Akira Uehara

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Vision

To realize a future where no one is left behind by Techno-Peer Support, where people and technology work together to support each other

Affiliations

University of Tsukuba — Ibaraki, Japan
Assistant professor, Institute of Systems and Information Engineering — 2022-present
Research member, Center for Cybernics Research
Research member, R&D Center for Frontiers of MIRAI in Policy and Technology

Sony Computer Science Laboratories, inc. — Tokyo, Japan
Adjunct researcher, Superception laboratory — 2021-2022

Sony Group Corporation — Tokyo, Japan
Interaction designer, Tokyo Laboratory 08, R&D center — 2020-2022

Education

University of Tsukuba — Ibaraki, Japan
Ph.D. of Engineering — 2020
Thesis: "側方揺動と体幹伸展へ介入可能な装着型システムによるパーキンソニズム患者のための歩行機能支援手法"
(Gait Function improvement for Parkinsonism Patients with Wearable System Supporting Lateral Swing and Trunk Extension)

University of Tsukuba — Ibaraki, Japan
Master of Engineering — 2017
Thesis: "パーキンソニズムを呈する多発性脳梗塞患者に対する歩行支援手法の開発に関する研究"
(Development of gait assist method for multiple stroke patients with Parkinsonism)

University of Tsukuba — Ibaraki, Japan
Bachelor of Engineering — 2015
Thesis: "パーキンソン病患者のすくみ足解消システムの開発に関する研究"
(Development of a Cancellation System for Freezing of Gait of Parkinson's Disease Patients)

Honors and Awards (Selected)

Best Student Paper Award, RAS EMBS BioRob2024	2024
Honorable Mention Award, Augmented Humans 2022	2022
Best Demonstration Award, SIGGRAPH ASIA 2021	2021
2020年度生体医工学会論文賞·阪本賞, 日本生体医工学会 (Sakamoto Award, Japan Society for Medical and Biological Engineering)	2021
SICE International Young Authors Award, The society of Instrument and Control Engineers	2020
Dean's Prize, Intelligent Interaction Technologies, University of Tsukuba	2017
Excellent Mater's thesis Prize, System and Information Engineering, University of Tsukuba	2017
Grand Prize, Microsoft Imagine Cup 2016 in Japan, Microsoft Japan Co., Ltd.	2016

Professional Affiliations

IEEE, The Japan Society of Mechanical Engineers (JSME), The Robotics Society of Japan (RSJ), The Japan Society of Embolus Detection and Treatment, Japanese Society for Medical and Biological Engineering (JSMBE), The Society of Instrument and Control Engineers (SICE), Japanese Society for Medical Virtual Reality (JSMVR), The Virtual Reality Society of Japan (VRSJ)

Grants

○Grant-in-Aid for Early-Career Scientists, Japan Science and Technology Agency 2026-2030
（日本学術振興会 若手研究　26K17340）

○Cross-ministerial Strategic Innovation Promotion Program (SIP) Third Phase: Development of Fundamental Technologies, the Establishment of Common Systems, Rules, and Regulation for the Expansion of Human Collaborative Robotics, New Energy and Industrial Technology Development Organization (NEDO) 2023-present
（内閣府「戦略的イノベーション創造プログラム（SIP）第3期 / 人協調型ロボティクスの拡大に向けた基盤技術·ルールの整備」）

○Grant-in-Aid for Early-Career Scientists, Japan Science and Technology Agency 2022-2025
（日本学術振興会 若手研究　23K13285）

○Collaboration Boost Project, Headquarters for International Industry-University Collaboration 2017
（筑波大学産学連携本部 共同研究実用化ブーストプロジェクト）

Professional service

Session (Co-)Chair

The 2024 IEEE/SICE International Symposium on System Integration (SII 2024)

Reviewers

Frontiers in Robotics and AI (section Human-Robot Interaction), Advanced Intelligent Systems, Advanced Robotics, AIM2026, SII2026, RITA2025, SMC2025, SII2025, IROS2024, SII2024, SMC2023, SII2023, AHs2022

Publications

Referred Journal Articles

1. D. Yoshikawa, **A. Uehara**, H. Kawamoto, Y. Sankai, "Cybernic finger: a wearable cyborg to supplement tactile force sensation and finger motor function for patients with hand paralysis," Advanced Robotics, 1–20, doi: 10.1080/01691864.2025.2530530, 2025.
2. T. Obinata, K. Baba, **A. Uehara**, H. Kawamoto, Y. Sankai, "Translating human information into robot tasks: action sequence recognition and robot control based on human motions." Front. Robot. AI 12:1462833. doi: 10.3389/frobt.2025.1462833, 2025.
3. **A. Uehara**, H. Kawamoto, Y. Sankai, "Development of human collaborative robot to perform daily tasks based on multimodal vital information with cybernics space," Frontiers in Robotics and AI, 12:1462243, 2025.
4. Y. Namikawa, H. Kawamoto, **A. Uehara**, Y. Sankai, "Analyzing gait data measured by wearable cyborg hybrid assistive limb during assisted walking: gait pattern clustering," Frontiers in Medical Technology, 6:1448317, 2024.
5. **A. Uehara**, H. Kawamoto, H. Imai, M. Shirai, M. Sone, S. Noda, S. Sato, N. Hattori, Y. Sankai. "Gait improvement with wearable cyborg HAL trunk unit for parkinsonian patients: five case reports", Scientific Reports 13, 6962, 28 April, 2023.
6. **上原皓**, 河本浩明, 今井壽正, 白井誠, 曾根政富, 野田幸子, 佐藤栄人, 服部信孝, 山海嘉之, "加速歩行を呈するパーキンソニズム患者のための側方揺動支援システムの開発," 生体医工学, vol. 57, no. 6, pp. 206-214 , 2019.
7. 石川優, 牟田将史, 田丸順基, 中田英輔, **上原皓**, 星野准一, "花水: 多視点観察及び移動が可能なフォグスクリーン," 日本バーチャルリアリティ学会論文誌, vol. 19, no. 2, pp 227-236, 2015.

Publications

Refereed Conference Proceedings (Full paper)

1. R. Yoshizawa, **A. Uehara**, Y. Sankai, H. Kawamoto, "Three-dimensional Knee Joint Load Estimation System During Walking Using IMU Sensors for the Prevention of Knee Osteoarthritis: A Fundamental Study," Proceedings of the 2026 IEEE/SICE International Symposium on System Integrations, pp. 1291-1296, 2026.
2. Y. Koyama, H. Kawamoto, **A. Uehara**, A. Ohya, A. Yorozu, "Human-Harmonized Navigation Considering Pedestrian Flow Using Deep Reinforcement Learning for Autonomous Mobile Robots," Conference: 2025 13th International Conference on Robot Intelligence Technology and Applications (RITA), 2025. (in press)
3. K. Yahagi, H. Kawamoto, **A. Uehara**, A. Ohya, A. Yorozu, "Multimodal World Model-Based Navigation of a Mobile Robot in Walkway Environments," 2025 13th International Conference on Robot Intelligence Technology and Applications (RITA), 2025. (in press)
4. K. Ikeda, **A. Uehara**, Y. Sankai, H. Kawamoto, "Wearable Cyborg HAL Trunk Unit Controlled by Voluntary Control Method for Patients with Parkinsons Disease : A Pilot Study," 2025 IEEE International Conference on Systems, Man, and Cybernetics (SMC), pp. 1297-1302, 2025,
5. M. Matsuura, **A. Uehara**, H. Kawamoto, Y. Sankai, "Development of a Wearable Cyborg HAL for Functional Improvement of Twisting Movements through Coordinated Hip-Trunk Motion," 2025 IEEE International Conference on Systems, Man, and Cybernetics (SMC), pp. 5776-5781, 2025.
6. Y. Namikawa, Y. Sankai, **A. Uehara**, H. Kawamoto, "Analysis of Gait Pattern Changes During Use of Wearable Cyborg HAL Related to Gait Ability in an Individual with Neuromuscular Disease," 2025 IEEE International Conference on Systems, Man, and Cybernetics (SMC), pp. 6233-6240, 2025.
7. Y. Seki, H. Kawamoto, **A. Uehara**, A. Ohya, A. Yorozu, "Robust Localization of Mobile Robots in Changing Environments Using Visual SLAM Enhanced with Semantic Information," 2025 IEEE International Conference on Systems, Man, and Cybernetics (SMC), pp. 5882-5888, 2025.
8. H. Tamai, **A. Uehara**, Y. Sankai, H. Hara, H. Kawamoto, "Development of Supine-Use Wearable Cyborg for Treatment of Neurogenic Bowel Dysfunction after Spinal Cord Injury," 2025 47th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), pp. 1-7, 2025.
9. D. Watanabe, **A. Uehara**, Y. Sankai, H. Kawamoto, "Development of Wearable Cyborg HAL Ankle Joint Unit to improve ankle joint function during gait," 2025 47th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), pp. 1-7, 2025.
10. H. Tamai, **A. Uehara**, Y. Sankai, H. Kawamoto, "Effects of Deep Core Activation Method Using Wearable Cyborg HAL in a Supine Position for Ameliorating Defecatory Function: A Pilot Study," 2025 International Conference On Rehabilitation Robotics (ICORR), pp. 1001-1008, 2025.
11. **A. Uehara**, M. Hoshikawa, K. Baba, A. Mikhailov, H. Kawamoto, Y. Sankai, "Study on Robotic Cell Culture Systems for Autonomous Cultivation of Fibroblast Cells," Proceedings of the 2024 IEEE/SICE International Symposium on System Integrations, pp.259-264, 2025.
12. N. Sawada, **A. Uehara**, H. Kawamoto, Y. Sankai, "Symptom-Adaptive Communication Method Based on Changes in Pupil Diameter for Amyotrophic Lateral Sclerosis (ALS) Patients," Proceedings of the 2024 IEEE/SICE International Symposium on System Integrations, pp.567-572, 2025.
13. A. Kamo, **A. Uehara**, H. Kawamoto, Y. Sankai, "Basic Study on Airbag-based Stationary Type Bracing System for Treatment of Scoliosis," Proceedings of the 2024 IEEE/SICE International Symposium on System Integrations, pp.109-114, 2025.
14. N. Miyazaki, **A. Uehara**, H. Kawamoto, Y. Sankai, "Study on the Lower Garments Dressing and Undressing Portable Support System for Independent Daily Toilet Activity," Proceedings of the 2024 IEEE/SICE International Symposium on System Integrations, pp.538-543, 2025.
15. S. Konishi, **A. Uehara**, H. Kawamoto, Y. Sankai, "Development of Cybernic Mirror System for Improvement of Hand Motor Functions for Patients with hemiplegia," Proceedings of the 2024 IEEE/SICE International Symposium on System Integrations, pp.532-537, 2025.
16. H. Tamai, Y. Sankai, **A. Uehara**, H. Kawamoto, "The Development of Anorectal and Core Activation Method with Wearable Cyborg HAL for Defecation Disorder Treatment," 2024 10th IEEE RAS/EMBS International Conference for Biomedical Robotics and Biomechatronics (BioRob)

Publications

Refereed Conference Proceedings (Full paper)

17. A. Uehara, Yoshiyuki Sankai, "Basic Study on Cybernic Interface for Amyotrophic Lateral Sclerosis Patients to Perform Daily living tasks by Transiting Seamlessly Between Cyberspace and Physical space," Proceedings of the 2024 IEEE/SICE International Symposium on System Integrations, pp.314-319, 2024.
18. N. Sawada, A. Uehara, H. Kawamoto, Y. Sankai, "Study on Wearable Gaze-Based Communication System for Patients with Amyotrophic Lateral Sclerosis (ALS)," Proceedings of the 2024 IEEE/SICE International Symposium on System Integrations, pp.165-171, 2024.
19. K. Ikeda, A. Uehara, H. Kawamoto, Y. Sankai, "Study on Gait Stabilization Method using Wearable Cyborg HAL Trunk-unit for Parkinson's Disease and Parkinsonism with Freezing of Gait," Proceedings of the 2023 IEEE International Conference on Systems, Man, and Cybernetics, pp.3228-3233, 2023.
20. T. Obinata, D. Yoshikawa, A. Uehara, H. Kawamoto, "Estimating Finger Joint Angles with Wearable System based on Machine Learning Model utilizing 3D Computer Graphics," Proceedings of the 2023 IEEE International Conference on Systems, Man, and Cybernetics, pp.4631-4636, 2023.
21. A. Uehara, H. Kawamoto, Y. Sankai, "Proposal of Period Modulation Control of Wearable Cyborg HAL Trunk-unit for Parkinson's disease/Parkinsonism utilizing Motor Intention and Dynamics," Proceedings of the 2023 IEEE/SICE International Symposium on System Integrations, pp.818-823, 2023.
22. T. Nemoto, H. Kawamoto, A. Uehara, Y. Sankai, "Study on Portable Respiratory Assist System for Independence Living of Neuromuscular Intractable Disease Patients," Proceedings of the 2023 IEEE/SICE International Symposium on System Integrations, pp.830-835, 2023.
23. K. Takada, M. Kawaguchi, A. Uehara, Y. Nakanishi, M. Armstrong, A. Verhulst, K. Minamizawa, S. Kasahara, "Parallel Ping-Pong: Exploring Parallel Embodiment through Multiple Bodies by a Single User," Proceedings of the Augmented Humans International Conference 2022 (AHs '22), 2022.
24. A. Uehara, H. Kawamoto, H. Imai, M. Shirai, M. Sone, S. Noda, S. Sato, N. Hattori, Y. Sankai, "Lateral Swing Support System for Parkinsonism Patients with Freezing of Gait," Proceedings of the 2020 IEEE/SICE International Symposium on System Integrations, pp. 317-322, 2020.
25. A. Uehara, H. Kawamoto, Y. Sankai, "Development of Gait Assist Method for Parkinson's Disease Patients with FOG in Walking," Proceedings of the Society of Instrument and Control Engineers, pp 1502-1507, 2016.
26. Y. Ishikawa, M. Muta, J. Tamaru, E. Nakata, A. Uehara, Junichi Hoshino, " HANASUI: Multi-view Observable and Movable Fogscreen," International Conference on Entertainment Computing, pp 189-196, 2014.

Refereed Conference Proceedings (Poster / Demo / Workshop / Oral)

1. K. Adachi, A. Uehara, Y. Sankai, H. Kawamoto, "Development of a Portable System to Support Environment Recognition for Individuals with Total Hearing Loss," International Conference on Computers Helping People with Special Needs (ICCHP), pp.1642-1645, 2026 (Accepted)
2. K. Adachi, A. Uehara, Y. Sankai, H. Kawamoto, "Basic Study on A Wearable System of Environmental Sound Recognition for Individuals with Total Hearing Loss," Proceedings of the 2025 SICE Festival with Annual Conference, pp.1642-1645, 2025.
3. Y. Seki, H. Kawamoto, A. Uehara, A. Ohya, A. Yorozu, "Robust Localization in Changing Environments for Mobile Robots Using Visual SLAM Enhanced with Movability-Aware Semantics," the 19th International Conference on Intelligent Autonomous Systems (IAS-19), Genoa, Italy, 2025. (in press)
4. Y. Namikawa, H. Kawamoto, A. Uehara, Y. Sankai, "Wearable Cyborg HAL for Both Gait Analysis and Treatment: Clustering of Bioelectrical Signal Patterns during Assisted Walking," 2025 IEEE/SICE International Symposium on System Integration (SII2025), Munch, Germany, 2025.
5. Y. Koyama, H. Kawamoto, A. Uehara, A. Ohya, A. Yorozu, "Dynamic Obstacle Avoidance in Crowded Environment Using Deep Reinforcement Learning for Autonomous Mobile Robot," JSME The 8th International Conference on Advanced Mechatronics (ICAM 2024), 06-08 November, Fukuoka, Japan, 2024.
6. 玉井隼, 河本浩明, **上原皓**, 國府田正雄, 山海嘉之, "Deep Core Activation Method Utilizing Wearable Cyborg HAL in Supine Position for Improving Anorectal Motility: A Case Study for a Patient with Chronic Spinal Cord Injury", 生体医工学シンポジウム2024, 東京, 2024年9月12-14日.

Publications

Refereed Conference Proceedings (Poster / Demo / Workshop / Oral)

7. 今井壽正, **上原皓**, 河本浩明, 山海嘉之, 白井誠, 曾根政富, 野田幸子, 佐藤栄人, 服部信孝, "New wearable device to support lateral swing of the trunk for Parkinsonian gait disturbances," 第63回日本神経学会学術大会, 62(Supplement), pp.S219, 2022.
8. K. Takada, M. Kawaguchi, Y. Nakanishi, A. Uehara, M. Armstrong, A. Verhulst, K. Minamizawa, S. Kasahara, "Parallel Ping-Pong: Demonstrating Parallel Interaction through Multiple Bodies by a Single User," SIGGRAPH Asia 2021 Emerging Technologies (SA '21 Emerging Technologies). Association for Computing Machinery, New York, NY, USA, Article 12, 1–2, 2021.
9. A. Uehara, "Colorable Band: A Wearable Device to Encourage Daily Decision Making Based on Behavior of Users with Color Vision Deficiency," In The 23rd International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS '21). Association for Computing Machinery, New York, NY, USA, Article 57, 1–4, 2021.
10. **上原皓**, 河本浩明, 今井壽正, 白井誠, 曾根政富, 野田幸子, 佐藤栄人, 服部信孝, 山海嘉之, "加速歩行を呈するパーキンソニズム患者の歩行支援に関する研究," 生体医工学シンポジウム2019, 2019年9月6-7日, 徳島.
11. A. Uehara, H. Kawamoto, Y. Sankai, "Case study of pedaling assist system for piano player with lower leg muscle weakness," ASIAN CHI SYMPOSIUM in CHI, Montreal, Canada, Apr. 21-26, 2018.
12. S. Ekuni, K. Murata, Y. Asakura, A. Uehara, "Bionic Scope: Wearable System for Visual Extension Triggered by Bioelectrical Signal," SIGGRAPH2016 Posters, 2016.

Exhibition

1. SIGGRAPH Asia 2021 Emerging Technologies, K. Takada, M. Kawaguchi, Y. Nakanishi, A. Uehara, M. Armstrong, A. Verhulst, K. Minamizawa, S. Kasahara, "Parallel Ping-Pong", Tokyo, Japan, Dec. 15-17, 2021.
2. Microsoft Imagine Cup 2018 Japan, Y. Asakura, A. Uehara, K. Nakagawa. "Cyber Scope", Tokyo, Japan, Apr. 16, 2018.
3. INNOVATION WORLD FESTA 2017, K. Murata, S. Ekuni, Y. Asakura, A. Uehara. "Bionic Scope", Ibaraki, Japan, Jun. 3, 2017.
4. Microsoft Imagine Cup 2016, K. Murata, S. Ekuni, Y. Asakura, A. Uehara. "Bionic Scope: Wearable System for Visual Extension Triggered by Bioelectrical Signal", Redmond, USA, Jul. 30, 2016.
5. Microsoft Imagine Cup 2016 Japan, K. Murata, S. Ekuni, Y. Asakura, A. Uehara. "Bionic Scope", Tokyo, Japan, Apr. 25, 2016.
6. GHOST IN THE SHELL / REALIZE PROJECT The AWARD, K. Murata, S. Ekuni, Y. Asakura, A. Uehara. "Bionic Scope", Tokyo, Japan, Feb. 12, 2016.
7. GHOST IN THE SHELL / REALIZE PROJECT Hackathon Tokyo, K. Murata, S. Ekuni, Y. Asakura, A. Uehara. "Bionic Scope", Tokyo, Japan, Nov. 25, 2015.
8. The 24th Hobby Award, Y. Ishikawa, K. Yoshida, A. Uehara, "kumakura", Tokyo, Japan, Apr. 27, 2014.
9. The 21st International collegiate Virtual Reality Contest, Y. Ishikawa, M. Muta, J. Tamaru, E. Nakata, A. Uehara, " HANASUI", Tokyo, Japan, Oct. 23-26, 2013.
10. The 18th Annual Conference of the Virtual Reality Society of Japan, Y. Ishikawa, M. Muta, J. Tamaru, E. Nakata, A. Uehara, " HANASUI", Osaka, Japan, Sep. 18, 2013.

Invited talk

1. A. Uehara, Challenge for leaving no one behind by techno-peer-support with cybernics medical and healthcare innovation — Fusion of Bio/Medical system and AI/Robot/Information system —", MONOzukuri forum," Tsukuba, Japan, 19 November, 2025.
2. A. Uehara, "Gait improvement with wearable cyborg Hybrid Assistive Limb trunk (HAL) unit for parkinsonian patients," Taiwan International Congress of Parkinson's Disease and Movement Disorders (7th TIC-PDMD), Taipei, Taiwan, 22-24 November, 2024.
3. 伊藤亮、**上原皓**、"異分野融合で拓くサイバニクス医療健康イノベーション~人とテクノロジーが支え合い、誰一人取り残さない未来社会の実現への挑戦~ みんつくゼミナール2023 第3回, 2024年2月4日, オンライン.
4. A. Uehara, "Cybernics treatment and independence living improvement for neurological intractable disorders", 2023 Japan-America Frontiers of Engineering Symposium, Tokyo, Japan, 17-20 July, 2023 (poster).

Patent

1. Information processing device and information processing method, A. Uehara, M. Saito, WO2023182183A1
2. Information processing device, information processing method, and program, H. Yusuke, Y. Ishihara, A. Uehara, . Nishimura, WO2023068062A1
3. Information processing device, information processing method, and storage medium, T. Noda, M. Iwafune, K. Morita, A. Uehara, WO2023079847A1
4. Color vision assistance system, A. Uehara, M. Imoto, R. Suzuki, WO2022230323A1
5. Walking disability support device and operating method of the walking disability support device, Y. Sankai, A. Uehara, JP7374019B2
6. Transmission type head mounted display device and program, H. Kawamoto, Y. Asakura, A. Uehara, A. Marushima, H. Matsukura, JP2020014160A
7. Optical instrument, K. Murata, S. Ekuni, Y. Asakura, A. Uehara, JP2017134369A

Teaching

University of Tsukuba (Graduate School of Science and Technology)

- ○Cybernics (Co-teaching) 2024-present
- ○Research in Intelligent and Mechanical Interaction Systems I-ⅤI/A-C (Co-teaching) 2023-present
- ○Fundamentals of Intelligent and Mechanical Interaction Systems (Co-teaching) 2023-present

University of Tsukuba (Doctoral Program in Empowerment Informatics)

- ○Physiological and Physical Human Sensing 2024-present

University of Tsukuba (School of Science and Engineering)

- ○Biosystem (Co-teaching) 2023-present
- ○Computer and Network (Co-teaching) 2023-present
- ○Tsukuba Robot Contest (Co-teaching) 2023-present
- ○Basic Laboratory of Engineering Systems A/B (Co-teaching) 2023-present
- ○Fundamental Labs Ⅰ/Ⅱ (Co-teaching) 2023-present

University of Tsukuba (Teaching assistant) 2017

- ○Biosystem 2016
- ○Linear algebra