

Ken Nakamura

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RESEARCH FOCUS

- **Mechanisms of human cognition and conceptual understanding**
- **Principles of intelligence:** Mathematical principles underlying how perception, concepts, and language abilities arise, become grounded, and support intelligent behavior.
- Approach: NeuroAI, model–brain alignment, representation analysis, and self-supervised learning.

EDUCATION

The University of Tokyo, Faculty of Engineering

Apr 2023–Mar 2027 (expected)

B.Eng., Department of Mathematical Engineering and Information Physics

GPA: 4.11/4.30

- Admitted through UTokyo's School Recommendation-Based Selection; one of about 30 Faculty of Engineering admits per year (approximately 1.0% of UTokyo's undergraduate intake).
- Permitted to exceed UTokyo's 30-credit-per-semester registration cap based on first-semester academic performance (approximately 10 students per cohort).

PUBLICATIONS AND PREPRINTS

- [1] **Nakamura, K.**, Nakai, T., Yashiro, R., Yamashita, A., & Amano, K. (2026). Beyond Prediction Accuracy: Target-Space Recovery Profiles for Evaluating Model-Brain Alignment. *arXiv preprint arXiv:2605.20127*. Under review. [🔗](#)
- [2] Asanuma, H., Koide-Majima, N., **Nakamura, K.**, Horii, T., Nishimoto, S., & Oizumi, M. (2025). Correspondence of high dimensional emotion structures elicited from video clips between humans and multimodal LLMs. *Scientific Reports*, 15(1), 32175. [🔗](#)

RESEARCH EXPERIENCE

Undergraduate Researcher

Jun 2024–Present

Amano-Nakai-Nakayama Lab, Department of Information Physics and Computing,

Bunkyo-ku, Tokyo, Japan

Graduate School of Information Science and Technology, The University of Tokyo

Advisor: Prof. Kaoru Amano, Assoc. Prof. Tomoya Nakai

- Investigated the structure underlying fMRI prediction accuracy, asking whether models with similar accuracy recover the same dimensions of human brain-response space.
- Proposed target-space recovery profiles to quantify which reproducible dimensions in brain-response space are captured by models and other human brains.
- Led a first-author preprint showing that prediction accuracy can obscure differences in recovered brain-response structure.

Undergraduate Researcher

Apr 2024–Aug 2025

Oizumi Lab, Department of General Systems Studies, Graduate School of Arts and Sciences, Meguro-ku, Tokyo, Japan

The University of Tokyo

Advisor: Prof. Masafumi Oizumi

- Investigated how multimodal LLM-inferred emotion spaces align with human emotional representations elicited by naturalistic videos.
- Collected emotion-rating data from multimodal LLMs and compared its representational geometry with human emotion reports.
- Analyzed item- and category-level model–human alignment using RSA and Gromov-Wasserstein optimal transport; co-authored a peer-reviewed publication.

Guest Researcher

Feb 2026–Apr 2026

Smart Data & Knowledge Services Department, German Research Center for Artificial

Kaiserslautern, Germany

Intelligence (DFKI)

Advisor: Prof. Dr. Prof. h.c. Andreas Dengel

- Examined learning dynamics in continual LLM self-distillation under controlled tool-use and mathematical-reasoning settings.
- Built unified training and evaluation protocols to isolate when self-distillation produces unstable representation and task-learning dynamics.
- Presented findings in a DFKI research webinar and documented the experimental setup, results, and follow-up directions.

Visiting Research Fellow
Sulchek BioMEMS and Biomechanics Lab, Georgia Institute of Technology
Advisor: Prof. Todd Sulchek

Aug 2025–Sep 2025
Atlanta, Georgia, USA

- Curated over 23,000 labeled cell-morphology images from high-speed microfluidic compression videos, including segmentation masks and labels for abnormal versus normal cell morphology.
- Trained accurate, lightweight, and fast computer-vision models and built a practical pipeline for identifying cells with abnormal morphology.

Undergraduate Research Assistant

Ikeuchi Lab, Department of Biomolecular and Cellular Engineering, Institute of Industrial Science, The University of Tokyo
Advisor: Prof. Yoshiho Ikeuchi

Oct 2023–Jan 2024

- Assisted experiments using electrical feedback to train in vitro mouse cerebral networks on maze-navigation tasks; contributed to stimulation design and data collection.

RESEARCH PRESENTATIONS

- [1] **Nakamura, K.**, & Frolov, S. (Apr 2026). *Toward Efficient Continual Learning for LLMs: Two Burdens of Self-Distillation*. Webinar presented at the Smart Data & Knowledge Services Department, German Research Center for Artificial Intelligence (DFKI), Kaiserslautern, Germany.
- [2] **Nakamura, K.**, Amiri, H. A., Chen, S., & Sulchek, T. (Sep 2025). *BlebNet: a Cell Damage Detection Network for High-speed Microfluidic Compressions*. Poster presented at the Nakatani RIES Symposium, Georgia Institute of Technology, Atlanta, Georgia, USA.
- [3] **Nakamura, K.**, Asanuma, H., & Oizumi, M. (Sep 2024). *Emotion Prediction During Video Viewing Using Multimodal LLMs*. Final seminar presentation, The University of Tokyo, Meguro-ku, Tokyo, Japan.

FELLOWSHIPS AND GRANTS

MITOU IT Program, Selected Developer 2025–2026
Ministry of Economy, Trade and Industry (METI), Government of Japan

- Selected as one of 21 projects from 227 applications (approximately 9.3%); received JPY 2.88 million (approximately USD 18,000) in project funding.

Nakatani Research and International Experiences for Students Fellowship Program Mar 2025
Nakatani Foundation / Georgia Institute of Technology

- Selected as one of 11 Japanese fellows from 130 applicants (approximately 8.5%); supported a fully funded research stay at Georgia Institute of Technology.

Nakatani Advanced Research Internship Program Oct 2025
Nakatani Foundation

- Selected as one of 5 Japanese students for a fully funded research stay at DFKI.

ASJ Foundation Scholarship Jun 2025
ASJ Foundation

- Selected as one of 12 undergraduate recipients in 2025.

KEYENCE Foundation Student Support Grant Jun 2026
KEYENCE Foundation

HONORS AND AWARDS

MITOU Super Creator Certification ([Press](#)) Jun 2026
Ministry of Economy, Trade and Industry (METI), Government of Japan

- Certified as one of 23 MITOU Super Creators among 34 creators who completed the 2025 MITOU IT Program.

Chemistry Grand Prix Awards 2021–2022
Chemical Society of Japan

- Bronze Prize (Aug 2022): awarded in Japan's national chemistry competition for high-school-and-younger students; approximately top 2.5% among 3,215 participants.
- Kanto Branch Chief's Award (Nov 2021), Chemical Society of Japan, Kanto Branch.

Valedictorian Mar 2023
Seiko Gakuin Junior and Senior High School

TECHNICAL SKILLS

Programming	Python, C/C++ , MATLAB, Rust, JavaScript/TypeScript, LaTeX
Machine Learning & Representation Analysis	PyTorch, TensorFlow, computer vision, fMRI encoding analysis, model–brain alignment, optimal transport, multimodal LLM evaluation, continual learning
Research Infrastructure	Docker, Git, SSH, dataset curation and annotation
Software Systems	React, Next.js, Vite, command-line tools, web application development

LANGUAGES

Japanese (Native), English (Fluent, TOEFL iBT 99/120)