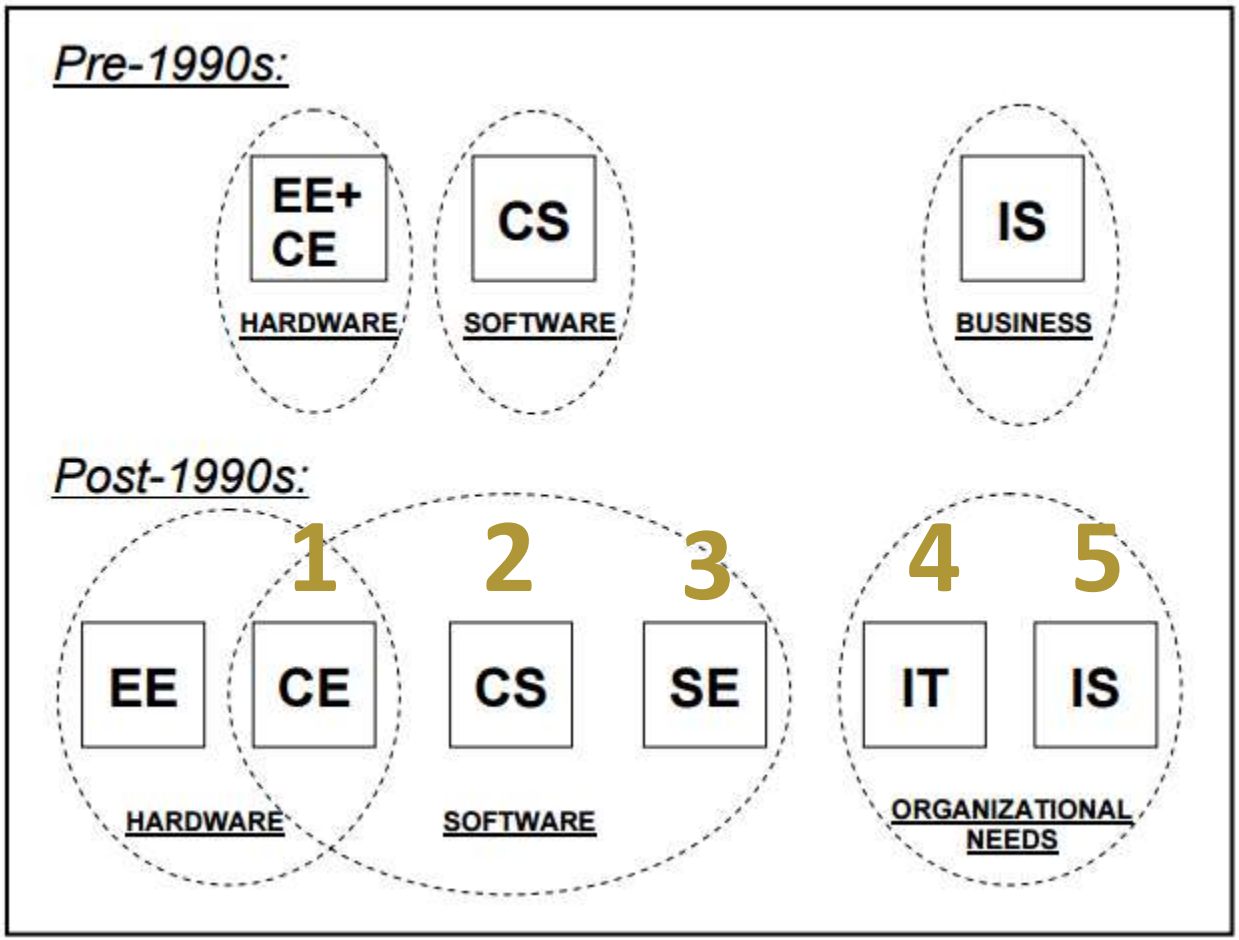
Introduction to Computing

Dr. Ajantha Atukorale
aja@ucsc.cmb.ac.lk

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

WHAT IS COMPUTING ?

Developments in Computing



Computing @ UCSC

- **Computer Science – Internal UG (3/4)**
- **Information Systems – Internal UG (3/4)**
- **Software Engineering – Internal UG (4)**
- **Information Technology – BIT External UG (3)**
- Computer Engineering – **Not Offered**

Common Elements of Volumes

- Identify a **body of knowledge**
- Define "**core**" knowledge
- Describe **courses and common structures** to create degree programs
- Specify the **intended results as outcomes** or **characteristics of graduates**

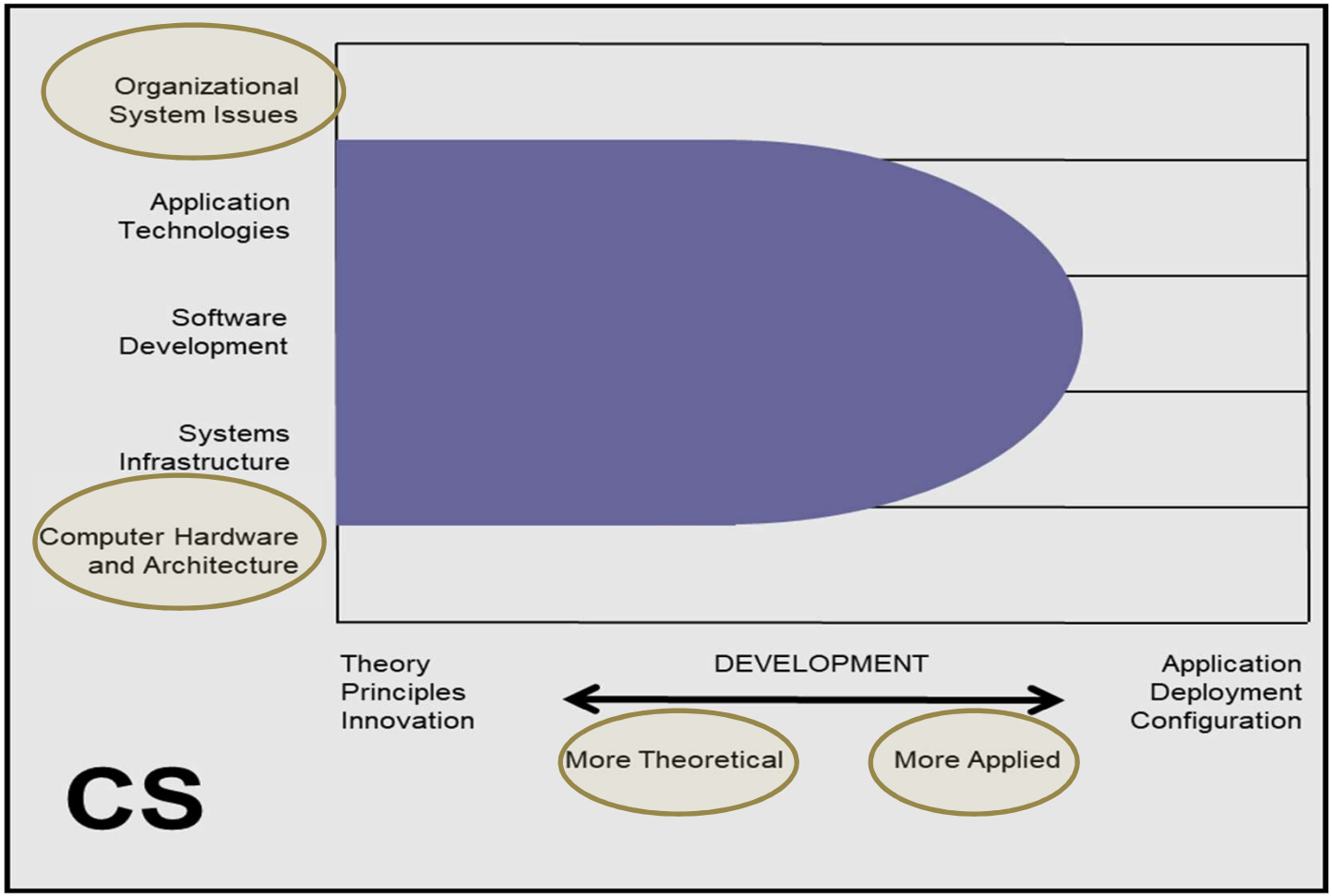
Science Vs Engineering

- Science **seeks to explain** phenomena through **theory**, **hypothesis**, and **experiment**, in an effort to ascertain natural laws
  - For example, chemistry investigates the structure of chemicals and their interactions
- Engineering **seeks to apply** natural laws to the solution of practical problems
  - For example, chemical engineering might use the results of chemistry to come up with a better way of refining gasoline

Computer Science

- They **design and implement** software. Computer scientists take on challenging **programming jobs**.
- They devise new ways to use computers.
- Progress in the CS areas of networking, database, and human-computer-interface enabled the development of the World Wide Web.
- They develop effective ways to solve computing problems. Their **theoretical background** allows them to determine the best performance possible, and their **study of algorithms** helps them to develop new approaches that provide better performance.

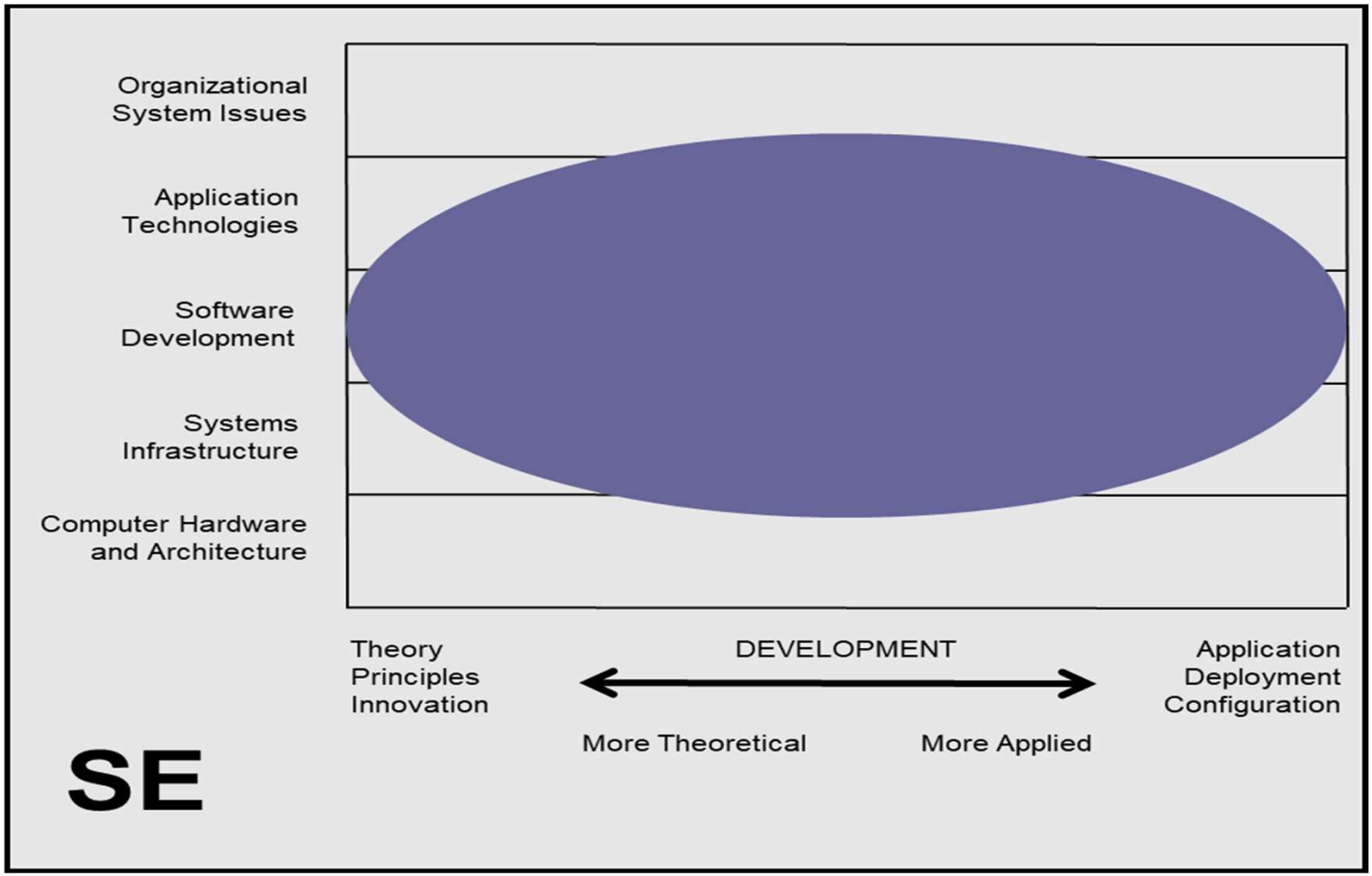
Computer Science



Software Engineering

- Software engineering is the discipline of **developing and maintaining software systems** that behave **reliably** and **efficiently**, are affordable to develop and maintain, and satisfy all the **requirements that customers** have defined for them.
- Software engineering is different in character **from other engineering disciplines**.
- It seeks to integrate the **principles of mathematics** and **computer science** with the **engineering practices** developed for tangible, physical artifacts.

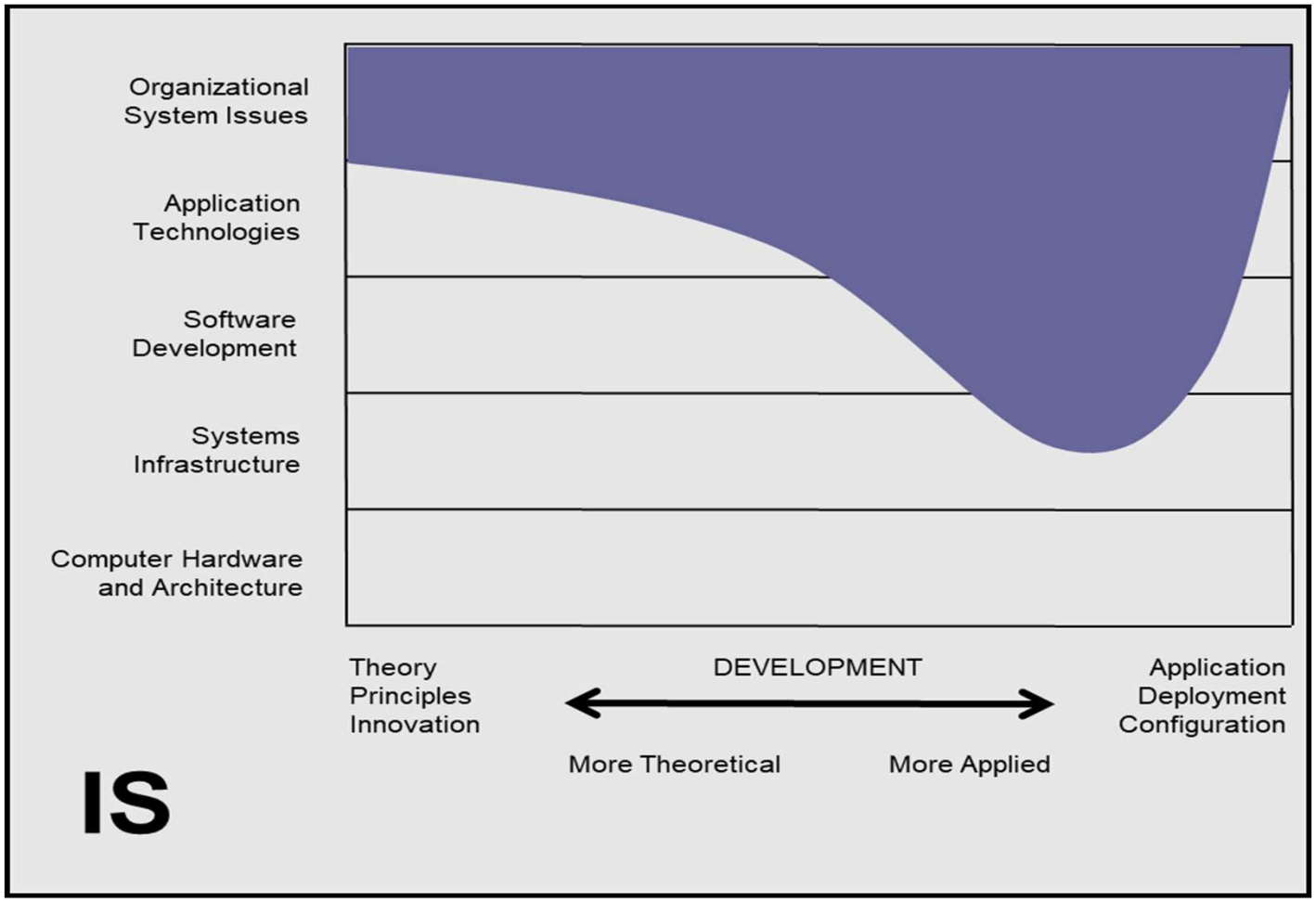
Software Engineering

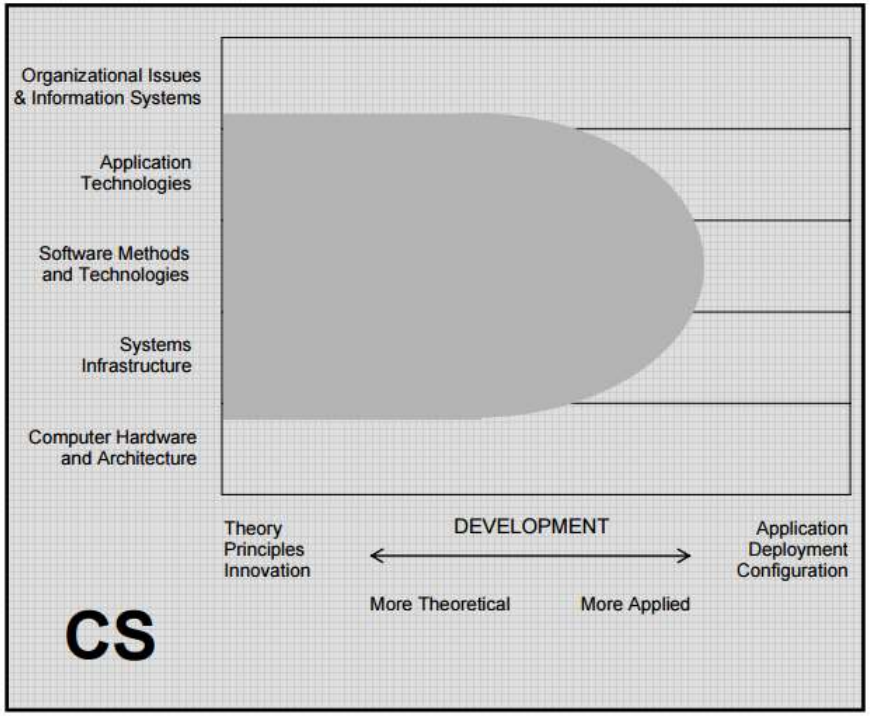


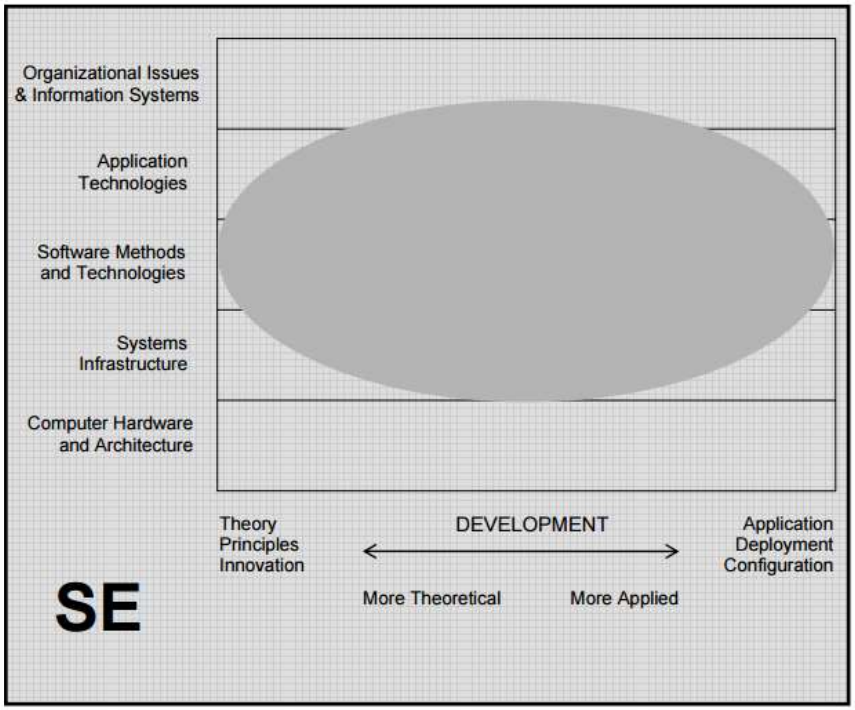
Information Systems

- Information systems specialists focus on **integrating information technology solutions** and **business processes** to meet the information needs of **businesses** and other **enterprises**, enabling them to **achieve their objectives** in an **effective**, **efficient** way.
- They must understand **both technical** and **organizational factors**, and they must be able to help an organization determine how **information and technology-enabled** business processes can provide a **competitive advantage**.

Information Systems




Organizational Issues & Information Systems
Application Technologies
Software Methods and Technologies
Systems Infrastructure
Computer Hardware and Architecture
Theory Principles Innovation
DEVELOPMENT
Application Deployment Configuration
More Theoretical
More Applied
CS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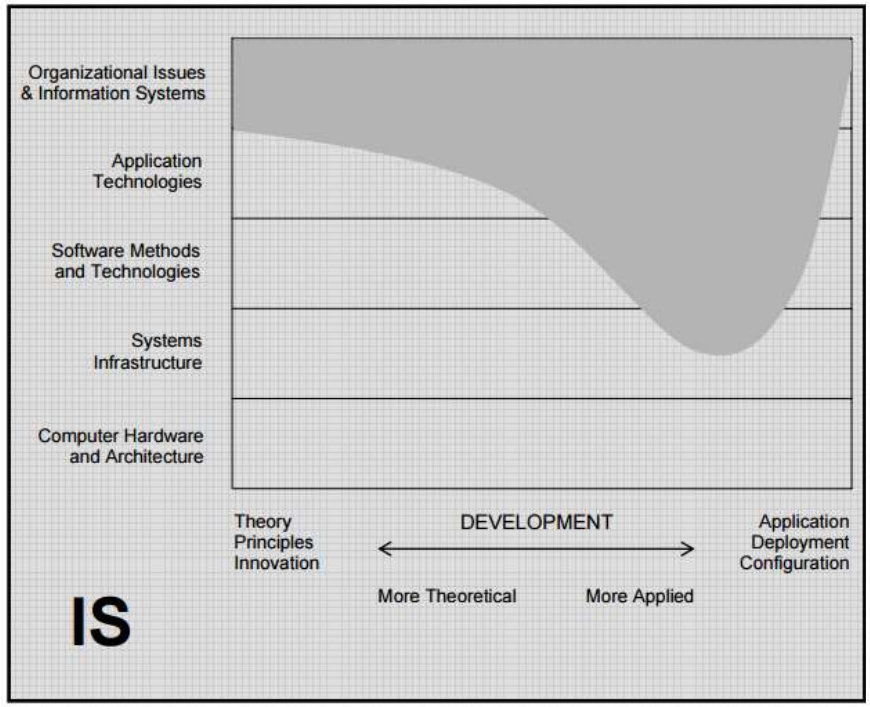
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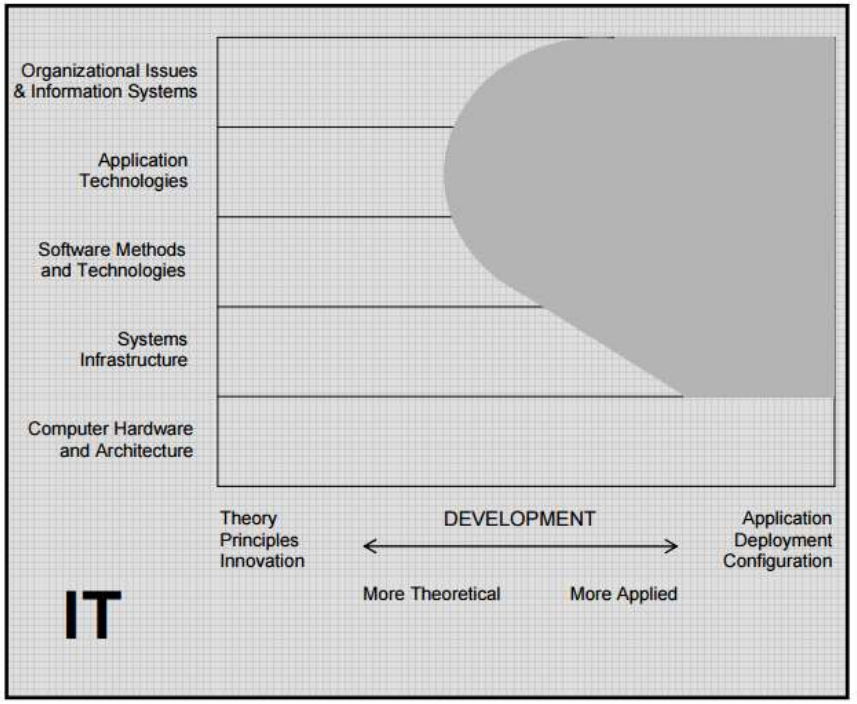
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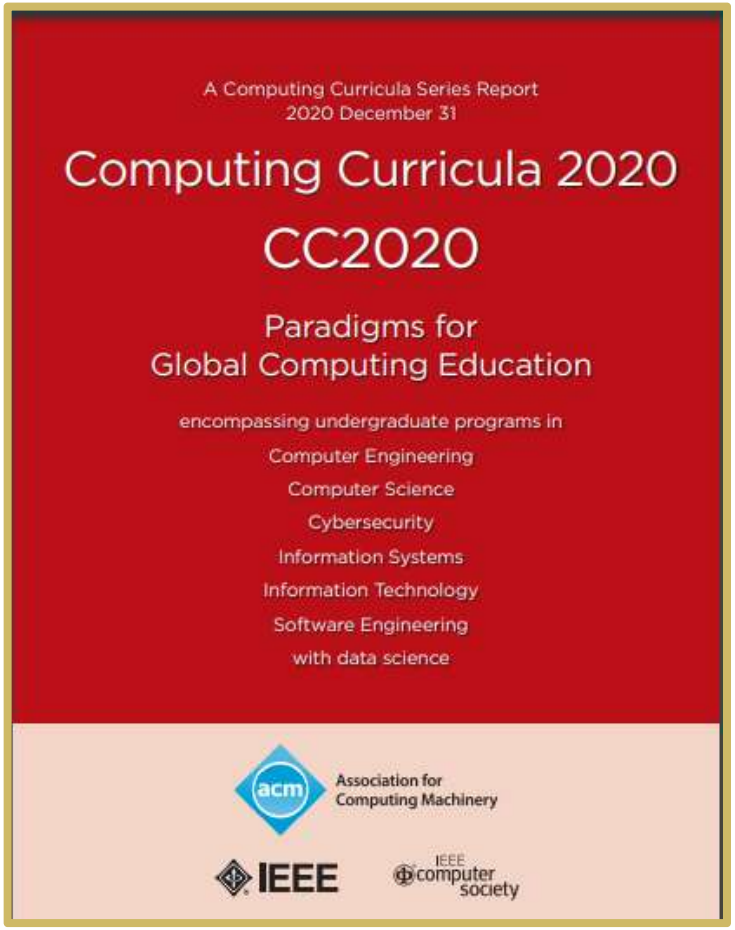
IT

Computing Curricula 2020 (CC2020)

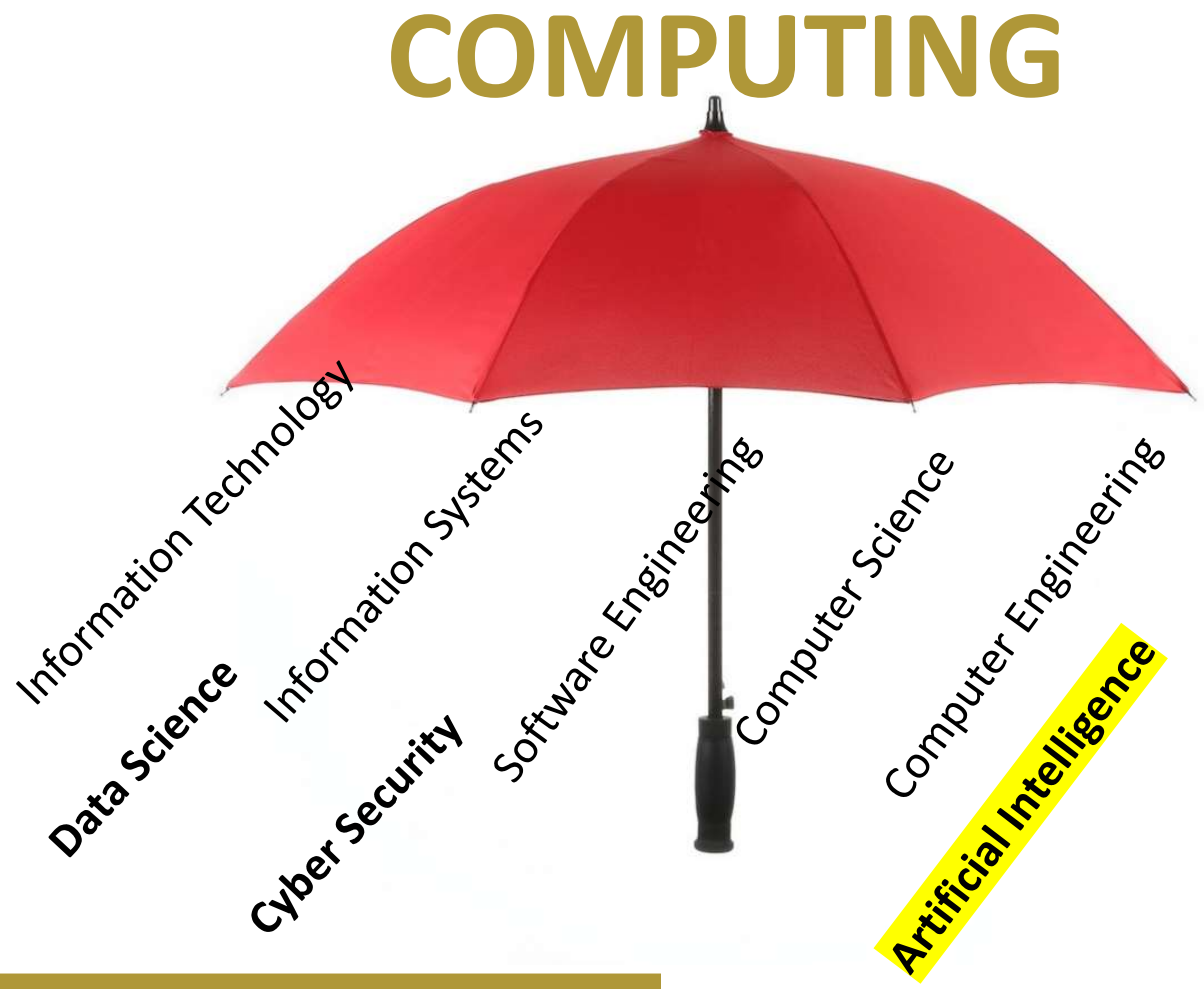
Computing Curricula 2020 (CC2020) seeks to generate a modern revision of the well-known CC2005 document by reflecting a more current view of computing, including the addition of new and emerging sub-disciplines like cybersecurity and data science.

Further, CC2020 proposes a competency-based characterization of computing, as well as a bottom-up organization of computing into its sub-disciplines based on an analysis of competencies.



https://www.acm.org/education/curricula-recommendations

Areas of Computing



Areas of Computing

- Current areas with approved curriculum documents
  - Computer Engineering
  - Computer Science
  - Software Engineering
  - Information Systems
  - Information Technology
- New areas that are meeting to develop curriculum
  - Cyber Security
  - Data Science
- Others
  - Artificial Intelligence

Undergraduate Curriculum Guidelines

Computer Science

- **CS2013**: Curriculum Guidelines for Undergraduate Programs in Computer Science (English)

Software Engineering

- **SE2014**: Curriculum Guidelines for Undergraduate Degree Programs in Software Engineering

Computer Engineering

- **CE2016**: Computer Engineering Curricula 2016

Information Technology

- **IT2017**: Curriculum Guidelines for Baccalaureate Degree Programs in Information Technology

Cybersecurity

- **CSEC2017**: Curriculum Guidelines for Post-Secondary Degree Programs in Cybersecurity

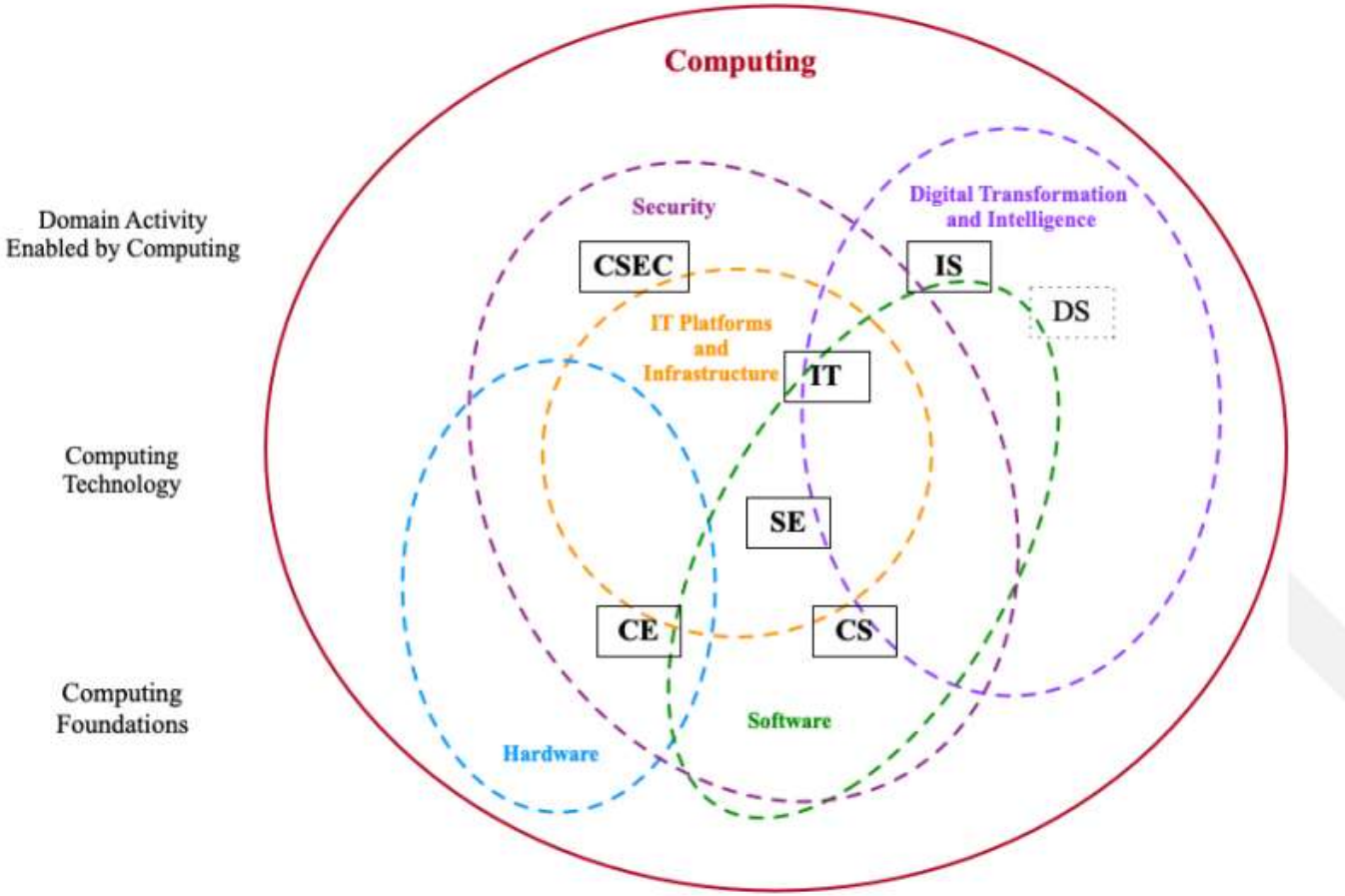
Information Systems

- **IS2020**: A Competency Model for Undergraduate Programs in Information Systems

Data Science

- **CCDS2021**: Computing Competencies for Undergraduate Data Science Curricula

Landscape of Computing Education



Computing: The Profession