The Knowledge Triangle for Advancing Complex Systems

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University of Athens

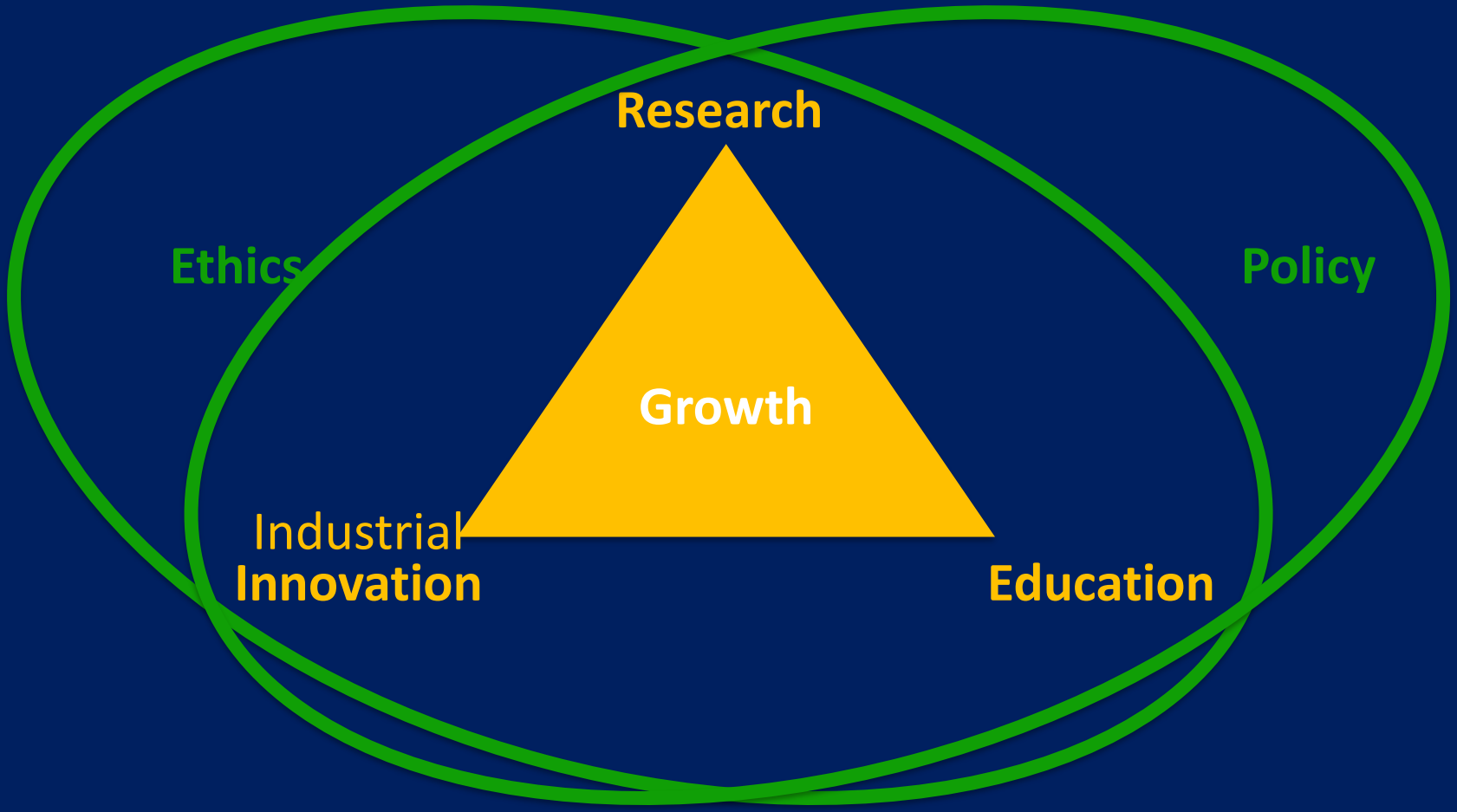
Athena Research Center 

ACM Past President

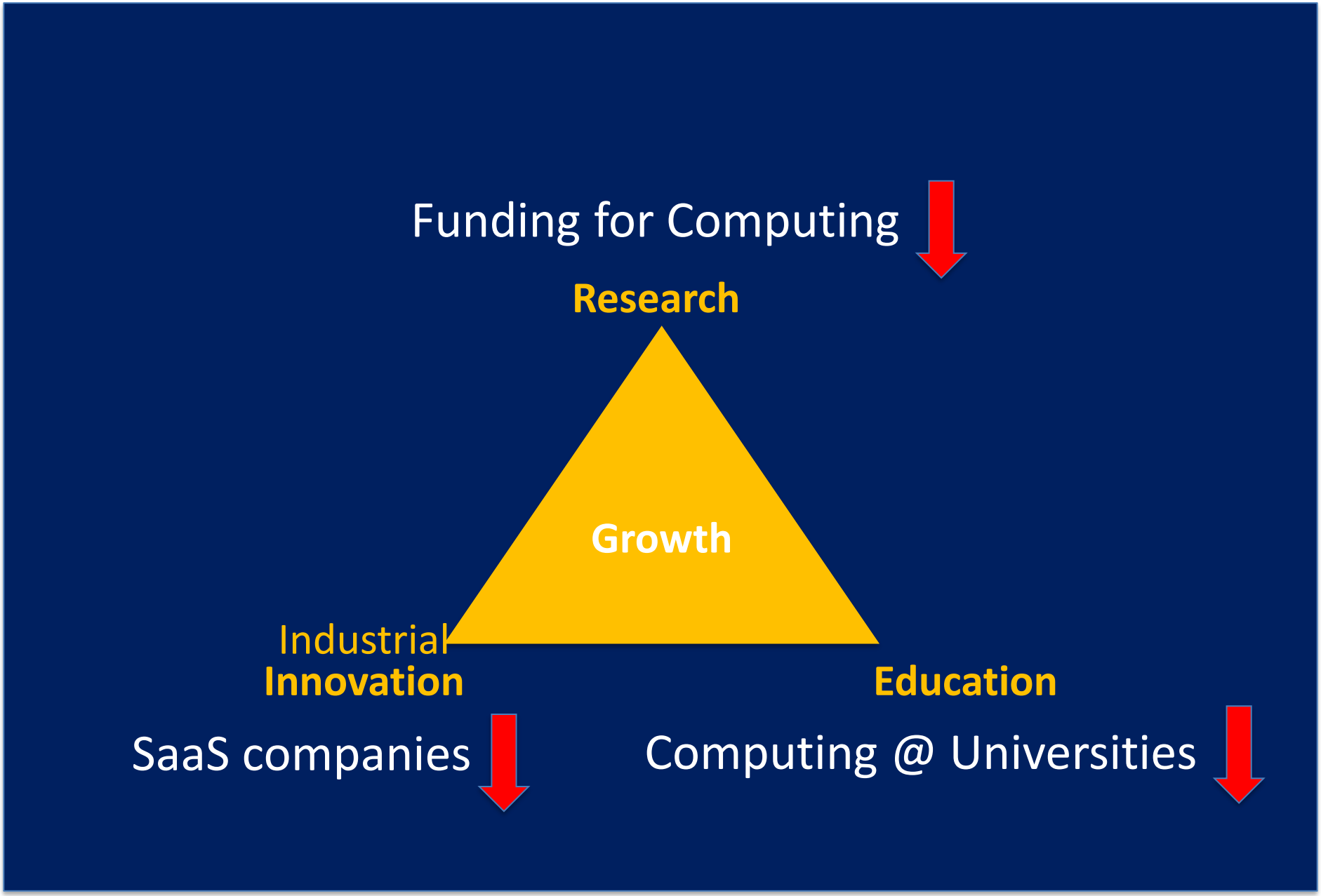


2nd Systems Workforce Summit, Delft, Netherlands, 27-28 October 2026

Triangle of Knowledge



AI will soon be better than any human at writing reliable, optimized code


Funding for Computing
Research
Growth
Industrial
Innovation
Education
SaaS companies
Computing @ Universities

AI will soon be better than any human
at writing reliable, optimized code

Coding is small % of Software Engineering
Software is only part of Computing

New Knowledge in the Triangle

Software Design and Orchestration
Agents need a harness

System Integration
Teamwork
Human-2-Human communication

Data and Knowledge Engineering
Clear, clean, consistent requirements
Semantically meaningful data

Physical World
Top-down vs. bottom-up knowledge

New Knowledge in the Triangle

Systems expertise needs holistic interdisciplinary skills

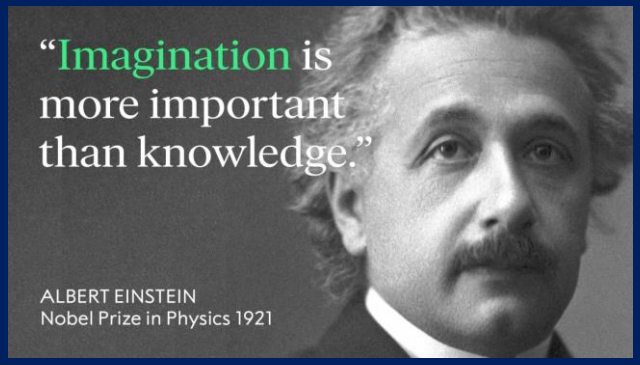
All formal education (preschool to graduate school) with horizontal integrative projects

computational, modeling, engineering, social thinking

New Knowledge in the Triangle

Technological progress at exponential speed

What knowledge for 60 years (preschool to retirement)



Out-of-the-Box Thinking

Vision and creativity

Novelty and innovation

"Meta-Thinking"

Learn how to Learn - Think how to Think

Gartner Top Strategic Technology Trends for 2026

● **Now** (1 – 3 years) ○ **Near** (3 – 5 years)



The Architect

1. AI-native development platforms
2. AI supercomputing platforms
3. Confidential computing

The Synthesist

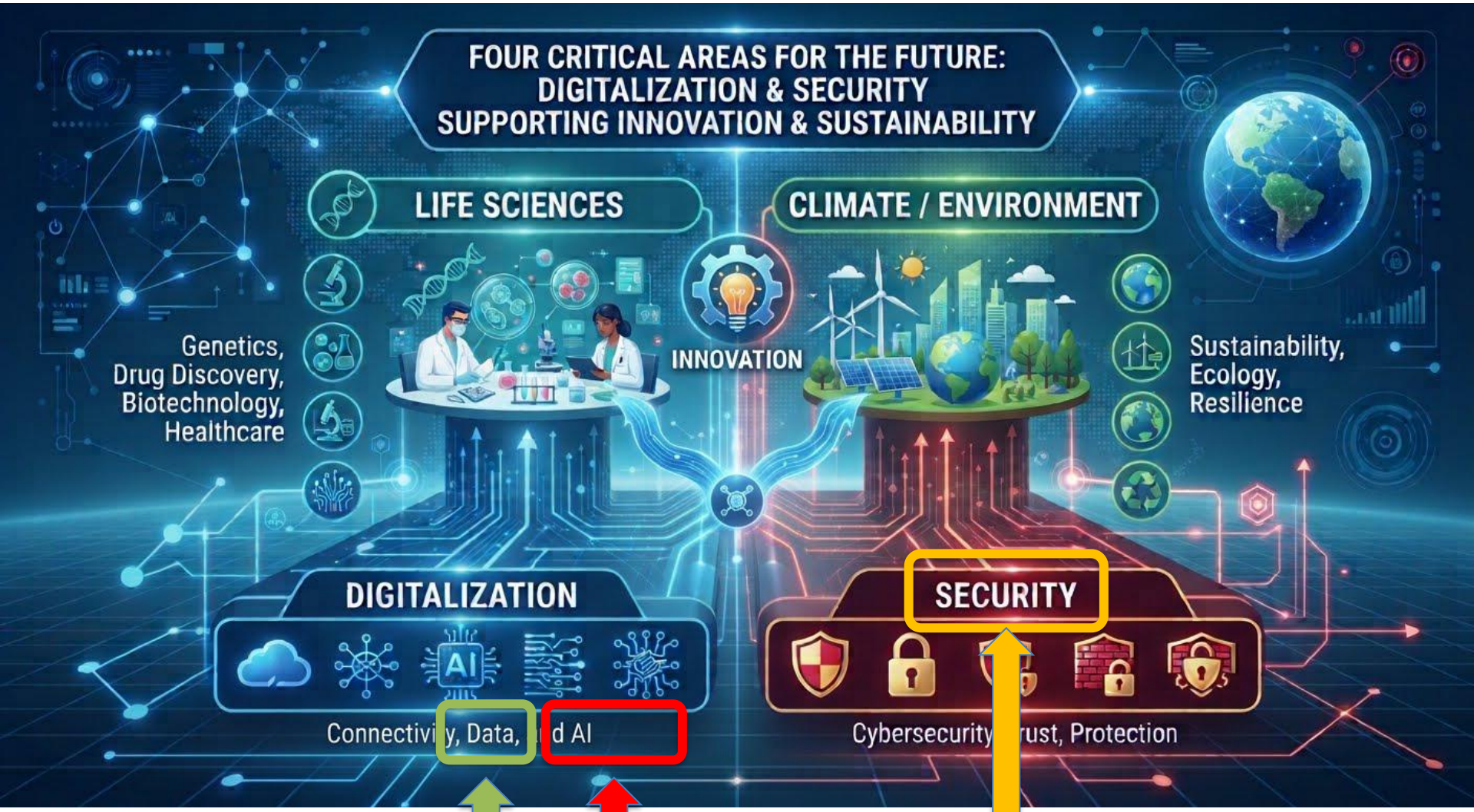
4. Multiagent systems
5. Domain-specific language models
6. Physical AI

The Vanguard

7. Preemptive cybersecurity
8. Digital provenance
9. AI security platforms
10. Geopatriation

Source: Gartner
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Gartner


FOUR CRITICAL AREAS FOR THE FUTURE:
DIGITALIZATION & SECURITY
SUPPORTING INNOVATION & SUSTAINABILITY
LIFE SCIENCES
CLIMATE / ENVIRONMENT
Genetics,
Drug Discovery,
Biotechnology,
Healthcare
INNOVATION
Sustainability,
Ecology,
Resilience
DIGITALIZATION
AI
SECURITY
Connectivity, Data, and AI
Cybersecurity, Trust, Protection

Understanding the principles behind

AI modeling

Data manipulation and exploration

Security

is fundamental for any future systems professional



Association for
Computing Machinery

Association for Computing Machinery

Advancing Computing as a Science & Profession

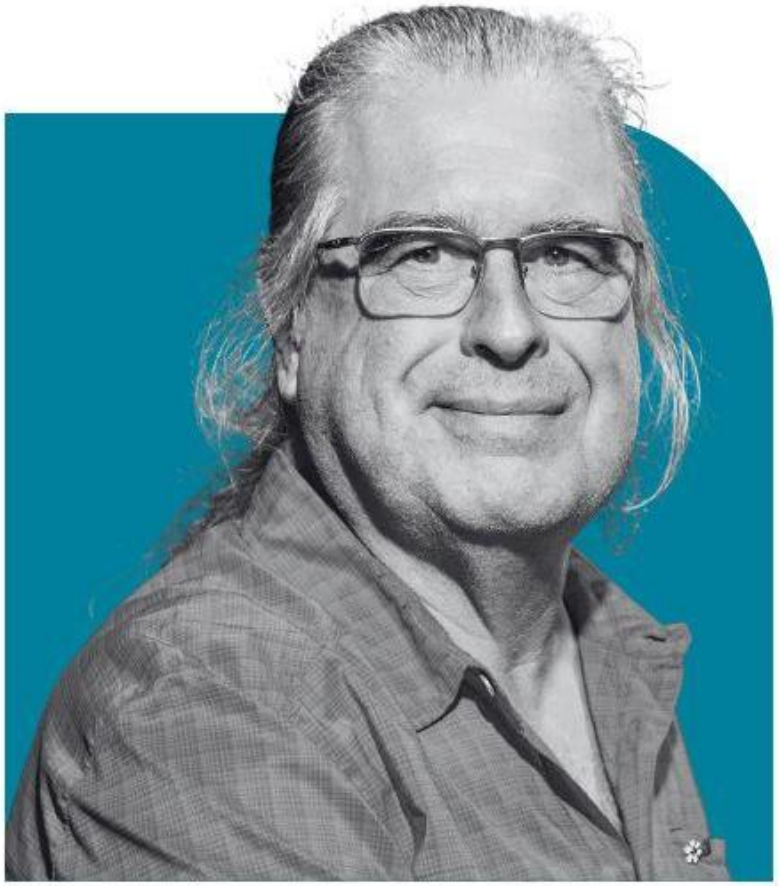
We see a world where computing helps solve tomorrow's problems.

Established in 1947

ACM A.M. TURING AWARD



ACM A.M. TURING AWARD RECIPIENTS

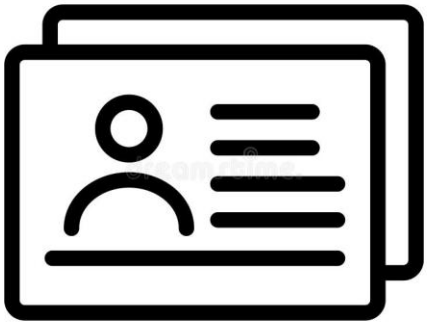


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Association for Computing Machinery



Professional Society



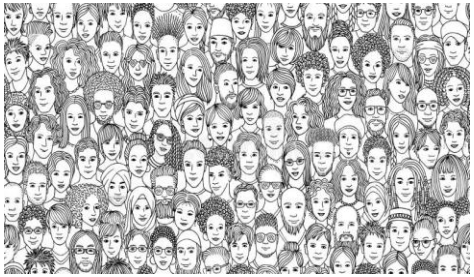
Publisher



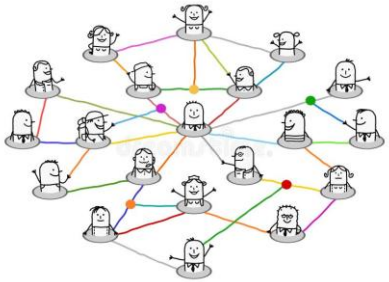
Event Organizer



Learning Center



Community Builder



Social Network



Think Tank



Career Mentor

Professional Society

85K professional members – 35K student members

190 countries (all 7 continents)

Community Builder

200 professional chapters – 600 student chapters

37 Special Interest Groups

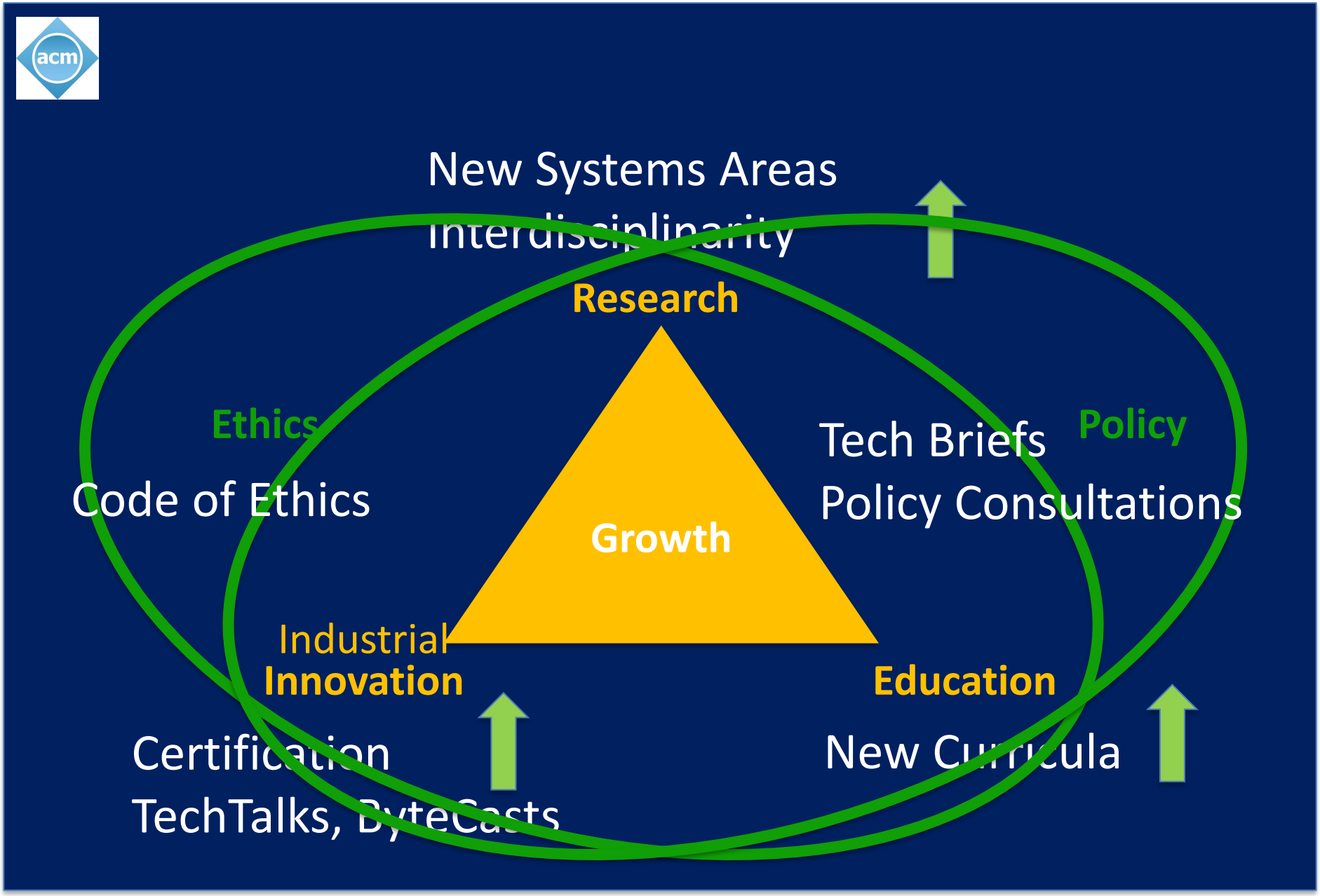
Event Organizer | Publisher | Learning Center

5M people engaging and benefiting

180 conferences, 80 journals and magazines

40K papers / year


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ACM is now Open Access
As part of the Digital Library's transition to Open Access, new features for researchers are available as the Digital Library Premium Edition
Click here to read ACM President Elisa Bertino's statement on the possibility of opening the Digital Library to LLMs

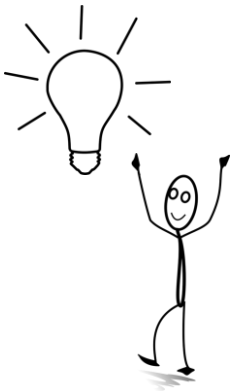

New Systems Areas
Interdisciplinarity
Research
Ethics
Code of Ethics
Policy
Tech Briefs
Policy Consultations
Growth
Industrial
Innovation
Education
Certification
TechTalks, ByteCasts
New Curricula


ECONOMY
SOCIETY
BIOSPHERE
SUSTAINABLE
DEVELOPMENT
GOALS


BE SURE TO WASH YOUR HANDS AND ALL WILL BE WELL
COVID 19
RECESSION
CLIMATE CHANGE
BIODIVERSITY COLLAPSE
WAR



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The End



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