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About Me

My research aims to advance healthcare through the application of cutting-edge technology.
With a background bridging academic research and industrial innovation, I have cultivated a diverse interdisciplinary perspective that encompasses computational neuroscience, robotics, digital health, and AI. My work involves not only the rigorous development and validation of AI models but also leading the design and execution of clinical research. Currently, I am focused on leveraging AI technologies to address clinical challenges in CT colonography.

Education

Ph.D. in Information Science & Technology, the University of Tokyo, Japan (2012–2015)
Advisor: Prof. Yasuo Kuniyoshi
Thesis: Embodied brain modeling for understanding functional neural development of human fetuses and infants
M.A. in Information Science & Technology, the University of Tokyo, Japan (2010 –2012)
B.S. in Engineering, the University of Tokyo, Japan (2006 –2010)

Work and Research Experience

Boston Medical Sciences (2025 – present)

General manager,
Advanced Clinical Science & Technology Research / AI Development

- Lead clinical research and AI development on CT colonography.

IBM Research – Tokyo (2015 – 2025)

Senior Research Scientist & Technical Lead of Digital Health Team (2020 – 2025)
Staff Research Scientist & Technical Lead of Digital Health Team (2017 – 2020)
Research Scientist, Accessibility team (2015 – 2017)

- **Research:** Led multiple interdisciplinary collaborations in digital health research targeting neurological disorders and mental health, in partnership with leading institutions such as the University of Tokyo, University of Tsukuba, UC San Diego, and Cleveland Clinic.
  - Designed and coordinated international, multicenter clinical studies on dementia and mental health conditions.
  - Developed experimental protocols and applications for behavioral sensor data collection in both clinical and home settings, covering modalities such as motion, eye movements, drawing/handwriting, and speech.

- Led and conducted data analysis integrating behavioral sensor data with clinical information, using statistical methods and machine learning techniques.
- Designed and implemented multimodal machine learning and deep learning models for healthcare applications including early detection and differentiation of dementia, severity grading, treatment response evaluation, and longitudinal prediction of disease progression.
- Performed rigorous model validation using large-scale, multicenter clinical datasets across diverse populations.
- Developed foundation models for generalizable healthcare applications, leveraging advanced techniques such as generative AI, self-supervised learning, deep reinforcement learning, and musculoskeletal simulation. (see IBM Research Blog)
- **Achievements:**
  - 40+ Publications including those in high-impact journals such as *Nature Communications*
  - 5 Best Paper Awards at major international conferences on AI and healthcare

- **Business:** Led client projects to translate research outcomes into scalable, real-world healthcare applications, working with cross-functional teams for pharmaceutical and other industry clients.
  - Led the entire project lifecycle, including proposal development, acquisition, and execution.
  - Managed a cross-functional team of over 20 members, including researchers, consultants, designers, and developers.
  - Designed and developed AI models and applications for multidimensional assessment of physical and cognitive functions in older adults.
  - **Achievements:**
    - 5 Awards from IBM Corporation for scientific and business contributions

The University of Tokyo (2012 – 2015) *Webpage

Japan Society for the Promotion of Science Research Fellow

Graduate Research (Adviser: Prof. Yasuo Kuniyoshi)

- Conducted data analysis on motion and brain imaging data collected from preterms, neonates, and infants.
- Developed biologically grounded computational simulation of human fetus, integrating large-scale brain and whole-body musculoskeletal models.
- Performed model validation to support applications in developmental neuroscience and preterm care.

Skill Summary

- **Leadership and Interpersonal Skills**
  - Led and coordinated multi-institutional, interdisciplinary research projects in collaboration with international teams across academia, healthcare, and industry.
  - Strong verbal and written communication skills, demonstrated through scientific publications, presentations, and cross-functional collaboration.

- **Problem Structuring & Solution Development:** Skilled in logically deconstructing complex real-world challenges and developing innovative technical solutions through research and engineering.

- **Interdisciplinary Learning for Real-World Impact**: Demonstrated ability and passion for continuously acquiring interdisciplinary knowledge essential for solving complex real-world problems through research and innovation.

- **Technical skills**
  - **Data Analytics**: Machine Learning, Deep Learning, Multimodal data analysis, Statistical Analysis, Time-Series Analysis, Dynamical Systems, Natural Language Processing, Biomechanical Analysis
  - **Biosignal Acquisition & Processing:** Brain Imaging, Electromyography (EMG), Wearable Sensor Data, Motion Capture, Actigraphy, Eye Tracking, Speech and Voice Analysis
  - **Computational Modeling:** Development of computational simulations for musculoskeletal systems and neural networks (e.g., spiking neural networks)
  - **Programming Languages:** Python, PyTorch, MATLAB, C/C++

Awards & Honors

Academic & Scientific Recognition

- **Best Paper Award**, IEEE International Conference on Digital Health, 2025 (*Lead-author paper*: "Toward a foundation model for healthcare applications on single-camera gait analysis")
- **Best Paper Award**, IEEE International Conference on Digital Health, 2023 (co-authored paper: "An automated digital biomarker of mobility")
- **Excellent Paper Award**, IEEE Global Conference on Life Sciences & Technologies, 2021 (co-authored paper: "A study for detecting mild cognitive impairment by analyzing conversations with humanoid robots")
- **Best Paper Award**, International Conference on the Human Side of Service Engineering, 2020 (*Lead-author paper*: "Predicting future accident risks of older drivers by speech data from a voice-based dialogue system: a preliminary result")
- **Best Paper Award**, Conference on Artificial Intelligence in Medicine, 2017 (*Lead-author paper*: "Detecting mental fatigue from eye-tracking data gathered while watching video")
- **Dean Prize**, Grad. School of Information Science & Technology, The University of Tokyo, 2015 (for the PhD thesis on embodied brain modeling for human fetus)
- **Research Fellow,** Japan Society for the Promotion of Science, 2012 – 2015.

Corporate & Business Recognition

- **Outstanding Technical Achievement Award**, IBM Corporation, 2022 (for scientific and business contributions to digital health for healthy aging)
- **Branding Corporation Appreciation Award**, IBM Japan, 2020 (for contribution to the increase in brand awareness through the R&D on dementia)
- **General Manager Award**, IBM Japan, 2020 (for business contributions to multiple industries through the R&D on dementia)
- **Branding Corporation Appreciation Award**, IBM Japan, 2019 (for contribution to the increase in brand awareness through the university collaboration toward early detection of dementia)
- **General Manager Award**, IBM Japan, 2019 (for contribution to successful marketing campaigns through university collaborations on research for smart aging).

Selected Publications (See all publications: Google Scholar)

1. **Y Yamada** et al., Utility of synthetic musculoskeletal gaits for generalizable healthcare applications, ***Nature Communications*****,** 2025
2. **Y Yamada** et al., Distinct eye movement patterns to complex scenes in Alzheimer's disease and Lewy body disease, ***Frontiers in Neuroscience*****,** 2024
3. H Kanazawa, **Y Yamada** et al., Open-ended movements structure sensorimotor information in early human development, ***PNAS***, 2023 [Altmetric attention score 655; Picked up by 84 news outlets]
4. **Y Yamada** et al., Speech and language characteristics differentiate Alzheimer's disease and dementia with Lewy bodies, ***Alzheimers Dement (Amst)***, 2022 [Selected as one of the top downloaded articles]
5. **Y Yamada** et al., Combining multimodal behavioral data of gait, speech, and drawing for classification of Alzheimer's disease and mild cognitive impairment, ***Journal of Alzheimer's Disease***, 2021
6. E Lee, …, **Y Yamada** et al., High prevalence and adverse health effects of loneliness in community-dwelling adults across the lifespan: role of wisdom as a protective factor, ***International Psychogeriatrics***, 2019 [Altmetric attention score 741; Picked up by 87 news outlets]
7. **Y Yamada**, T Morimura, Weight Features for Predicting Future Model Performance of Deep Neural Networks. ***International Joint Conference on Artificial Intelligence (IJCAI)***, 2016
8. **Y Yamada** et al., An embodied brain model of the human foetus, ***Scientific Reports***, 2016