

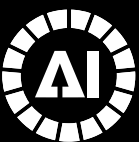
16TH ITU ACADEMIC CONFERENCE

ITUKALEIDOSCOPE

GENEVA2026

*AI and frontier
technologies for good*

7-9 July 2026
Geneva, Switzerland

Hosted by  **AI for Good**
Global Summit



Reuniting the fragmented body of EmAI

08 July 2026





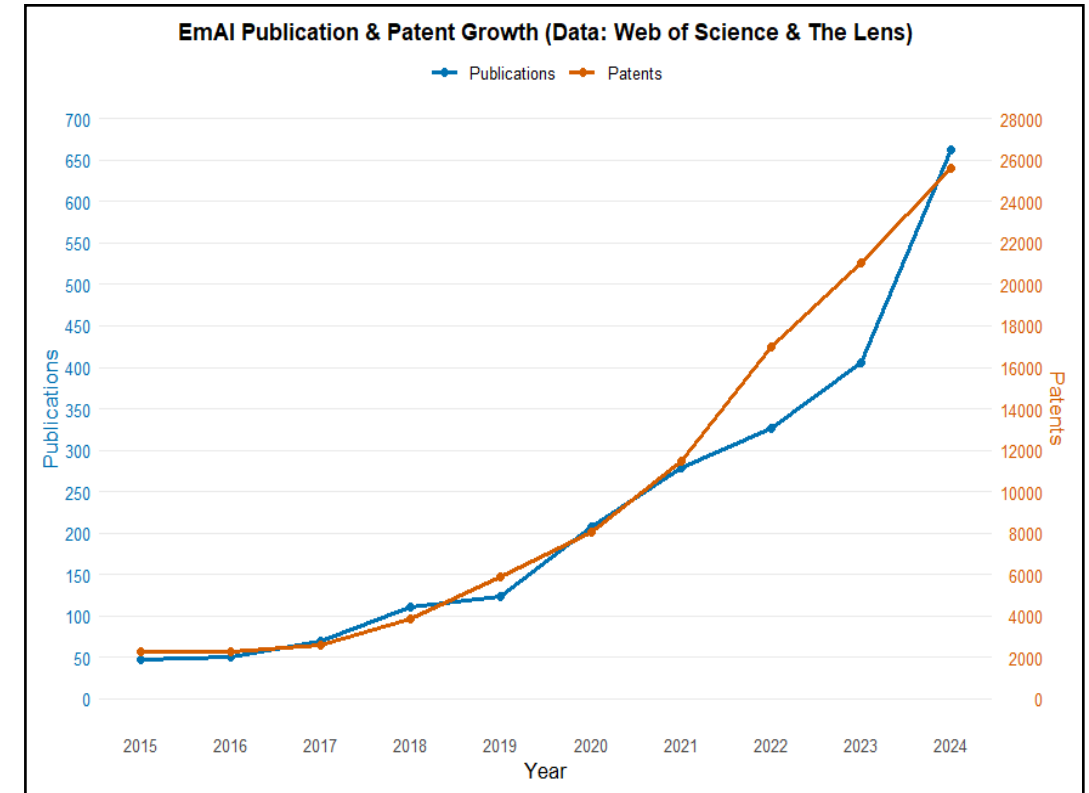
**Leonhard Konstantin
Cuzmin**

Maastricht University,
The Netherlands

Session #4.4

Defining Embodied AI (EmAI)

- AI agents with bodies made of sensors and interfacing tools [1]
- Frontier of AI research [2]
- Largely shared technologies and challenges → Potential for cross-fertilization [2]



[1] Y. Liu *et al.*, "From screens to scenes: A survey of embodied AI in healthcare," *Inf. Fusion*, vol. 119, Art. no. 103033, 2025.

[2] Y. Chen, C. Yang, C. Luo, and D. Zhao, "Guest editorial: Special issue on embodied AI in indoor robotics: Bridging perception, interaction, and autonomy," *IEEE Trans. Cogn. Dev. Syst.*, vol. 17 no. 5, pp. 1047–1049, 2025.

Problem: Lack of Global Synthesis

- High cross-fertilization potential but little interdisciplinary knowledge integration in the literature
- Knowledge flows carry progress [3] → Linearity causes silos
- Aim: Analyze field and structures globally to facilitate integrated progress and inform policies that reduce compartmentalization

[3] L. Wang, S. Jiang, and S. Zhang, "Mapping technological trajectories and exploring knowledge sources: A case study of 3D printing technologies," Technol. Forecast. Soc. Change, vol. 161, Art. no. 120251, 2020.

Methodology and Data

- Bibliometric and patent data analysis
- Examining underlying innovation structures through academic and industry research output [3], [4]
- Data sources: *Web of Science* (WoS) by Clarivate Analytics, *The Lens* (Lens.org)

Query:

(EmAI OR (embod AND (AI OR "artificial intelligence")) AND (sensing OR perception OR "motion planning" OR "motion control" OR learning OR reasoning OR interaction OR collaboration OR train OR "real-world environment"))*

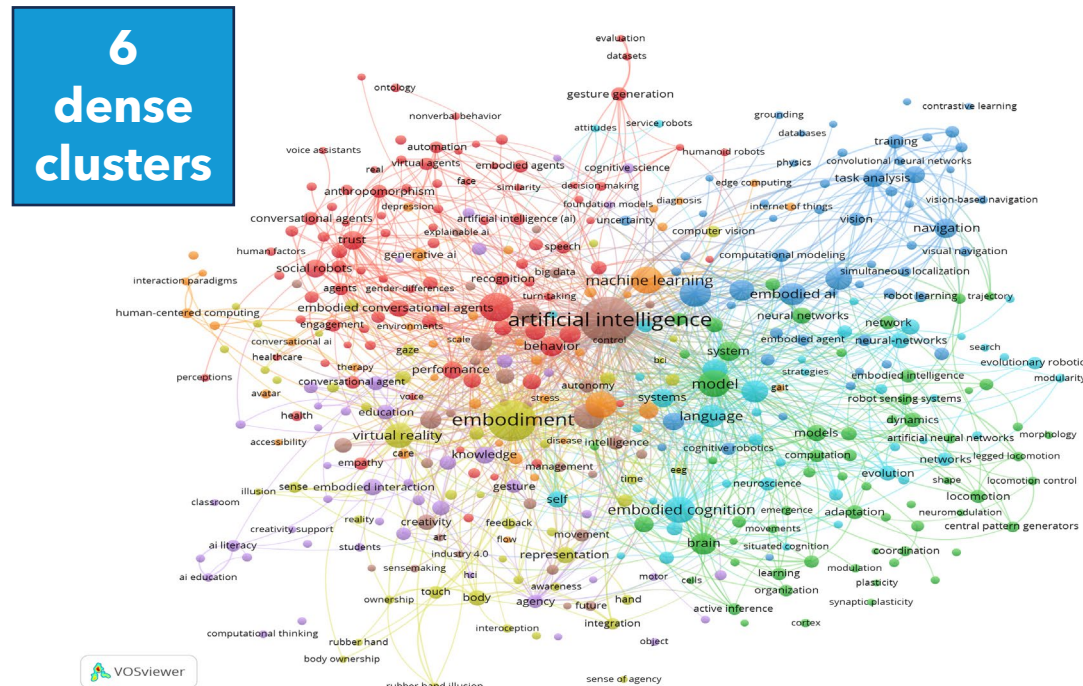
[3] L. Wang, S. Jiang, and S. Zhang, "Mapping technological trajectories and exploring knowledge sources: A case study of 3D printing technologies," *Technol. Forecast. Soc. Change*, vol. 161, Art. no. 120251, 2020.

[4] D. M. Obreja, R. Rughiniş, and D. Rosner, "Mapping the conceptual structure of innovation in artificial intelligence research: A bibliometric analysis and systematic literature review," *J. Innov. Knowl.*, vol. 9 no. 1, Art. no. 100465, 2024.



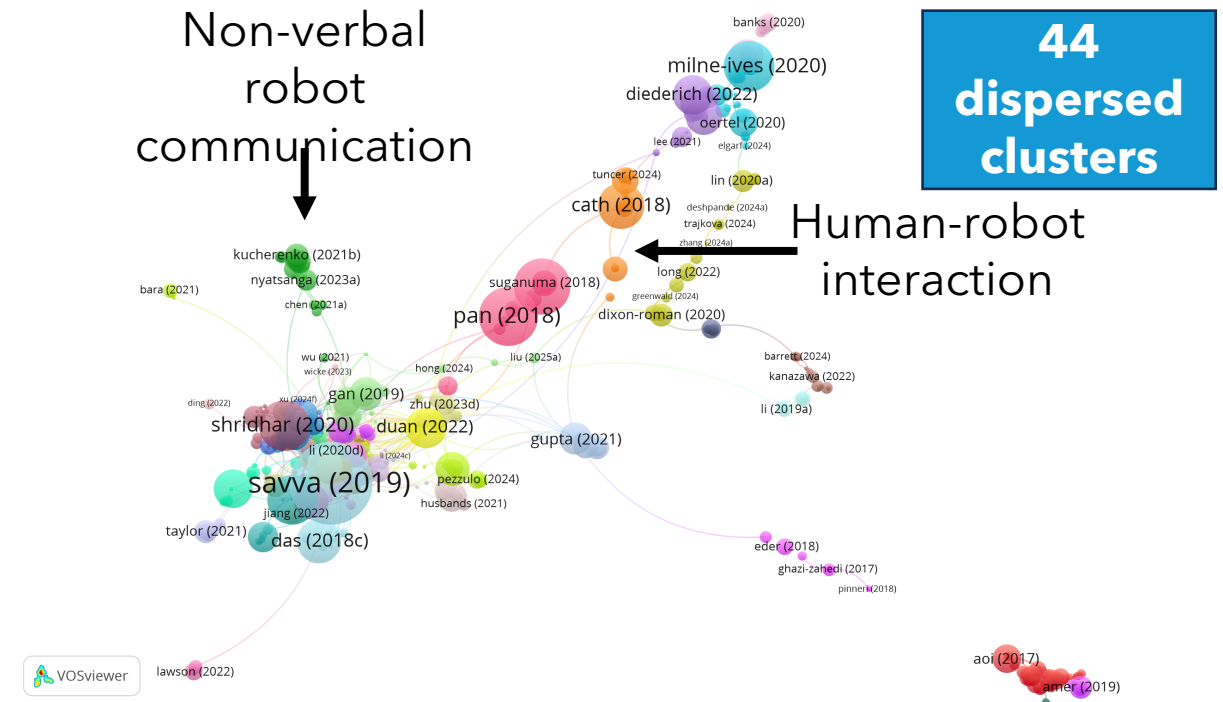
Results: Silos and Early Divergence

EmAI Keyword Map (Data: WoS)



→ High theoretical synergy and interdependence

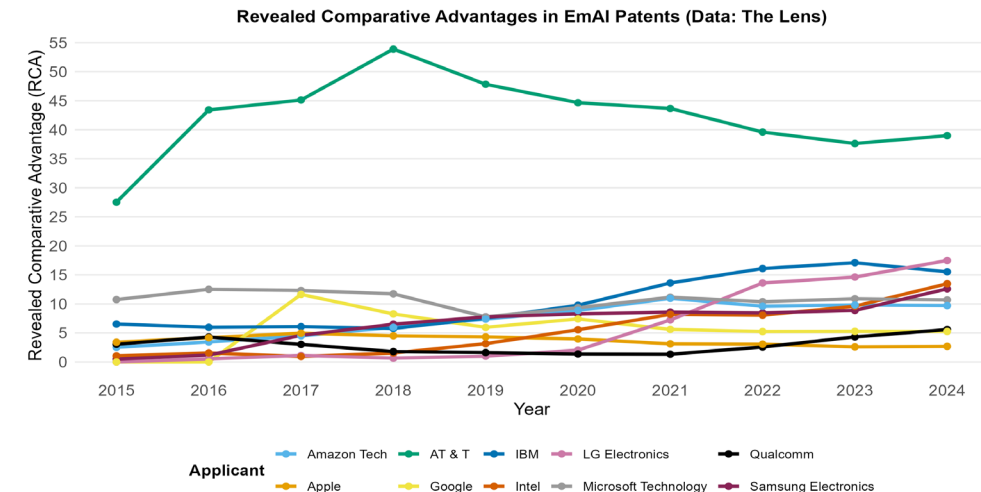
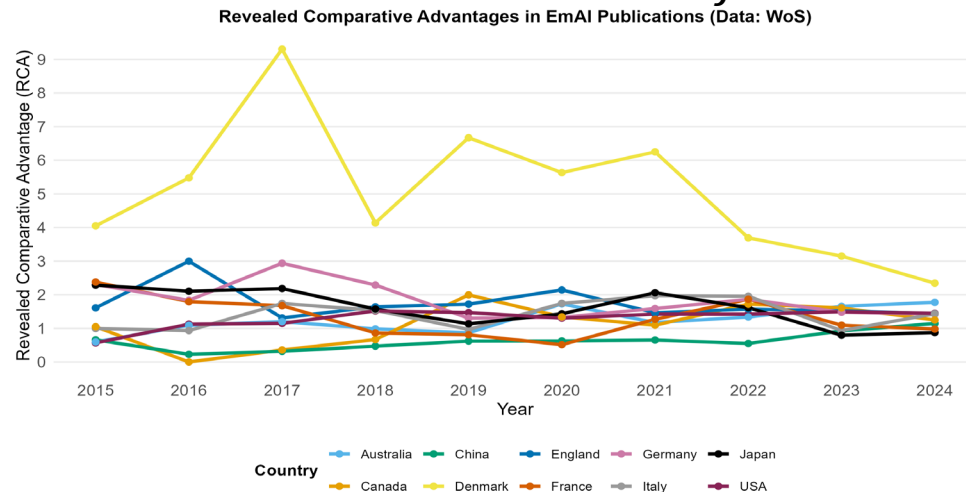
EmAI Citation Network (Data: WoS)



→ Compartmentalization in research

Results: Dominant Actors

Revealed comparative advantage (RCA) of $i \in J$:
 $Output\ Ratio_i / Output\ Ratio_J$ [5]



- Country-level balance but major and growing RCAs among top patent applicants
- Comparative advantages discourage entry and experimentation [6]
- Linearization and silo risks in industry and adjacent EmAI research

[5] M. Grančay, T. Dudáš, and L. Mura, "Revealed comparative advantages in academic publishing of 'old' and 'new' European Union member states 1998–2018," *Scientometrics*, vol. 127 no. 3, pp. 1247–1271, 2022.

[6] G. Dosi, "Technological paradigms and technological trajectories," *Res. Policy*, vol. 11 no. 3, pp. 147–162, 1982.

Summary and Solutions

- Compartmentalization risks in academic and industry EmAI research
- Solution: Tightening interdisciplinary research networks
→ Identifying and linking intersectoral dependencies and use cases
- Breaking silos: Individual academic collaborations, institutional leadership, joint platforms, (inter)national research agendas [7]

Facilitating collaborative structures for effective and ethical progress!

[7] A. Buylova et al., “Bridging silos through governance innovations: the role of the EU cities mission,” Front. Sustain. Cities, vol. 6, Art. no. 1463870, 2025.



Thank you!

