Korean Researchers Profile

Korea-EU Horizon Europe Researchers Networking Forum 2026 on Cluster 4

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Your Target Call

HORIZON-CL4-2027-02-DIGITAL-EMERGING-52-two-stage
New approaches for Human/AI collaboration for the workforce of the future (RIA, AI, Data and Robotics Partnership. First Stage deadline 2 February 2027)

Your Expected Contribution to the Project / Consortium

I lead the SENSE layer of our consortium's Sense-Analyse-Act framework, that is, the part that reads what the worker's body is actually doing and in what state it is.

Concretely I bring:

1. Biomechanical sensing and human-intention estimation. Wearable EMG and RGB-D based estimation of joint torque, ergonomic overloading and muscular fatigue during manual work, mapped continuously into what we call a Digital Kinesiology Twin of the worker. This is the input that lets an AI decide when and how much to intervene, rather than following a fixed script.
2. Ergonomic physical human-robot interaction. Anticipatory robot assistance that prevents joint overloading before it happens, developed during my years at IIT and continued at HYU with collaborative robots and exoskeletons.
3. Proposal work. I lead the drafting of the concept note and I coordinate the Korean side of the consortium.
4. Validation outside Europe. Access to Korean manufacturing SMEs and to industrial partners for a second, independent test bed, which strengthens the generalisation claim of the framework.

Our consortium currently has seven European institutions, with the University of Twente as coordinator, and Hanyang University ERICA as the Korean partner.

Biography

Wansoo Kim is an Associate Professor in the Department of Robotics at Hanyang University ERICA, Republic of Korea, where he leads the Human-Robot Collaboration (HARCO) Laboratory. He received his

B.S. in Mechanical Engineering from Hanyang University ERICA in 2008 and his Ph.D. in Mechanical Engineering from Hanyang University in 2015, with a thesis on human synchronised gait control of a lower- limb exoskeleton based on human-robot interaction force.

From 2016 to 2021 he was a post-doctoral researcher in the Human-Robot Interfaces and Physical Interaction (HRI2) Lab of Dr. Arash Ajoudani at the Istituto Italiano di Tecnologia, Italy, where he worked on anticipatory robot assistance for the prevention of human joint overloading in human-robot collaboration, in the context of EU funded research on ergonomic physical human-robot collaboration. He joined Hanyang University ERICA in 2021.

His work spans physical human-robot interaction, ergonomic human-robot collaboration, human biomechanical modelling, shared control and powered exoskeletons. He has developed several exoskeleton systems and collaborative robot applications, and holds a US patent on a lower-limb strength assisting wearable robot. He won the KUKA Innovation Award in 2018 and the Solution Award in Robotics (Premio Innovazione Robotica) in 2019, and was a best paper award finalist at IEEE RO-MAN 2020.

He serves as Co-Chair of the IEEE RAS Technical Committee on Human-Robot Interaction, and as Associate Editor for the International Journal of Robotics Research (Human-Centered Robotics and Automation), Mechatronics, and Frontiers in Robotics and AI. He has organised seven IEEE ICRA and IROS workshops on ergonomic physical human-robot collaboration since 2018.

Research Areas / Expertise

Main research areas
- Physical human-robot interaction (pHRI) and ergonomic human-robot collaboration
- Human biomechanical modelling and intention estimation, including online estimation of joint loading and muscular fatigue
- Shared and whole-body control of collaborative robots and mobile manipulators
- Powered exoskeletons and wearable assistive robots
- Haptic and cognitive feedback interfaces for guiding a human operator

Distinctive technology
The Digital Kinesiology Twin: a musculoskeletal-dynamics model of the worker that runs online from wearable and vision sensing, and exposes otherwise hidden states such as fatigue and ergonomic risk as continuous signals a robot or an AI can act on. This is what turns generic collaboration into worker- specific assistance.

Representative outcomes
- Anticipatory assistance that reduces human joint overloading before the overload occurs, developed and validated at IIT and extended at HARCO
- Several exoskeleton systems (HEXAR series) and collaborative robot applications developed with Korean industry
- US patent 8,702,632, wearable robot for assisting muscular strength of the lower extremity
- Ongoing national project on intelligent human-robot collaboration considering ergonomic predictive behaviour (NRF, 2022 to 2027), plus industry projects with Hyundai Mobis, Neuromeka and Hexar Humancare on whole-body control and human-joint-motion based control
- Journal publications in IEEE T-RO, RA-L, T-MECH and related venues

Motivation, Expectation and Plan

Motivation
Our group and seven European partners already prepared and submitted a joint proposal, EMPOWER 5.0, to a Horizon Europe Cluster 4 call in 2025. The evaluation was strong on the scientific side but the proposal was not retained, and the reviewers pointed at the same two places we already suspected were thin: a concrete exploitation route for manufacturing SMEs, and a standardisation strategy. The consortium is intact and we are now aiming at HORIZON-CL4-2027-02-DIGITAL-EMERGING-52. I am coming to Brussels to fix those two weaknesses with people who evaluate and write these proposals for a living, rather than guessing at them from Korea.

What I hope to get out of the forum
1. Direct expert feedback on our impact and standardisation strategy, and on how much of it belongs in the first stage of a two-stage call.
2. One or two partners we are still missing, specifically an end-user or SME in manufacturing, and someone with a real track record in standardisation.

3. Face to face agreement with our coordinator on the work package structure, which is faster in a room than over email.
4. A clear answer on how a Korean partner is best positioned in a Horizon Europe consortium, in terms of both funding rules and evaluation.

Concrete follow-up

- Consortium meeting during the forum, with the coordinator present
- A concept note in English, circulated to all partners, timed against the call opening on 22 September 2026
- Letters of intent from partners, and a draft consortium agreement covering joint ownership of IP
- Joint first stage submission on 2 February 2027, second stage on 2 September 2027