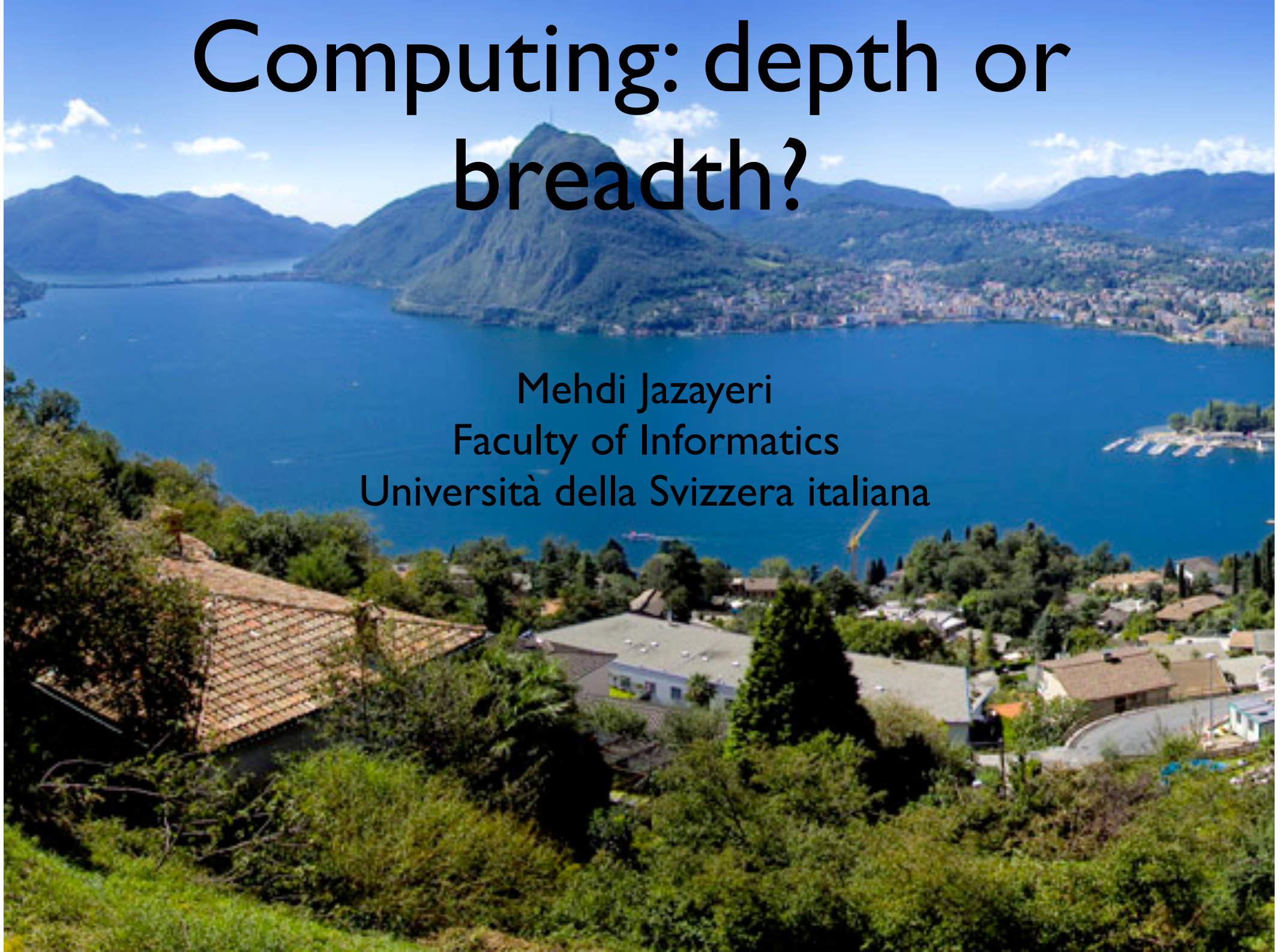
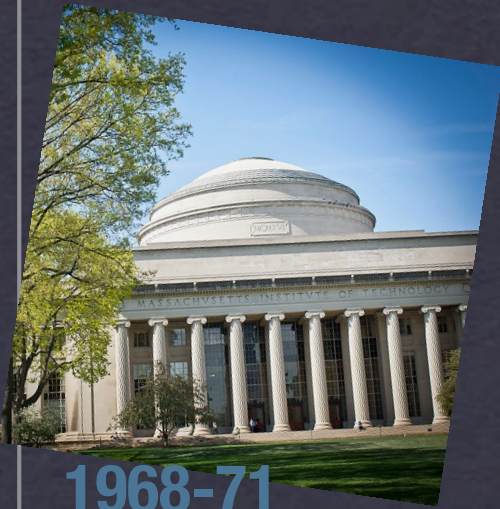


# Computing: depth or breadth?

Mehdi Jazayeri  
Faculty of Informatics  
Università della Svizzera italiana





1968-71



1975-80



1980-94



1994-2007



1971-75



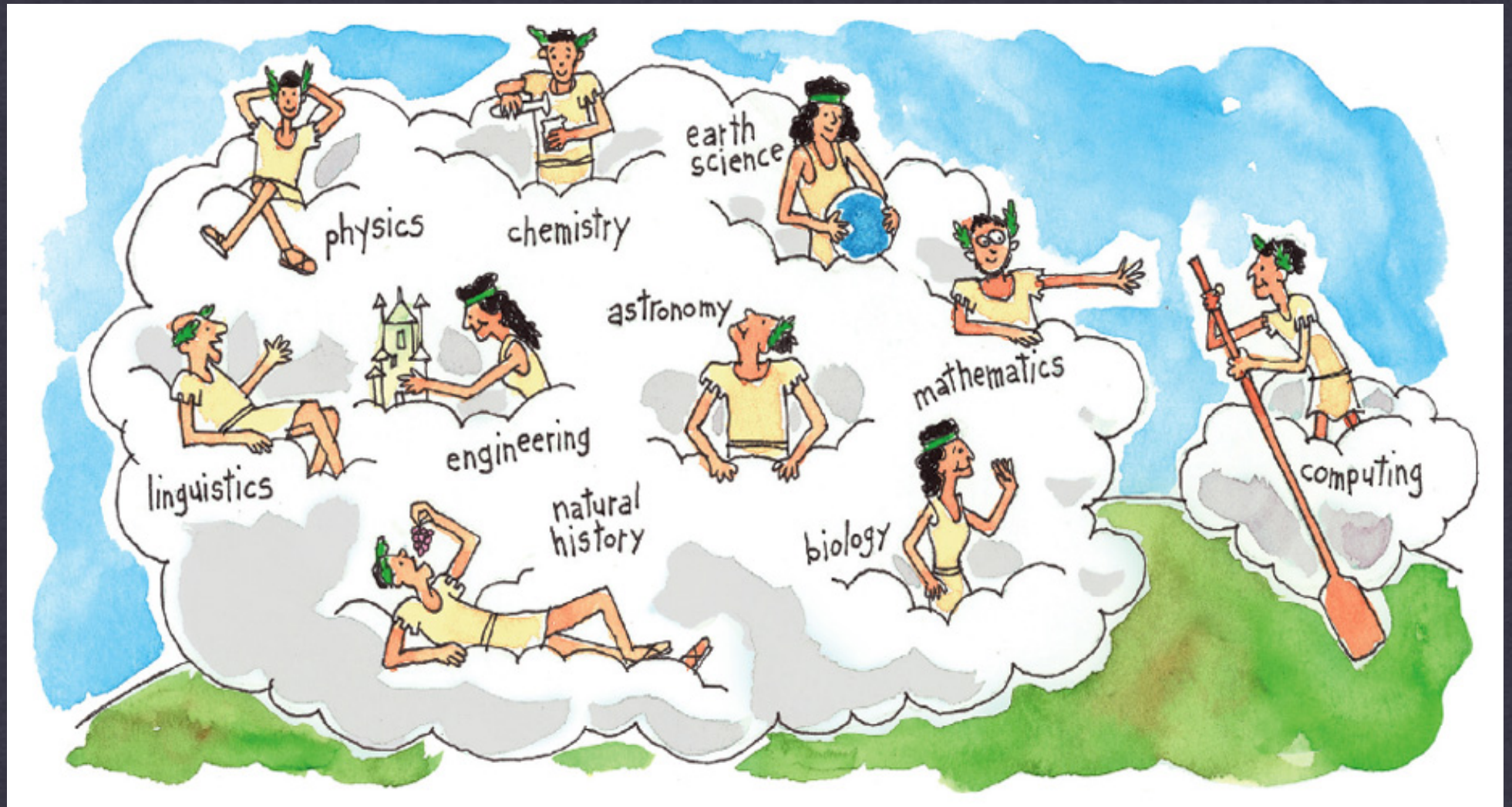
2004-NOW

# MY JOURNEY

1968 - PRESENT

# My history

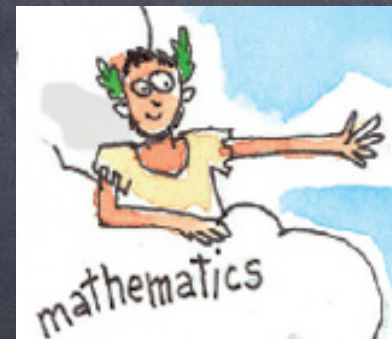
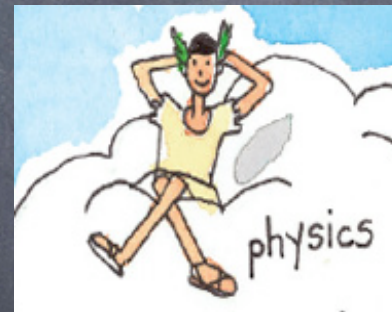
- ◉ Bachelor of science in Electrical Engineering and Computer Science, MIT
- ◉ Master in Computer Engineering, PhD in Computer Science, Case Western Reserve University
- ◉ Assistant Professor, Computer Science Department, University of North Carolina
- ◉ [10 years in industry in Silicon Valley]
- ◉ Professor of Distributed Systems, Technical University of Vienna
- ◉ Dean of the Faculty of Informatics, University of Lugano

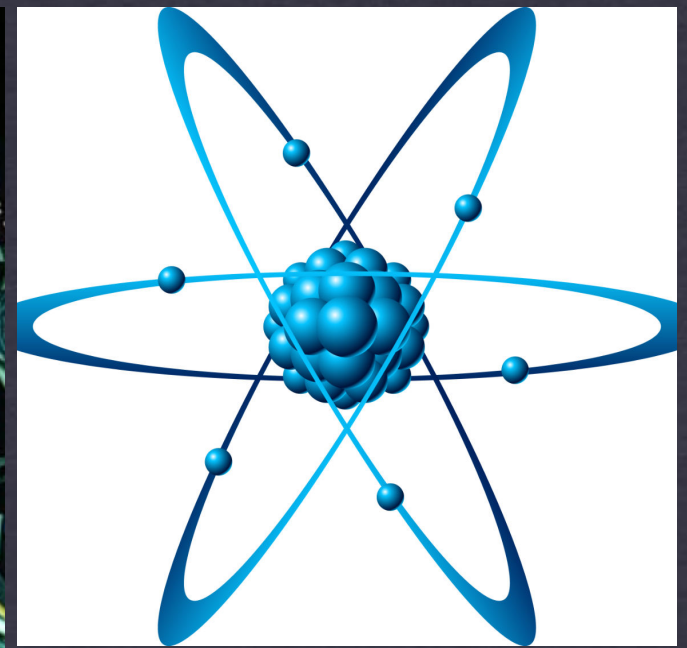
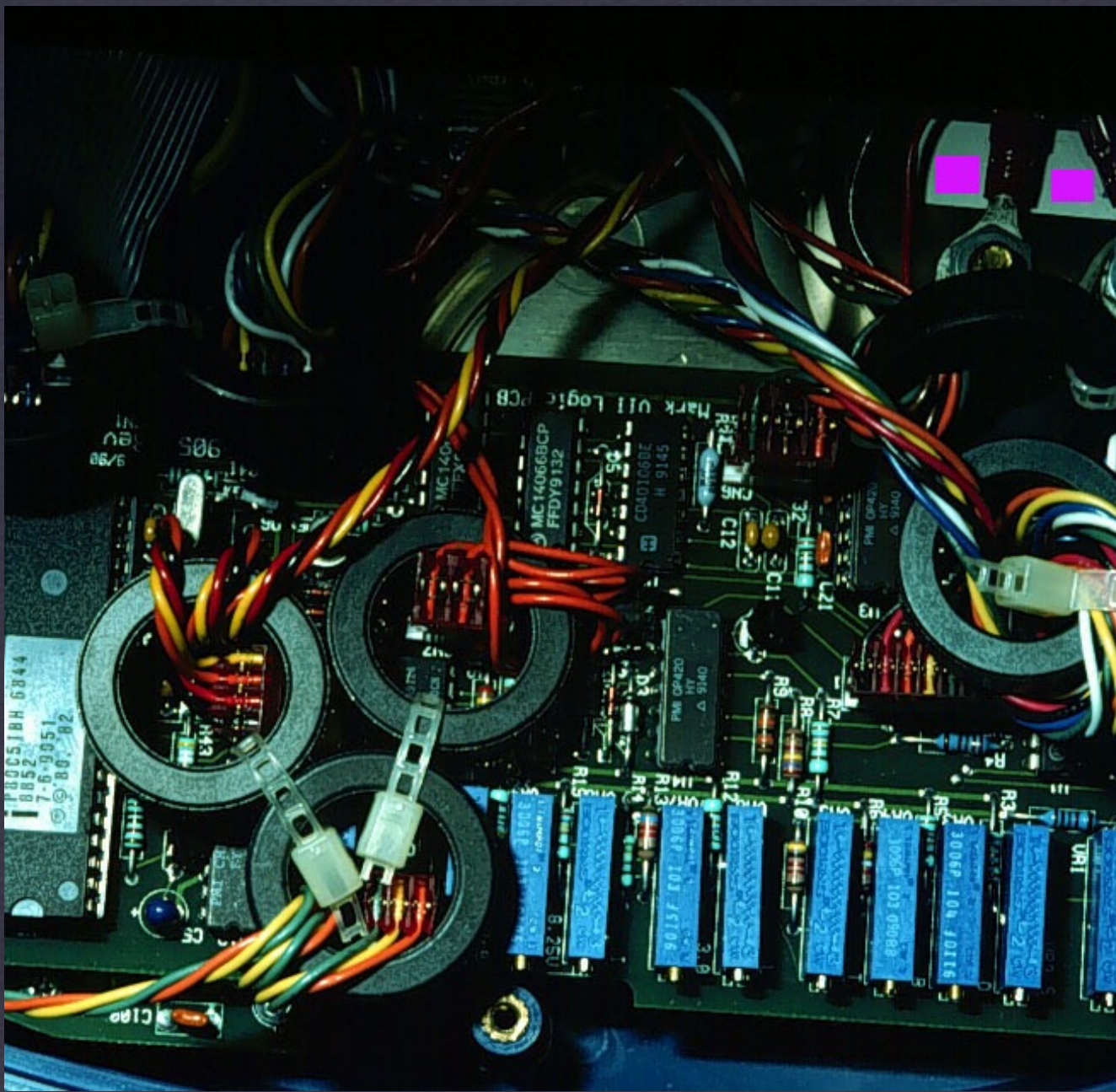


**"Computing may be the fourth great domain of science along with the physical, life and social sciences"**

P.J. Denning, *The great principles of computing*, *The American Scientist*, Sept.-Oct., 2010.

# Yesterday...

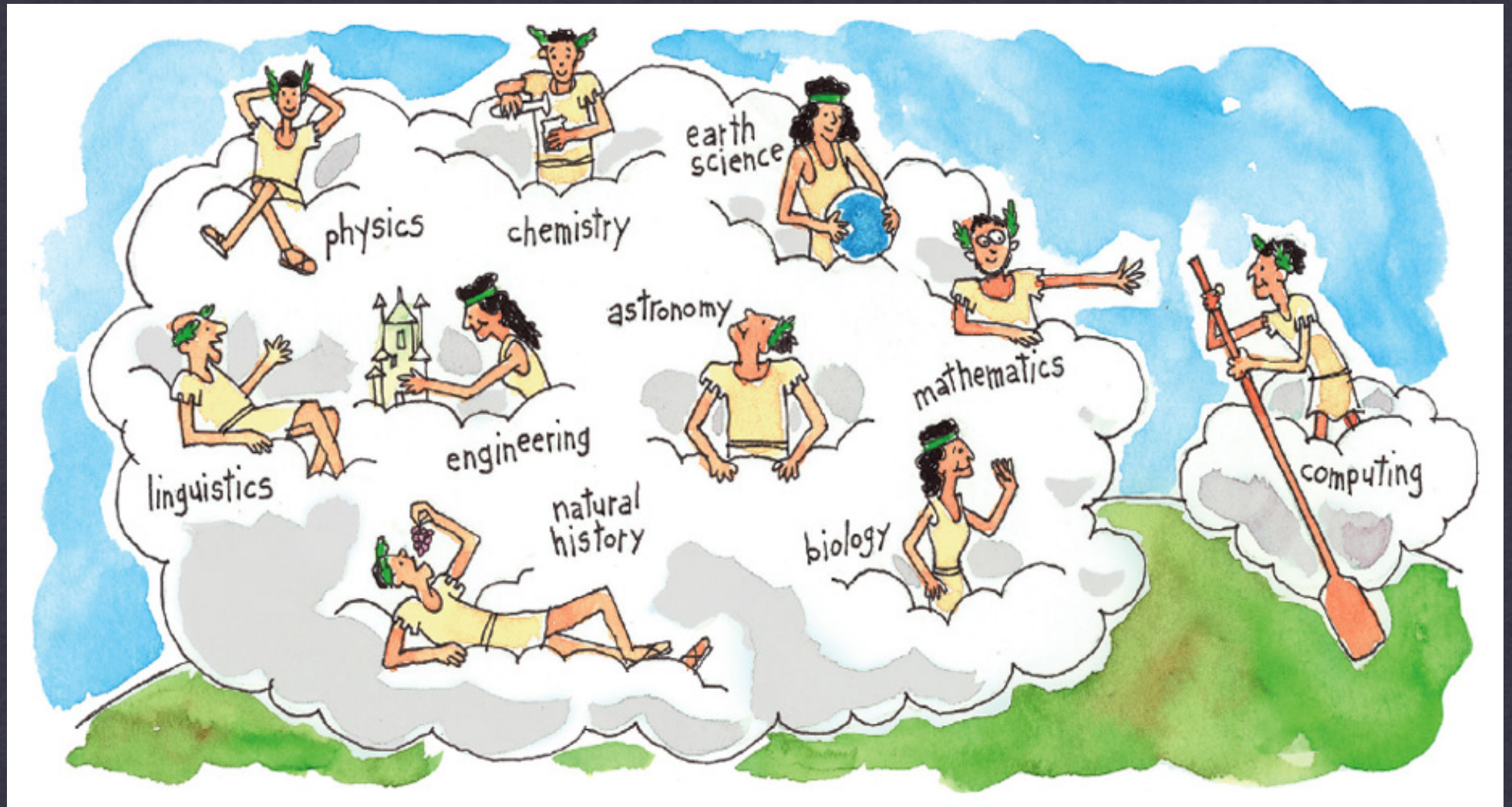




$$\int_{R_n} \dots dx = \int_{R_n} \frac{\partial}{\partial \theta} T(x, \theta) f(x, \theta) dx$$
$$\ln f_{a, \sigma^2}(\xi_1) = \frac{(\xi_1 - a)}{\sigma^2} f_{a, \sigma^2}(\xi_1) = \frac{1}{\sqrt{2\pi\sigma^2}}$$
$$f(x) \cdot \frac{\partial}{\partial \theta} f(x, \theta) dx = M \left( T(\xi) \cdot \frac{\partial}{\partial \theta} \ln L(\xi, \theta) \right)$$
$$f(x) \cdot \left( \frac{\partial}{\partial \theta} \ln L(x, \theta) \right) \cdot f(x, \theta) dx = \int_{R_n} T(x) \cdot \left( \frac{\partial}{\partial \theta} \frac{f(x, \theta)}{f(x, \theta)} \right) \cdot f(x, \theta) dx$$
$$T(\xi) = \frac{\partial}{\partial \theta} \int_{R_n} T(x) f(x, \theta) dx = \int_{R_n} \frac{\partial}{\partial \theta} T(x) f(x, \theta) dx$$

# WHERE WE COME FROM

ELECTRICAL ENGINEERING, PHYSICS, MATHEMATICS



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P.J. Denning, *The great principles of computing*, *The American Scientist*, Sept.-Oct., 2010.

# Proliferation of hyphenated fields

- Computational physics, chemistry, biology, ...
- Computational geology, mathematics, ...
- Computational culture, sociology, linguistics...
- Social computing, public interest computing, ...
- Web informatics, {Security, Media} informatics
- {Medical, Health, Health Communication, Bio}  
informatics
- Computational Informatics

# Implications for

- ◉ Individual researchers
- ◉ Department level in university
- ◉ Discipline
- ◉ Profession

# Individual Researcher

- ◉ Should I specialize in core computer science or take my computer science expertise into an application field
- ◉ Where do I publish?
- ◉ Am I just a programmer?
- ◉ Where do I get funding?

# Department level

- How do we divide the budget?
- Do we hire computer scientists or application level experts?
- Are we producing just programmers or scientists?

# Discipline and profession

- ◉ Are we a unique science or are we (only) providing a service to other disciplines?
- ◉ What does a certification as a computer scientist guarantee?
- ◉ Are application specialists computer scientists?

# Teaching

- ◉ Who are our students?
- ◉ What do we produce?
- ◉ What do we teach?
  - ◉ MIT model
  - ◉ Stanford model

# ACM-IEEE Computer Science Curriculum

- Curriculum '68
- Curriculum '78 (core knowledge)
- CC1991 (knowledge units)
- CC2001 (Body of knowledge)
- CC2008 (Interim report)
- CC2013 (Big tent)

# Three models

- MIT: Introduction to computing required for all university students
- Stanford: Allow computer science students to specialize in other disciplines
- Bologna 3-2: core + specialization

# Big tent view of computing

- ◉ Requires major overhaul of curriculum
- ◉ While still developing the core