

Hideki Kozima

(Ph.D in Computer Science and Information Mathematics, UEC 1994)

Professor
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Identity

Lastname: Kozima (Note: On my passport, my last name is shown as "Kojima")
First name: Hideki
Birthdate: Feb. 19, 1966 (Tokyo, Japan)
Sex: Male
Nationality: Japanese

Research Experience

- **Tohoku University** (Miyagi, Japan)
 - [Apr. 2022 – present]
Vice Dean of the Graduate School of Education
 - [Apr. 2018 – present]
Full Professor at the Graduate School of Education
Research and education in cognitive technology, including AI and robotics, for creating future education and welfare, as well as serving as a steering committee member of the school.
 - [Apr. 2017 – Mar. 2018]
Full Professor at Graduate School of Educational Informatics
Research and education in cognitive technology, including AI and robotics, for creating future education and welfare.
- **Miyagi University (MYU)** (Miyagi, Japan)
 - [Apr. 2013 – Mar. 2017]
Vice President (appointed for university reformation)
Planning and implementing the future vision of Miyagi University, including the establishment of new schools and faculties.
 - [Oct. 2008 – Mar. 2017]
Full Professor at the Department of Design Informatics, School of Project Design
Research and education in welfare technologies, social robotics, physical computing, media art, and cognitive sciences.
- **National Institute of Information and Communications Technology** (Headquarters: Tokyo, Japan)
 - [Apr. 2006 – Sep. 2008]
Senior Researcher in Universal City Group (Group-Leader: Hiromitsu Wakana), Knowledge Creating Communication Research Center (Director: Takashi Matsuyama; Kyoto, Japan).

On April 1st, 2004, *Communications Research Laboratory* changed its name as *National Institute of Information and Communications Technology*.

Research on developmental robotics and communication-care. I investigate the underlying mechanism of human communicative development and its disorders. I designed and constructed the upper-torso humanoid, *Infanoid 5 and 6*, for this study. Also, I designed and constructed a small creature-like robot, *Keepon*, for remedial application for children with developmental disorders.

- **Communications Research Laboratory** (Headquarters: Tokyo, Japan)

- [Apr. 2001 – Mar. 2006]

Senior Research Scientist in Social Interaction Group (Group Leader: Hiroyuki Yano), Keihanna Human Info-Communication Research Center (Kyoto, Japan). (Note that Social Interaction The group is formerly Cyber Human Technology Section.)

- [Oct. 1999 – Mar. 2001]

Senior Research Scientist in Knowledge Systems Section (Section-Chief: Hiroyuki Yano), Kansai Advanced Research Center (Kobe, Japan).

Research on epigenesis of human communication. I worked on psycho-robotic model of the development of social skills, including non-verbal and verbal communication. I designed and constructed a new infant robot, *Infanoid 4*, as an experimental platform of this study.

- **Massachusetts Institute of Technology** (Cambridge, Massachusetts, USA)

- [Oct. 1998 – Oct. 1999]

Visiting Researcher at Artificial Intelligence Laboratory (Supervisor: Prof. Rodney A. Brooks)

Research on attentional interaction between humans and robots. I worked on cognitive modules that enable humanoid robots to share visual attention with human users. I designed and implemented an eye-contact detector and a face-direction detector.

- **Communications Research Laboratory** (Headquarters: Tokyo, Japan)

- [Oct. 1996 – Oct. 1998]

Research Scientist in Knowledge Systems Section (Section-Chief: Akira Ito), Kansai Advanced Research Center (Kobe, Japan).

Research on pre-verbal communication. I worked on cognitive development of communication abilities, e.g. attention-sharing by gaze and pointing, in normal and autistic infants. I designed and implemented an attention-sharing robot, *Infanoid*, which currently can perform face-contact (i.e. orientation to human faces).

- [Apr. 1994 – Sep. 1996]

Research Scientist in Knowledge Systems Section (Section-Chief: Akira Ito), Kansai Advanced Research Center (Kobe, Japan).

Research on semantic processing of natural language. I developed a computational method for measuring context-sensitive semantic distance between concepts. I designed and evaluated a discourse-scene-based model of word prediction, which predicts succeeding words according to the preceding words in a text.

- **The University of Electro-Communications** (Tokyo, Japan)

- [Apr. 1990 – Mar. 1994]

Graduate student working for doctoral degree (Supervisor: Prof. Teiji Furugori).

Research on semantic measurement of linguistic concepts. I devised a method for computing the semantic distance between concepts by spreading activation on an English dictionary. Using the semantic measurement, I devised a method for finding scene boundaries in a given text.

- [Apr. 1988 – Mar. 1990]
Graduate student working for master’s degree (Supervisor: Prof. Teiji Furugori).
Research on knowledge representation for natural language processing. I designed a psycholinguistic model of knowledge representation and implemented a simple converter between text and the internal representation.

Education

- **The University of Electro-Communications** (Tokyo, Japan)
Apr. 1990 – Mar. 1994
Received a Doctor of Engineering in Computer Science and Information Mathematics.
Thesis: “Computing lexical cohesion as a tool for text analysis” (in English). Supervisor: Prof. Teiji Furugori.
- **The University of Electro-Communications** (Tokyo, Japan)
Apr. 1988 – Mar. 1990
Received a Master of Engineering in Computer Science and Information Mathematics.
Thesis: “A lexical/structural disambiguation model for natural language understanding” (in Japanese). Supervisor: Prof. Teiji Furugori.
- **The University of Electro-Communications** (Tokyo, Japan)
Apr. 1984 – Mar. 1988
Received a Bachelor of Engineering in Information Mathematics.
Thesis: “A model of bi-directional conversion between text and meaning” (in Japanese). Supervisor: Prof. Teiji Furugori (Apr. 1983 – Mar. 1984).

Languages

- **Japanese** (native)
- **English** (fair)
 - **TOEIC**: 975 points (2016), 980 points (2000).
 - **STEP** (*Ei-ken*): Pre-1st Grade (1996).
 - **Harvard University Extension School** (Cambridge, Massachusetts, USA)
[Feb. 1999 – May. 1999] (Spring semester)
Completed the Intensive Integrated Skills Course (High Advanced Level) in the Harvard Institute for English Language Program.

Major Publications

Google Scholar: Citations 4008. h-index 29. i10-index 43.

For details, please refer (by clicking) to the following sites:

<https://scholar.google.com/citations?user=3fmGocMAAAAJ>

<https://researchmap.jp/7000020979>

<https://tohoku.elsevierpure.com/ja/persons/hideki-kozima>

Here are some major publications in English.

- Hideki Kozima: Communication as joint prediction: A case study of robot-mediated pretend play with children at a kindergarten. IEEE International Conference on Robot and Human Interactive Communication (RO-MAN 2023, Korea), pp.1216-1221, 2023. (DOI:10.1109/RO-MAN57019.2023.10309527)

- Hideki Kozima: Cognitive granularity: A new perspective over autistic and non-autistic styles of development, Japanese Psychological Research, Vol.55, No.2, pp.168-174, 2013. (DOI:10.1111/jpr.12006)
- Hideki Kozima, Marek P. Michalowski, Cocoro Nakagawa: Keepon: A playful robot for research, therapy, and entertainment, International Journal of Social Robotics, Vol.1, No.1, pp.3-18, 2009. (DOI:10.1007/s12369-008-0009-8)
- Hideki Kozima, Cocoro Nakagawa, Yuriko Yasuda: Children-robot interaction: a pilot study in autism therapy, Progress in Brain Research, Vol.164, pp.385-400, 2007. (DOI:10.1016/S0079-6123(07)64021-7)
- Hideki Kozima, Cocoro Nakagawa, Yuriko Yasuda: Interactive robots for communication-care: A case-study in autism therapy, IEEE International Workshop on Robot and Human Interactive Communication (RO-MAN 2005, USA), pp.341-346, 2005. (DOI:10.1109/ROMAN.2005.1513802)

Honors and Grants

- Grant-in-Aid for Scientific Research (C) (Ministry of Education and Science and Technology, Japan), “Toward a unified explanation for autism: linking the brain structure/function and the symptoms’, Apr. 2021 – Mar. 2025.
- Center of Innovation (Japan Science and Technology Agency + Ministry of Education and Science and Technology, Japan), “Communication robots for healthcare, Dec. 2017 – Mar. 2022.
- Grant-in-Aid for Scientific Research (C) (Ministry of Education and Science and Technology, Japan), “Communication and autism: From the view point of cognitive granularity”, Apr. 2015 – Mar. 2019.
- Research funding donation (BeatBots, LLC), “Creating Robots for Communication Care”, Apr. 2014 – Mar. 2015.
- Grant-in-Aid for Scientific Research (C) (Ministry of Education and Science and Technology, Japan), “Ethics in human and robots” (PI: Kotaro Matsumoto, Ibaraki University), Apr. 2011 – Mar. 2014.
- Grant-in-Aid for Scientific Research (B) (Ministry of Education and Science and Technology, Japan), “Mentalizing filter hypothesis and robotic therapy for children with autism”, Apr. 2009 – Mar. 2014.
- Grant-in-Aid for Scientific Research (Exploring A New Academic Field) (Ministry of Education and Science and Technology, Japan), “Reliable relationship with robots” (PI: Michita Imai, Keio University), Apr. 2009 – Mar. 2014.
- ICRA-2009 (IEEE International Conference on Robotics and Automation), “Kobe City Mayor’s Award” for outstanding performance in the 2009 ICRA Human-Robot Interaction Challenge, “BeatBots” (Marek Michalowski, Hideki Kozima)
- ICRA-2008 (IEEE International Conference on Robotics and Automation), The ICRA 2008 Robot Challenge, Winner of the 1st Grand Challenge in Human-Robot Interaction, “Keepon” (Hideki Kozima, Marek Michalowski)
- ROMAN-2007 (IEEE International Symposium on Robot and Human Interactive Communication), Best Interactive Demonstration Award, “Keepon and the BeatBots”, 2007. (Hideki Kozima, Marek Michalowski)
- Robots at Play Prize 2007 (Winner), Robots at Play, Odense, Denmark. (Hideki Kozima, Marek Michalowski)
- Human Agent Interaction 2006, Outstanding Research Award, The first prize (HAI-2006; Tokyo, Japan), “Human-robot interaction in therapeutic and pedagogical fields”, Mar. 2007.

- Grant-in-Aid for Scientific Research (B) (Ministry of Education and Science and Technology, Japan), “Exploratory reserach on robotic therapy for autistic children”, Apr. 2006 – Mar. 2009.
- IEEE International Workshop on Robot and Human Interactive Communication (ROMAN-2003; San Francisco, CA, USA), Best Paper Award, “Attention coupling as a prerequisite for social interaction” (Hideki Kozima, Cocoro Nakagawa, Hiroyuki Yano), Sep. 2004.
- SICE System Integration 2002 (SI-2002; Kobe, Japan), Best Session Award, “What is the prerequisite for empathetic communication”, Jan. 2003.
- Communications Research Laboratory, Outstanding Research Award, “Research on cognitive mechanisms of preverbal communication”, Aug. 2002.
- Science and Technology Agency, the Japanese Government, Long-term Visiting Research Grant, “Visiting research on humanoid robotics at MIT AI Lab.”, Oct. 1998 – Oct. 1999.
- The Okawa Foundation for Information and Telecommunications, Grants for Individual Researchers and Research Groups, “Memory based natural language understanding”, Jul. 1996 – Jun. 1997.
- Japanese Foundation for Education (*Nihon Ikuei Kai*), Scholarship for Undergraduate Student, Apr. 1985 – Mar. 1988. Scholarship for Master’s Candidates, Apr. 1988 – Mar. 1990. Scholarship for Doctoral Candidates, Apr. 1990 – Mar. 1993.

Research Interests

- **Objectives:** I am a scientist working on cognitive science, artificial intelligence, and robotics. My major research interest is “the ability to imagine others’ minds”, which is the underlying core mechanism for interpersonal communication specific to the human species. Where did it come from? How does it develop over time? Investigating these issues, I would like to make robots and artificial systems that have “the ability to imagine others’ mind”, which would enables them to understand people’s feelings and pain, to make a promise with people, and then to live together with people in the community.

Keywords: human-robot communication, development of communication and its disorders, empathy and imitation, acquisition of language and culture, communication-care for children and the aged.

- **Background knowledge:** General linguistics (semiotics), developmental/cognitive psychology, ethnomethodological approach to human behavior, and brain sciences.
- **Techniques:** Designing and building mechanical apparatus (e.g., robots) and electrical apparatus (e.g., sensors and computers) for psychological experiments. 3D-CAD, machining and soldering.