A Vision for an Integrated Degree Program - a BA/BS and an MA/MS in Computational Science

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What is lacking in today's graduates?

- Limited academic training in modern computational science principles and practices
  - Algorithm Analysis
  - Numerical Methods
  - Parallel Programming
- A typical BA/BS graduate is not always well prepared for a computationally intensive graduate program
- Modern computational methods are sometimes being learned "on-the-job"

Can universities make small but useful changes at the undergraduate level?

- One potential solution: an integrated 5-year BA/BS and an MA/MS degree program
  - BA/BS in engineering or sciences (physical, biological, earth, mathematical or social)
  - MA/MS in Computational Sciences
- Keep the undergraduate curriculum intact, i.e. the students still earn degrees in their chosen majors
- Add 8-10 computationally-focused classes beyond the required freshman year programming class (C++ or Fortran)
- Four classes to be taught in years 2-4 of the 5-year curriculum
  - Algorithm Analysis
  - Mathematical Methods in Sciences and Engineering
  - Parallel Numerical Algorithms
  - Advanced Parallel Programming

Can universities make small but useful changes at the undergraduate level? (cont'd)

- Other four classes to be advanced senior or first-year graduate level classes in the students' majors
  - These classes to have a strong computational content directly tied to the subject matter in disciplines/majors
  - To be taken in years 4 and 5
- Intent is to produce scientists and engineers who are also well versed in computational sciences, especially as it applies to their chosen profession
- Encourage students to write a senior-year thesis with a strong computational component
- Incentivize 5th year with scholarships and grants for motivated students