FY 2024 Annual Report

Unit Name

Cognitive Neurorobotics Research Unit

Collaborations

Yuichi Yamashita, National Center of Neurology and Psychiatry, Japan, Section Chief

Kenji Doya, OIST, Japan, Professor

Jeffrey White, NOVA-LINCS, Portugal, Collaborator

Research Personnel

Takazumi Matsumoto, Staff Scientist

Jeffrey Queisser, Staff Scientist

Henrique Carlos Oyama, Postdoctoral Scholar

Sergio Verduzco Flores, Postdoctoral Scholar

Hok Shing Lau, Research Unit Technician

Jeffrey Benjamin White, Visiting Reseacher

Jinho Chung, Research Unit Technician

Fabien Benureau, Postdoctoral Scholar, Aleph Alpha

Federico Sangati, Research Unit Technician, RIKEN

Rui Fukushima, OIST Student

Wataru Ohata, OIST Student

David Pere Tomas, OIST Student

Hiroki Sawada, OIST Student

Raymond Alexander Baranski, OIST Student

Prasanna Vijayaraghavan, OIST Student

Theodore Jerome Tinker, OIST Student

Scholarly Contributions and Creative Productions (by Faculty)

Journal Article

1. Vijayaraghavan, P.; Queisser, J. F.; Flores, S. V.; Tani, J.
   Development of Compositionality through Interactive Learning of Language and Action of Robots. Science Robotics 2025, 10, eadp0751.
2. Takahashi, Y.; Idei, H.; Komatsu, M.; Tani, J.; Tomita, H.; Yamashita, Y.
   Digital Twin Brain Simulator for Real-Time Consciousness Monitoring and Virtual Intervention Using Primate Electrocorticogram Data. NPJ digital medicine 2025, 8, 80.
3. Tani, J.
   The Epistemic Uncertainty Gradient in Spaces of Random Projections. Entropy 2025, 27.

4. Ohata, W.; Tani, J.

   Characterizing the Sense of Agency in Human–robot Interaction Based on the Free Energy Principle. NPJ Complexity 2025, 2.
5. Sawada, H.; Ohata, W.; Tani, J.

   Human-Robot Kinaesthetic Interaction Based on Free Energy Principle. IEEE Transactions on Systems, Man, and Cybernetics: Systems 2024, 55, 366–379.
6. Tinker, T. J.; Doya, K.; Tani, J.

   Intrinsic Rewards for Exploration Without Harm From Observational Noise: A Simulation Study Based on the Free Energy Principle. Neural computation 2024, 36, 1854–1885.
7. Han, D.; Doya, K.; Li, D.; Tani, J.

   Synergizing Habits and Goals with Variational Bayes. Nature communications 2024, 15, 4461.

Presentation at Conference

1. Tani, J.

   Cognitive Neurorobotics Studies Extending the Free Energy Principle. Simulation of Adaptive Behavior (SAB2024) 2024.
2. Tani, J.

   Toward Understanding Structural Basis for Autonomy of Consciousness: A Synthetic Neurorobotics Study. A Synthetic Neurorobotics Study. Association for the Scientific Study of Consciousness 27 (ASSC-27) 2024.

Seminars

1. Tani, J.

   Development of Compositionality through Interactive Learning of Language and Action of Robots Using Free Energy Principle. 2025.
2. Tani, J.

   Development of Compositionality through Interactive Learning of Language and Action of Robots Using Free Energy Principle. 2025.
3. Tani, J.

   Synergizing Habits and Goals with Variational Bayes. 2024.
4. Tani, J.

   Cognitive Neurorobotics Studies Using the Free Energy Principle. 2024.

Scholarly Contributions (by Unit Members)

Name of Unit Member	Type	Title	Outlet	Publisher	Year Pub
Hok Shing Lau	Conference Proceedings	Interpreting Pretrained Speech Models for Automatic Speech Assessment of Voice Disorders	Artificial Intelligence in Healthcare First International Conference, AIiH 2024, Swansea, UK, September 4–6, 2024, Proceedings, Part I	Splinger	2024
Federico Sangati	Conference Proceedings	The Collaborative Abilities of ChatGPT Agents in a Number Guessing Game	Proceedings of the Joint Symposium of AROB-ISBC-SWARM 2024		2024
Wataru Ohata	Poster Presentation at Conference	Investigating the Sense of Agency in Human--Robot Interaction Based on the Free Energy Principle	The 27th annual meeting of the Association for the Scientific Study of Consciousness		

Name of Unit Member	Type	Title	Outlet	Publisher	Year Pub
Henrique Oyama	Poster Presentation at Conference	Lyapunov-Based Economic Model Predictive Control for Online Model Discrimination and Safe Data Collection	2024 OIST Researcher Appreciation Month		2024
Alexander Baranski	Poster Presentation at Conference	Generating adaptive behavior via a self-mutating neural search process to solve complex spatiotemporally continuous problems	SfN2024		2024
Henrique Oyama	Poster Presentation at Conference	Lyapunov-Based Economic Model Predictive Control for Online and Safe Process Model Discrimination	16th HOPE Meeting		2025
Alex Baranski	Poster Presentation at Conference	Generating Adaptive Behavior By A Self-Mutating Search Process	The 3rd RIKEN CBS Co-Creation International Conference		2025
Henrique Oyama	Poster Presentation at Conference	Computational Framework for Focus-Mind Wandering Modes of Operation under the Free Energy Principle	The 3rd RIKEN CBS Co-Creation International Conference		2025
Takazumi Matsumoto	Poster Presentation at Conference	Incremental Learning of Goal-Directed Actions in a Dynamic Environment by a Robot Using Active Inference	2024 IEEE International Conference on Development and Learning (ICDL)	IEEE	2024
Henrique Oyama	Poster Presentation at Conference	Modeling Autonomous Transitions Between Focus and Mind-Wandering States under the Free Energy Principle	OIST TSVP Symposium: Computational and Physical Understanding of Biological Information Processing		2025
Henrique Oyama	Presentation at Conference	Modeling Autonomous Transitions Between Focus and Mind-Wandering States under the Free Energy Principle	OIST TSVP Symposium: Computational and Physical Understanding of Biological Information Processing		2025
Henrique Oyama	Presentation at Conference	Investigation of Hierarchical-Shallow Processing Architecture and Economic Model Predictive Control for Safe Model Discrimination	7th International Conference on Machine Learning and Machine Intelligence		2024

Honors, Awards & Fellowships (only by unit members)

2024-12-04	Henrique Oyama, Selected by JSPS for the 16th HOPE Meeting, Selected by JSPS for the 16th HOPE Meeting, 2024, JSPS, n/a
2024-08-03	Henrique Oyama, Best oral presentation, Best oral presentation, 2024, Ritsumeikan University, n/a

External Service

2024 - Ongoing	大学コンソーシアム沖縄創立１０周年記念事業企画・運営委員会委員

Outreach Activities (For Unit Members Only)

2025-03-29	Jeffrey Queisser, OIST Beach Robot Hackathon, OIST
2025-03-15	Jeffrey Queisser, OIST Beach Robot Remote Islang School Visit, OIST
2025-02-01	Jeffrey Queisser, OIST Science Festival, OIST
2025-02-01	Henrique Oyama, OIST Science Festival, OIST
2025-02-01	Takazumi Matsumoto, OIST Science Festival, OIST
2024-10-25	Henrique Oyama, OIST New Postdoc Orientation, OIST
2024-07-23	Henrique Oyama, Children’s School of Science, OIST