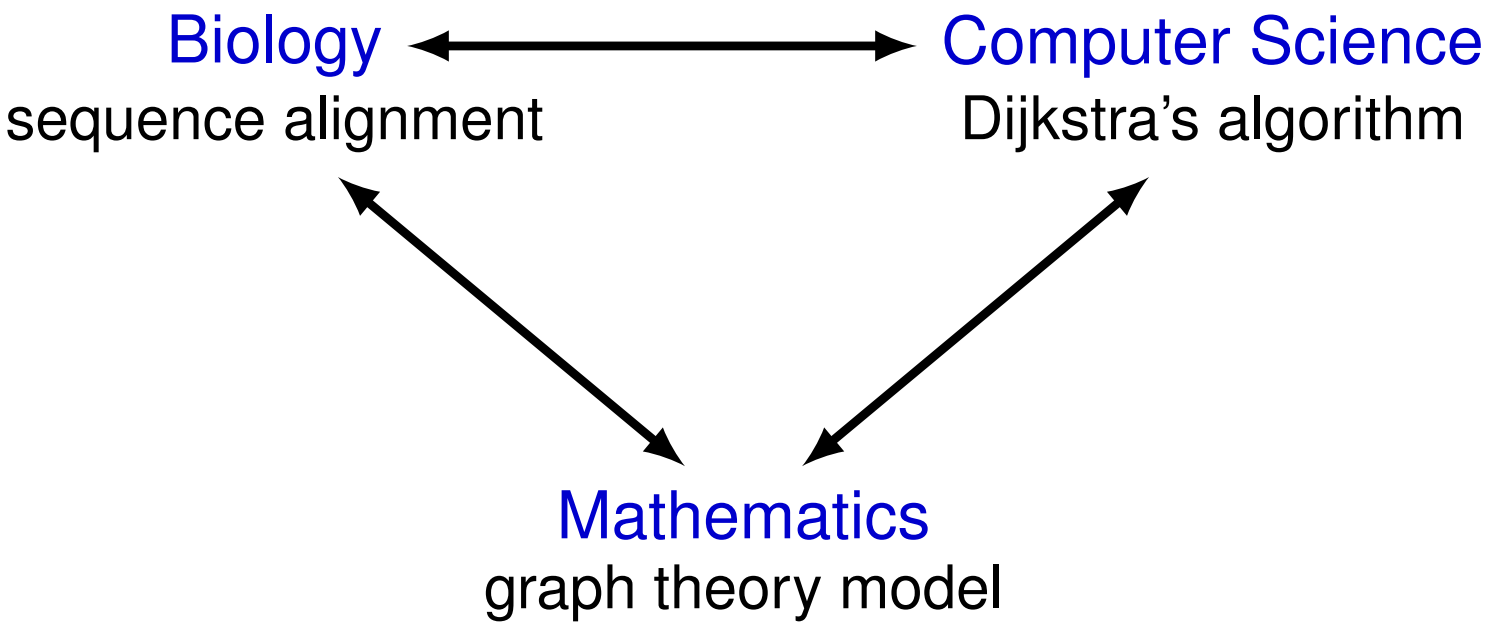

What is BastEd?

Product of a 2007 workshop

- MAA PREP (Professional Enhancement Program)
- SC07 Education Program
- National Computational Science Institute
- Shodor Foundation

  CSERD = Comp Science Education Reference Desk

Workshop Goals:

- bring math, bio, and comp sci faculty together for a week
- offer some training – primarily in software applications
- have working groups produce classroom materials

BlastEd project

BlastEd Team:

- Joel Adams, Calvin
- Kapila Attele, Chicago State
- Nancy Cowden, Lynchburg
- James Dooley, Adelphi
- Mike Martin, Johnson County CC
- Stephen Matheson, Calvin
- Randall Pruim, Calvin
- Raina Robeva, Sweet Briar

BlastEd Goals:

- introduce bio students to math/comp sci behind BLAST
- introduce math/comp sci students to an important biological application
- provide an interactive tool to visualize algorithm and to see effects of various parameter choices

Putting the I into TEAM

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Teamwork is essential for curricular improvement

- our educational efforts require the best of each discipline
- we are each limited by our own (disciplinary) background
- if we could do it alone, we'd already be done

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Teamwork is also vital for IDS research

- we need to teach students how to be members of IDS teams
- we need to be in IDS teams

Collaboration is key

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- complementary skill set
  - disciplinary expertise
  - extra-disciplinary interest
  - extra-disciplinary knowledge/skill
    or ability & willingness to learn
- communication skills [listening, speaking, writing]
- social skills
- reliability [delivering on promises]
- proximity

Look for these in colleagues, develop them in students.

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- a project

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Faculty First

(Or at least, TOO.)

We need to recruit colleagues to IDS if we are going to train students in IDS.

IDS can still be no man's land

"IDS sounds great until you want to publish or get a grant."

– a colleague

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Test Case: Submission to CCSC:

The Consortium for Computing Sciences in Colleges is a non-profit organization focused on promoting quality computer-oriented curricula as well as effective use of computing in smaller institutions . . . It supports activities which assist faculty in making appropriate judgments concerning computing resources and educational applications of computer technology. . . .

The Consortium is concerned with the advancement of major programs in both Computer Science and Computer Information Systems, and with the use of computers in the Liberal Arts and Sciences.

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Reviewers' comments on article describing *BlastEd*:

- The Good
  - This is a very good presentation of a tool for educational application of a bioinformatics problem. This is a very hot topic and almost all schools are looking for ways to introduce it into the curriculum. BlastEd seems to be a tool with a great deal of potential.
  - This is very appropriate for the CCSC conference.

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- The Bad
  - Primarily, a Biology paper, with only Section 4 (JASAT applet) of interest to CCSC conference attendees, and journal readers.
  - Although this paper/presentation has some technical (computing) references, it is primarily a biology paper, of interest to biology educators and students.

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IDS can lead to an identity crisis (internal or external)

- What are you?

Quantitative $\neq$ Mathematics

- Statistics and Computer Science are also "quantitative"
  - Comp Sci seems to be lagging behind Math and Stats in terms of integration with biology
- There is much more to mathematics than "quantities"
  - many other non-numerical structures
  - a way of thinking and reasoning

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Q. To what extent will biological applications lead to novel mathematics, computer science, and statistics?

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Look for multiple audiences and write differently for each audience.

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- resources (time, $$, etc.)
- hard work
- a community of collaborators (co-conspirators?)
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Good, Better, Best