

Technology and the Liberal Arts

(Version α)

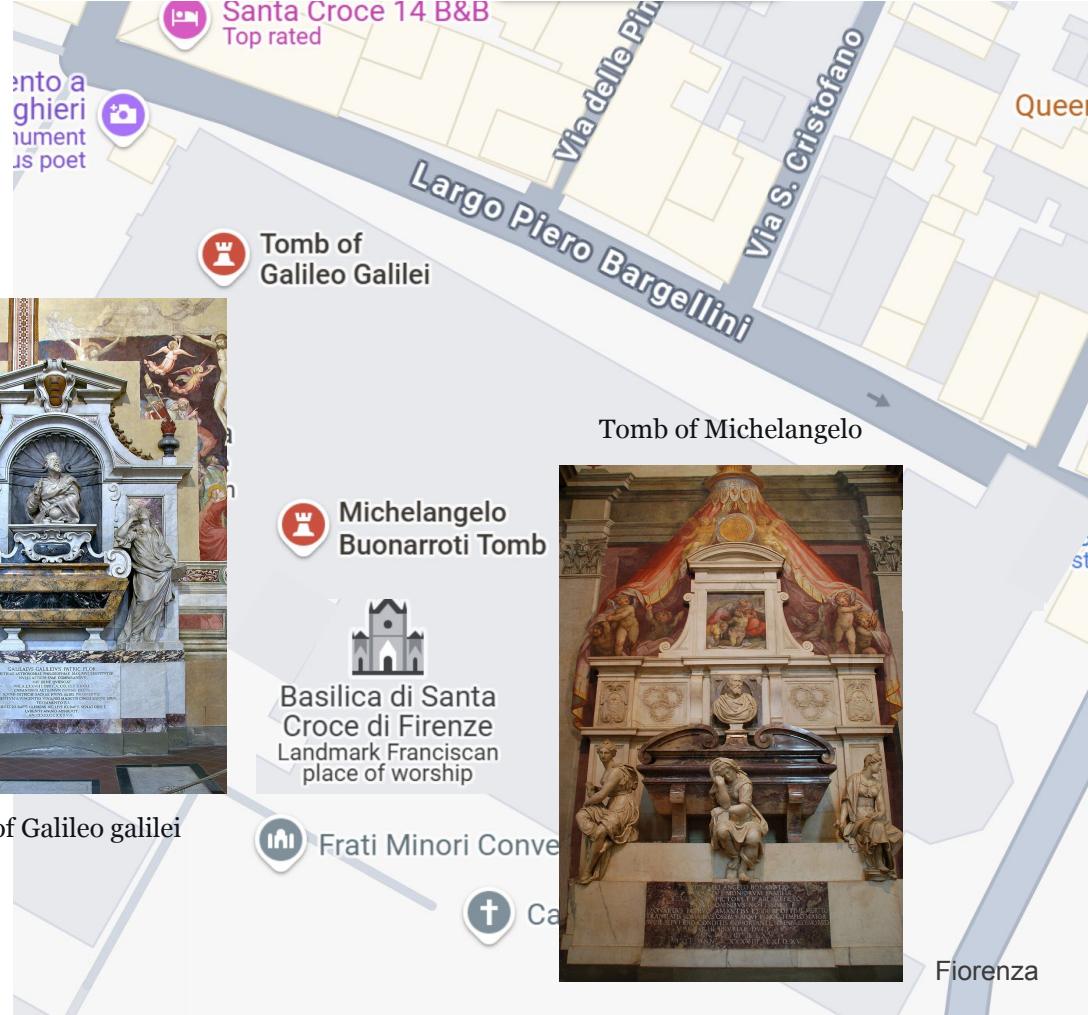
For MITHIC Colloquium

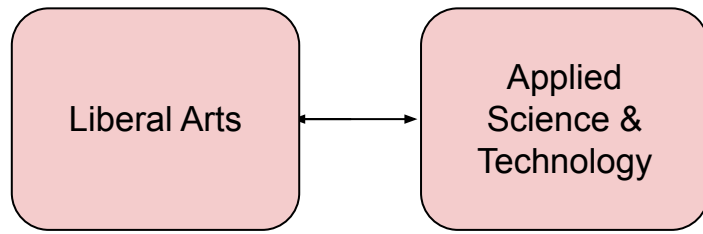
3PM - 4PM

May 14th, 2025

Dr. Alfred Z. Spector, Professor of Practice, EECS

Based on joint work with Frederick Lawrence, Secretary/CEO of Φ BK





- **Premise:**

- Technology, particularly AI, is historically different than previously, in terms of its depth and breadth of impact
- It will have even more profound effects on the future than has even previous technical change
- In particular, technology is addressing challenges that long been the focus of the Liberal Arts

- **General Implications:**

- Applying technology effectively will require technologists to have more perspective from the liberal arts
- Technology will also help the missions of the liberal arts due to data, tools, and new challenge
- We need this fusion of technology and the Liberal Arts if we, both as individuals and as an informed citizenry, are to navigate our complex future

- **Practical implications:**

- Technology faculty and students should attend more to the Liberal Arts & Liberal Arts faculty and students should attend more to technological change
 - Courses offered by both faculties should be more accommodating to the techniques and objectives provided by the other
 - This is feasible: Technology and liberal arts students should wisely use their electives and/or choose complementary minors.
- Each group of students may benefit career-wise:
 - Technology students may find that their breadth will become increasingly important as technology development becomes increasingly automated
 - Liberal arts students will find their broader education yields greater success and relevance in their chosen career paths.
- Many of higher education's internal challenges may be solved by more collaboration between its more applied disciplines and the methodologies of the humanities and social sciences

Definitions

- Liberal Arts - the skills (Latin, *artes*) needed to allow individuals to think freely and independently (Latin, *liberales*) and to be competent participants in complex, societal undertakings.
 - The ancient Greeks defined seven categories of the liberal arts: grammar, logic and rhetoric, geometry, arithmetic, astronomy, and music
 - Modern liberal arts institutions, including Phi Beta Kappa, define the liberal arts to include the **humanities, social sciences, mathematics and the physical sciences**
 - an emphasis on understanding and reasoning, not vocation or application
- Technology - is the application of scientific advancement for practical benefit, encompasses the multi-disciplinary advances that are generating new products, services, treatments, and even modes of living.
 - Artificial intelligence is most on our minds today; although timing is unclear, AI will duplicate more and more human capabilities, change the nature of human discourse and work, and speed up progress in other sciences.
 - However, biomedical advances in neuroscience, genetics, precision medicine, and brain-computer interfaces (in part accelerated by AI) are likely to have just as big an impact

What's Different?

Technology Itself

1. Breadth of impact
2. Depth of impact
3. Complexity of impact
4. Geopolitical impact
5. Rapid progress
6. Potential to accelerate further advances
7. Potential existential risks

Society

1. Risk aversion
2. Less obvious necessity

Technology influencing age-old human challenges

Examples

1. Understanding human biology and intelligence
2. Procreation and life-span
3. Human labor (invention and work) and economic systems
4. The body politic, jurisprudence, just-war theory, etc.
5. Personalization, nudging, filter bubbles, collectivist control
6. Communication patterns
7. Short-term benefits but long-term harms
8. Highly compelling personal avatars (even the dead's); almost “persons”

You **can't** always get what you want
But, if you try sometime you'll find
You **get** what you need

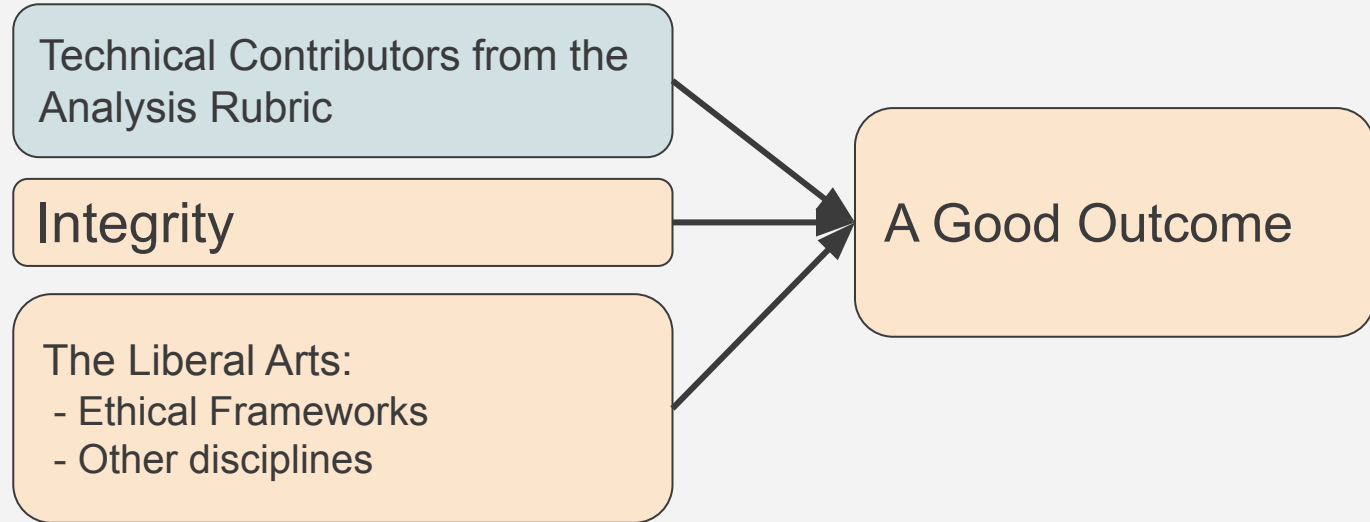
Professor Mick Jagger

You **can** always get what you want
But, if you try sometimes, you'll find
You **don't get** what you need.

Data Science and Artificial Intelligence

Technology's Need for the Liberal Arts

A Decision-Making, 3-Part Framework



From: [Gaining Benefit from Artificial Intelligence and Data Science: A Three-Part Framework](#), A. Spector - Communications of the ACM, 2024

1. Technologists Can *Partially* Address These Challenges

- Specific to engineering and science field
 - Structural engineering: corrosion, hairline fractures, etc.
 - Medicine: side effects, dosing, cost-benefit, etc, etc.
- For data science: the rubric elements:

Tractable Data	Technical Approach	Dependability	Understandability	Clear Objectives	Toleration of Failures	Ethics, Legal, Societal Considerations

Privacy	
Security	
Abuse-resistance	
Resilience	

Dependability

Analysis Rubric

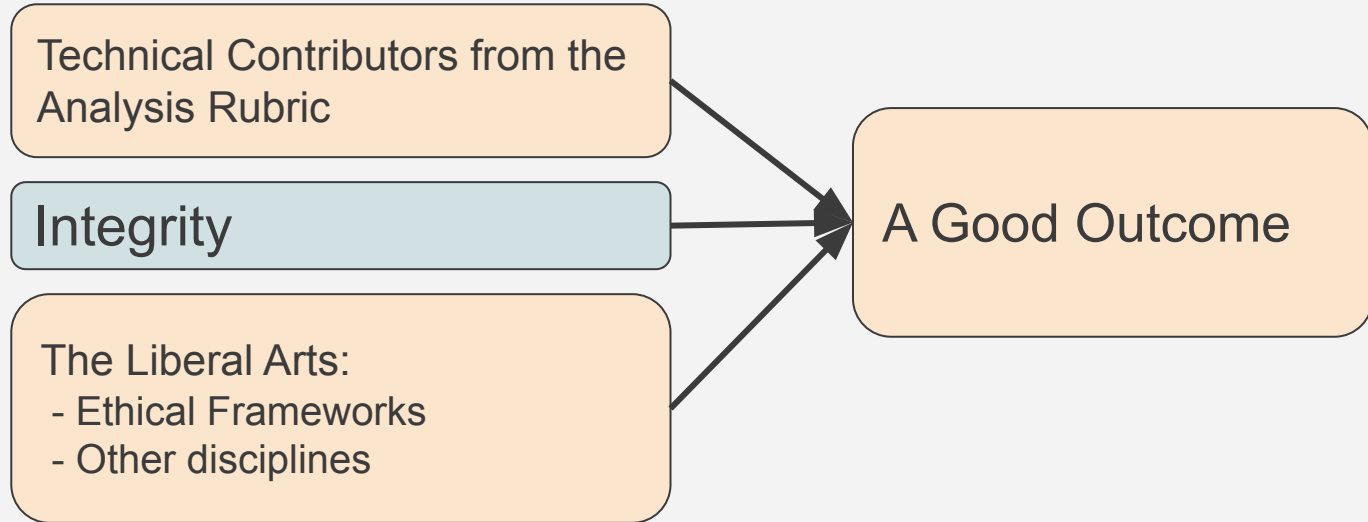
Explanation	
Causality	
Reproducibility	
Transferability	

Understandability

Legal	
Societal	
Ethical	

ELSI Considerations

A Decision-Making Framework



2. Integrity

“As professionals, we must disclose the limits of our art, practice lawful behavior, always tell the truth, and not misrepresent our conclusions or capabilities.”

1. To Society

- Honest, Accountable, Forthcoming, Objective, Respectful.

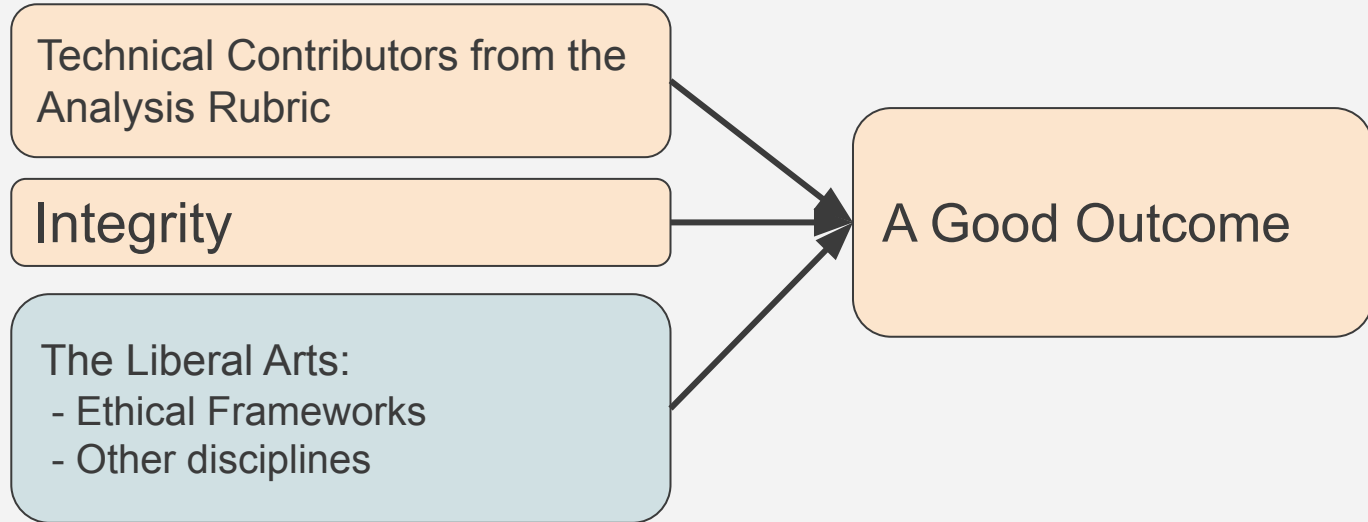
2. To Our Organizations

- Accurate, Alert, Informed, Questioning, Realistic, Rigorous.

3. To Our Professions

- Cooperative, Impartial, Inclusive, Tolerant, Truthful in Attribution, Vigilant.

A Decision-Making Framework



3. The Liberal Arts

- **Ethics, though ethics is *not, by itself, enough***
 - Example:
 - Individual rights (Mill Harm Principle)
 - Collective benefit (Kant Positive rights)
 - Implications on freedom/fairness (including what is meant by fairness)
 - Human well-being/environmental sustainability
- **Economics:** *the study of systems that foster logical and effective use of resources to meet private and social goals, including such objectives as economic freedom, fairness in reward and the balance of wealth, economic security, growth and efficiency, price stability, and employment*
- **Political Science:** *the study of societal governance often with the objective of developing more effective political systems*
- **History:** *“Those who fail to learn from history are condemned to repeat it.” (Santayana, Churchill)*
- **Literature:** Great explorations in literature can also inform us as to the range of possibilities and outcomes.
- **And more.**

The Liberal Arts' need for Technology

Challenges to Liberal Arts

- Declining Enrollments
- Questioning of its role
 - Translation
 - Broader necessity?
- Utility to students in a changing workplace
- Concerns and reality of insufficient diversity of viewpoints
- Allegations of being only a luxury good
- *And more...*



D. Graham Burnett, *New Yorker*, 4/26/25

The Value of Technology to Liberal Arts

1. Far more information information available and accessible
2. Tools of all varieties
3. New Problems to Attend to
 - a. Free will
 - b. Implications of the evolving future of work
 - c. New domains for balancing individual vs. collective benefits
 - d. Impact on nation-state of hive-minds, given cultural differences and politics
4. A real ability to better prepare liberal arts students for careers

Practical Opportunities

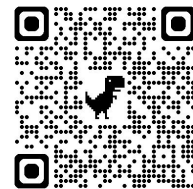
- Students should use electives very wisely
- Possibly change distribution requirements
- Advisors attend to courses outside of major (bi-directionally)
- Technical Faculty should increase collaboration with SHASS
- Liberal Arts Faculty and Students should embrace technology, and attend to needs of tech students
- Many contemporary university challenges may also be solved by more communication between the Liberal Arts and Technologists.

Recap - A Structure for Applying DS and AI

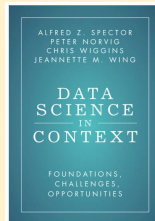
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Three Part Framework
2024 - CACM



Amazon Link or
www.datascienceincontext.com



2 Paragraphs - Technology
and the Liberal Arts



Data Science and AI in Context:
Summary and Insights
Harvard Data Science Review (July 2024)

Thank You and Questions