HELLO HUMANS

INTERNATIONAL HUMANOID FORUM

20TH-21ST FEBRUARY 2025 I BIEL/BIENNE, SWITZERLAND

Reflections on the 1st INTERNATIONAL HUMANOID FORUM

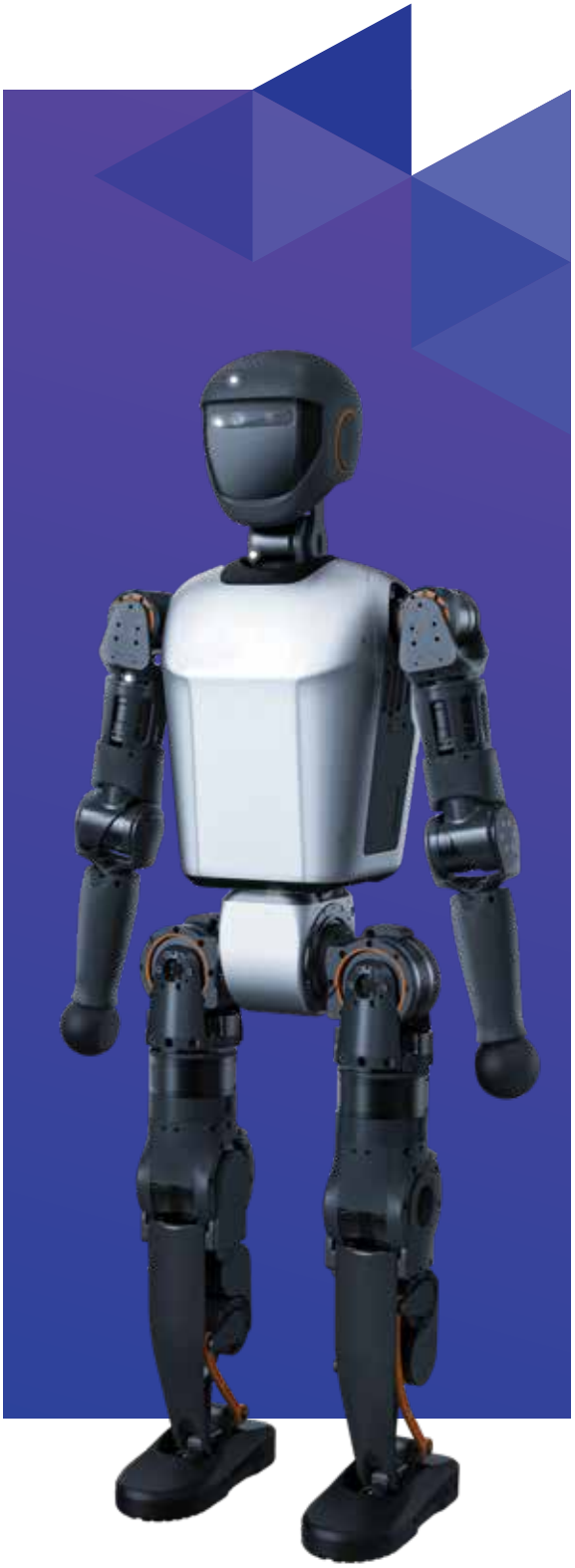
Biel, Switzerland

February 20–21, 2025

Reflections on the 1st International Humanoid Forum

In the rapidly evolving landscape of technology, the fusion of artificial intelligence (AI) and robotics—known as **physical AI**—is becoming a reality through humanoid robots. While every emerging technology experiences a **hype cycle**, humanoid robots are proving to be more than just a passing trend. Research centers, established companies, and startups are actively developing **practical applications**, aiming to transition humanoid robots from novelty to mainstream adoption.

The **1st International Humanoid Forum**, hosted by the **Swiss Smart Factory (SSF)** of **Switzerland Innovation Park Biel/Bienne** and the **Swiss Cobotics Competence Center (S3C)**, marked a European premiere by bringing together **academics, industry leaders, and entrepreneurs** to explore the real-world potential of humanoid robots. The forum fostered a critical debate, balancing **hype and reality** while highlighting both the challenges and opportunities ahead.



Key Discussions and Insights

1 Humanoids vs. Industrial Robots

A central theme was the comparison between **humanoid robots and industrial robotic arms**. While industrial robots are already widely deployed and optimized for efficiency, humanoid robots remain in an **early adoption phase**, requiring further advancements before achieving industrial viability. Discussions examined whether humanoids could **complement or even replace** traditional robotic solutions in certain sectors.

2 Hype vs. Reality: The Road to Mainstream Adoption

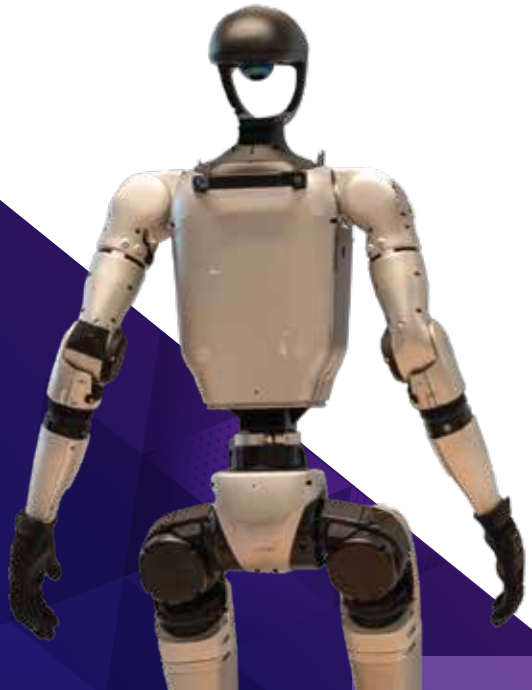
Experts debated the trajectory of humanoid robots—**when and how they will transition from niche applications to widespread industry adoption**. Will they become a core part of automation, or will they fade as the hype subsides? While the field is still evolving, the consensus was that **strategically aligned efforts by developers and end-users** are needed to determine their long-term success.

3 The Innovator's Dilemma: Incremental vs. Disruptive Innovation

Companies face a strategic decision:

- **Play it safe** by focusing on proven robotics technologies, such as industrial robotic arms, improving them through incremental innovation.
- **Embrace high-risk, high-reward innovation** by investing in humanoid robots, which **have yet to fully prove their economic and technological feasibility** but are gaining traction in specialized markets.

Some businesses adopt an **ambidextrous innovation strategy**, balancing **incremental automation improvements** with exploratory investments in **human-robot collaboration** through humanoid systems.



Key Discussions and Insights

4 AI Needs a Body

A key takeaway from the forum was that **AI alone is not enough—it needs a physical form to interact with the world effectively**. While AI-powered software has already transformed industries, **embodied AI** in humanoid robots enables **physical interaction**, making automation more **adaptive, intuitive, and human-compatible**. Experts emphasized that true **human-AI collaboration** will require robots designed to operate in **dynamic, human-centric environments**.

5 The Socio-Technical Dimension: Integration with the AI & Robotics Ecosystem

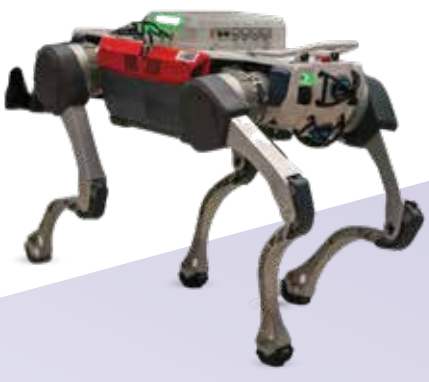
Humanoid robots **cannot evolve in isolation**. To maximize their potential, they must be integrated into the broader **robotics, automation, and AI ecosystem**. Just as AI benefits from **human-AI collaboration**, humanoid robots will likely thrive **alongside humans, rather than replacing them**.

A broad consensus emerged that **demographic change**—marked by aging populations and labor shortages—will accelerate the demand for **human-inspired automation**. Unlike traditional robots, humanoid systems can be designed to **seamlessly integrate into human-centric environments**, making them well-suited for roles in **healthcare, elder care, hospitality, and service industries**. As societies adapt to these shifts, humanoid robots could play a crucial role in maintaining **productivity and quality of life**.

6 Regulatory & Ethical Considerations: Ensuring Responsible Deployment

As humanoid robots increasingly **mimic human learning** through AI-driven adaptation, **regulatory frameworks** must be established to ensure **responsible data collection**, **storage, and use**. Ethical considerations—such as **transparency, user consent, and bias mitigation**—become critical when AI learns from human behavior in real-world settings.

Furthermore, the **integration of humanoid robots into industrial and everyday life** requires stringent **safety regulations**. These must address not only **physical safety** (collision avoidance, fail-safe mechanisms) but also **cybersecurity**, ensuring humanoid systems operate securely and reliably. Harmonizing **industrial safety norms** with emerging **human-robot coexistence policies** will be essential for building trust and ensuring their **responsible adoption**.



Conclusion: A Balanced Perspective on the Future

The **1st International Humanoid Forum** provided a **realistic and strategic perspective** on humanoid robot development. It showcased **cutting-edge innovations** while fueling discussions on the **future trajectory of humanoid robotics**. While significant challenges remain, the forum highlighted the importance of **collaborative innovation, ecosystem integration, and pragmatic adoption strategies** in shaping the future of humanoid robotics in both **industry and society**.

Additionally, the forum established a **unique platform** for **academics, industry leaders**, **policymakers**, **and society** to collaboratively shape the **socially responsible development** of humanoid technology—ensuring its long-term **beneficial impact**.

Acknowledgments

This report was prepared based on the discussions and insights shared at the **1st International Humanoid Forum**, chaired by **Dr. Dominic Gorecky** and documented by **Dr. Hakan Girgin** and **Prof. Dr. David Romero** as rapporteurs.

Biel, Switzerland
February 20–21, 2025

Special Thanks

Organizers

SWISS SMART FACTORY ®

powered by SWITZERLAND INNOVATION PARK BIEL/BIENNE

SCC SWISS COBOTICS COMPETENCE CENTER

Co-Organizers

Swiss CxO Forum
Innovation in Millions of Lives

robotics Innovation Booster

Sponsors

Standortförderung Kanton Bern

BOOSTER ROBOTICS

DEEP Robotics

Génération ROBOTS

ROLLOMATIC

KAWADA Robotics

Media & Technical Support

DF DataFaktory

Aimpakt Essence of Dataleaf

essence infinite possibilities

CONTACT US

Switzerland Innovation Park Biel/Bienne AG
Aarbergstrasse 46
2503 Biel/Bienne
+41 32 530 88 88

www.humanoid-forum.com
info@humanoid-forum.com

HELLO HUMANS

INTERNATIONAL HUMANOID FORUM

20TH-21ST FEBRUARY 2025 I BIEL/BIENNE, SWITZERLAND