# How Is Computer Science Changed by Other Disciplines?

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# Isn't It the Other Way Around?

- *Computational* Finance

- *Computational* Biology

- *Computational* Chemistry

- *Computational* Social Science

- The list goes on and on
  - *Tele*medicine
  - *Robotic* Surgery
  - Business *Analytics*
  - *Cyber* security
  - *Digital* Humanities
  - ...
  - *e*-Everything

# But Computer Science *Has* Changed

- The influences are often subtle and indirect
  - The *opportunity* for the "fourth paradigm of science" came from the natural and social sciences, not from computing
- More generally, other disciplines look to computer science to help solve an increasing number of fundamental problems
  - Many computer scientists respond by investigating discipline-relevant computer science problems
  - *Example:* Resource constraints on mobile devices influence algorithm design and selection, program analysis techniques, allocation of functionality between client and server, giving rise to mobile cloud services
- This influence is as natural for computer science as it was for mathematics
  - Tools to reason about and solve problems

# The Challenges Are Many

- Institutional Culture
- Enlightened Administrators
- Top-Down versus Bottom-Up Collaboration
- Learning the Language and Mindset of Other Disciplines

- Faculty Recruitment
- Resources

- *And for computer scientists:*
  Overcoming fears of being "just" a service discipline

# Thanks