Digital Humanism and Engineering

Mälardalen University, 2026 06 03

AI Ethics and Governance

Human agency, responsibility, and research practice in the age of Generative AI

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AI, education, governance, and human agency in a rapidly changing technological landscape

The radical change of knowledge production and use: AI, research, and Digital Humanism

Change from traditional individual knowledge possession/ownership to global knowledge flow. Universities were historically designed for conditions of information scarcity.

Historically, knowledge had to be memorized because:

- books were rare,
- expertise localized,
- communication slow.

AI changes the underlying constraints, based on:

- information abundance,
- ubiquitous access,
- collaborative cognition,
- machine-assisted reasoning.

The question is no longer whether AI will become part of research and education. It already is. The real question is how we shape its role responsibly and humanistically.

Current tensions: fears and opportunities

Concerns

- concern about dependency,
- loss of deep understanding,
- superficial learning,
- automation of reasoning,
- de-skilling.

Opportunities

- broad access to individualized learning,
- support for creativity,
- accelerate exploration,
- enable higher-level reflection,
- democratize expertise.

AI as scalable Socratic tutor rather than answer machine. Automata Theory course example. AI as substitute vs. AI as cognitive assistant.

AI Governance in Research and Education: Emerging Frameworks

European Union

EU AI Act

Risk-based governance framework for AI

Education-related AI systems classified as high-risk in several contexts

https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai

European Commission

Ethical Guidelines for Educators on AI and Data Use

https://education.ec.europa.eu/focus-topics/digital-education/actions/plan/ethical-guidelines-for-educators-on-using-artificial-intelligence

Globally, similar governance efforts are underway:

- UNESCO Recommendation on the Ethics of AI (2021)
- OECD AI Principles (2019, updated 2024)
- National frameworks (US, China, UK, Japan, Singapore, etc.)
- What distinguishes the EU approach is its comprehensive risk-based regulatory framework.

AI in Research and Education Governance

Research and Publication Ethics

- COPE*: Authorship and AI Tools
  AI cannot be listed as author; AI use should be disclosed
- Nature Portfolio AI Policies
  Disclosure requirements; accountability remains human

Universities and Higher Education

- European University Association (EUA): AI and Universities
  Responsible integration of AI into higher education and research
- Digital Education Council: EU AI Act and Universities
  Universities as governance actors, not only AI users

AI governance is rapidly evolving from abstract general discussion toward concrete institutional norms, legal frameworks, and research practices.

* COPE: Committee on Publication Ethics, a global, non-profit organization promoting integrity in scholarly research and publishing

Engineering in Transition

Historical evolution

- slide rule
- calculator
- simulation
- CAD
- distributed engineering
- AI

Engineering evolves

- upward in abstraction
- upward in socialization

Preparing Engineers for AI-Augmented Engineering

What becomes more important

- critical evaluation
- systems thinking
- collaboration
- ethics
- responsibility
- lifelong learning

AI in research practice 1

Critical evaluation

We must ask

- What tasks can be delegated?
- When is AI appropriate?
- With what risks?
- Under what epistemic assumptions?
- Necessary cross-checking

Methodological reflection

AI changes:

- search,
- literature review,
- coding,
- analysis,
- writing,
- visualization,
- hypothesis generation, etc.

AI outputs are plausible constructions, not guaranteed truths.
It is always researcher who is responsible for truthfulness of their results.

AI in research practice 2

Critical evaluation

- bias,
- confabulations/hallucinations,
- compression effects,
- hidden assumptions,
- training-data dependencies.

Transparency

- disclosure of AI use,
- reproducibility,
- traceability,
- verification.

Research fields differ:

- engineering,
- medicine,
- humanities,
- arts.

AI outputs are plausible constructions, not guaranteed truths.

Leiden Declaration on Artificial Intelligence and Mathematics

Leading mathematicians are not debating whether AI should be prohibited.

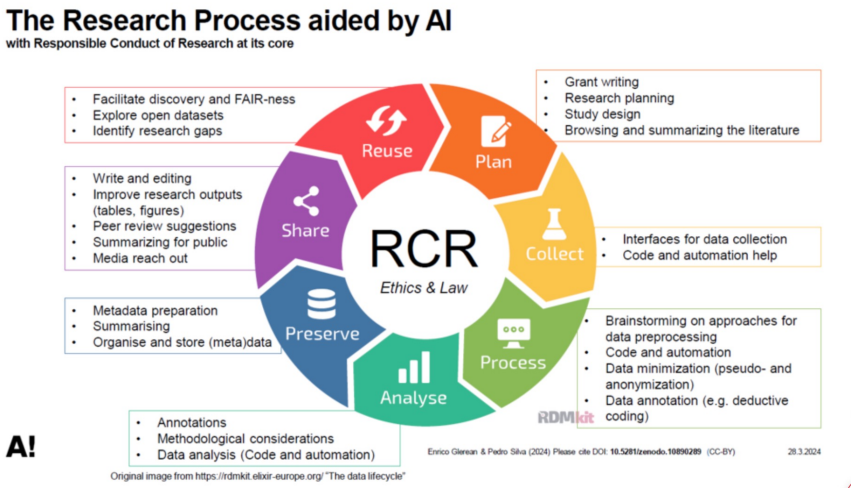
https://leidendeclaration.ai

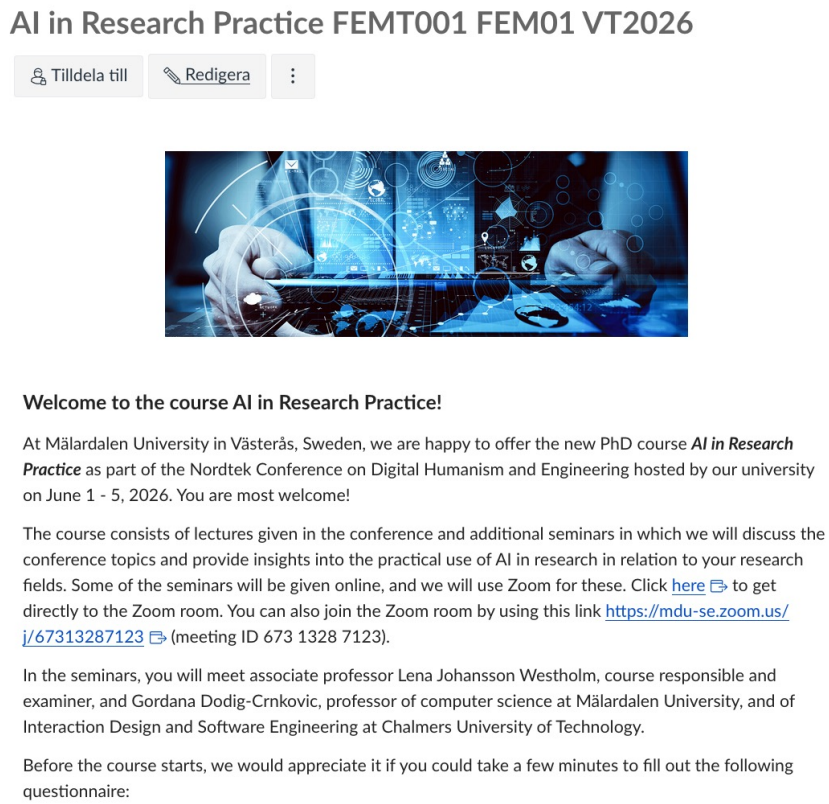
They are debating:

- rigor,
- verification,
- responsibility,
- disclosure,
- adaptation of the discipline.

Terence Tao is an example of a world-leading mathematician who is using AI for supporting his high-level mathematical exploration.

AI in Research Practice MDU Nordtek Phd Course





AI in Research Practice FEMT001 FEM01 VT2026

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Welcome to the course AI in Research Practice!

At Mälardalen University in Västerås, Sweden, we are happy to offer the new PhD course ***AI in Research Practice*** as part of the Nordtek Conference on Digital Humanism and Engineering hosted by our university on June 1 - 5, 2026. You are most welcome!

The course consists of lectures given in the conference and additional seminars in which we will discuss the conference topics and provide insights into the practical use of AI in research in relation to your research fields. Some of the seminars will be given online, and we will use Zoom for these. Click here to get directly to the Zoom room. You can also join the Zoom room by using this link https://mdu-se.zoom.us/j/67313287123 (meeting ID 673 1328 7123).

In the seminars, you will meet associate professor Lena Johansson Westholm, course responsible and examiner, and Gordana Dodig-Crnkovic, professor of computer science at Mälardalen University, and of Interaction Design and Software Engineering at Chalmers University of Technology.

Before the course starts, we would appreciate it if you could take a few minutes to fill out the following questionnaire:

https://www.aalto.fi/en/services/ai-and-research-work-useful-learning-materials

QUESTION FOR THE PANEL

Summary

- AI changes knowledge production.
- This creates tensions.
- Governance frameworks are emerging.
- Engineering itself is changing.
- Engineering education must therefore change.
- Research practice must adapt.
- Mathematics shows adaptation already happening.
- How should engineering education evolve?

How should engineering education evolve in an AI-augmented world?

References

Book

B. Eager (2025) AI-powered scholar : a beginner's guide to artificial intelligence for academic writing & research https://searchworks.stanford.edu/view/in00000293696

Current discussion of AI disclosure guidelines (2026)

Researchers discuss universal AI disclosure guidelines.pdf

Download Researchers discuss universal AI disclosure guidelines.pdf

References

ALLEA European code of conduct for research integrity

ALLEA-European-code-of-conduct-for-research-integrity.pdf Download ALLEA-European-code-of-conduct-for-research-integrity.pdf

New guidelines for using AI in Europe (2024) (from Swedish Research Council)

https://www.vr.se/english/just-now/news/news-archive/2024-04-09-new-guidelines-for-using-ai-in-europe.html Links to an external site.

AI policies of major publishing companies

https://libguides.iou.edu.gm/c.php?g=1482669&p=11059956 Links to an external site.

References

AI and Research Work - Useful learning materials from Aalto University

https://www.aalto.fi/en/services/ai-and-research-work-useful-learning-materialsLinks to an external site.

Leiden Declaration on Artificial Intelligence and Mathematics

https://leidendeclaration.ai

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- European AI Office https://digital-strategy.ec.europa.eu/en/policies/ai-office Information on the EU AI Office and implementation of the AI Act.
- OECD AI Principles https://www.oecd.org/en/topics/sub-issues/ai-principles.html Human-centered, trustworthy AI principles adopted in 2019 and updated in 2024.
- OECD Recommendation on Artificial Intelligence https://legalinstruments.oecd.org/en/instruments/oecd-legal-0449 Formal OECD intergovernmental recommendation on AI governance.
- UNESCO Recommendation on the Ethics of Artificial Intelligence Global ethical framework emphasizing human rights, transparency, fairness, and human oversight. https://www.unesco.org/en/artificial-intelligence
- EU AI Act Service Desk https://ai-act-service-desk.ec.europa.eu/en Practical implementation and compliance support for the AI Act.
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