

# Hirokazu Shirado

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School of Computer Science  
Human-Computer Interaction Institute  
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## Professional experience

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- 2019 – Assistant Professor  
Human-Computer Interaction Institute; and  
Societal Computing, Software and Societal Systems (affiliated faculty),  
School of Computer Science,  
Carnegie Mellon University, USA
- 2006 – 2014 Researcher  
Intelligent Systems Laboratory, Sony Corporation, Japan
- 2011 – 2012 Visiting researcher  
Department of Health Care Policy, Harvard Medical School, USA
- 2009 – 2011 Visiting researcher  
Graduate School of System Design and Management, Keio University, Japan

## Education

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- 2019 Ph.D., Sociology  
Yale University, USA
- 2018 M.A., MPhil, Sociology  
Yale University, USA
- 2006 M.S., System and Mechanical Engineering  
Keio University, Japan
- 2004 B.S., Mechanical Engineering  
Keio University, Japan

## Publications

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### *Thesis*

H. Shirado, Autonomous-agent interventions in human network cooperation and coordination.

## Articles

H. Shirado, S. Karahara, and N.A. Christakis, “Emergence and collapse of reciprocity in semiautomatic driving coordination experiments with humans,” *PNAS: Proceedings of the National Academy of Science*, Vol. 120, No. 51, e2307804120, 2023.

H. Shirado, Y.T. Hou, and M.F. Jung, “Stingy bots can improve human welfare in experimental sharing networks,” *Scientific Reports*, Vol. 13, No. 17957, doi:10.1038/s41598-023-44883-0, 2023.

H. Shirado, “Individual and collective learning in groups facing danger,” *Scientific Reports*, Vol. 12, No. 6210, doi:10.1038/s41598-022-10255-3, 2022.

E. Erikson and H. Shirado, “Networks, property, and the division of labor,” *American Sociological Review*, Vol. 86, No. 4, pp. 759-786, 2021.

H. Shirado and N.A. Christakis, “Network engineering using autonomous agents increases cooperation in human groups,” *iScience*, Vol. 23, No. 9, doi:10.1016/j.isci.2020.101438, 2020.

H. Shirado, F.W. Crawford, and N.A. Christakis, “Collective communication and behaviour in response to uncertain ‘Danger’ in scenario experiments,” *Proceedings of the Royal Society A*, Vol. 476, doi:10.1098/rspa/2019.0685, 2020.

H. Shirado, G. Iosifidis, N.A. Christakis, “Assortative mixing and resource inequality enhance collective welfare in sharing networks,” *PNAS: Proceedings of the National Academy of Science*, Vol. 116, pp. 22442-22444, 2019.

H. Shirado, G. Iosifidis, L. Tassiulas, N.A. Christakis, “Resource sharing in technologically defined social networks,” *Nature Communications*, doi:10.1038/s41467-019-08935-2, 2019.

H. Shirado and N.A. Christakis, “Locally noisy autonomous agents improve global human coordination in network experiments,” *Nature*, Vol. 545, pp. 370-374, 2017.

A. Nishi, H. Shirado, and N.A. Christakis, “Intermediate levels of network fluidity amplify economic growth and mitigate economic inequality in experimental social networks,” *Sociological Science*, Vol. 2, pp. 544-557, 2015.

A. Nishi, H. Shirado, D. Rand, and N.A. Christakis, “Inequality and visibility of wealth in experimental social networks,” *Nature*, Vol. 526, pp. 426-429, 2015.

H. Shirado, F. Fu, J.H. Fowler, and N.A. Christakis, “Quality versus quantity of social ties in experimental cooperative networks,” *Nature Communications*, Vol. 4, No. 2814, doi:10.1038/ncomms3814, 2013.

Y. Nonomura, T. Miura, T. Miyashita, Y. Asao, H. Shirado, et. al., “How to identify water from thickener aqueous solutions by touch,” *Journal of the Royal Society Interface*, doi:10.1098/rsif.2011.0577, 2011.

H. Shirado, M. Konyo, and T. Maeno, “Modeling of tactile texture recognition mechanism,” *Japan Society of Mechanical Engineers*, chapter C, Vol. 73, No. 733, pp. 2514-2522, 2007 (in Japanese).

H. Shirado, Y. Nonomura, and T. Maeno, “Development of artificial skin having human skin-like texture (Realization and evaluation of human skin-like texture by emulating surface pattern and elastic structure),” *Japan Society of Mechanical Engineers*, chapter C, Vol. 73, No. 726, pp. 541-546, 2007 (in Japanese).

H. Shirado and T. Maeno, “Modeling of texture perception mechanism for tactile display and sensor,” *Virtual Reality Society of Japan*, Vol. 9, No. 3, pp. 235-240, 2004 (in Japanese).

#### *Conference proceedings*

Z. Zhang, M. AL-Sunni, H. Jing, H. Shirado, and Y. Nakahira, “Rethinking safe control in the presence of self-seeking humans,” *the 37<sup>th</sup> AAAI Conference on Artificial Intelligence*, 2023.

E. Erikson and H. Shirado, “Network structure and the division of labor,” *the Conference of the Society for the Advancement of Socio-Economics*, 2019.

K. Nagasaka, A. Miyamoto, M. Nagano, H. Shirado, et. al., “Motion control of a virtual humanoid that can perform real physical interactions with a human,” *IEEE/RSJ International Conference on Intelligent Robots and Systems*, pp. 2303-2310, 2008.

H. Shirado, Y. Nonomura, and T. Maeno, “Realization of human skin-like texture by emulating surface shape pattern and elastic structure,” *Symposium on Haptic Interface for Virtual Environment and Teleoperator Systems*, pp. 295-296, 2006.

Y. Mukaibo, H. Shirado, M. Konyo and T. Maeno, “Development of texture sensor emulating the tissue structure and perceptual mechanism of human fingers,” *IEEE International Conference on Robotics and Automaton (ICRA)*, pp. 2576-2581, 2005.

H. Shirado and T. Maeno, “Modeling of human texture perception for tactile displays and sensors,” *World Haptics Conference*, pp. 57-58, 2005.

#### *Books*

M. Nakatani, Y. Kakehi, and H. Shirado, *Technology-Based Tactile Design*, Iwanami, 2011 (in Japanese).

#### *Book chapters*

H. Shirado and T. Maeno, *Tactile recognition mechanism and technology of tactile sensor and display*, Science & Technology, chapter 1, Vol. 3, 2010 (in Japanese).

## Funding

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- 2023 – 2028 “Using Machine Intelligence to Facilitate Intergroup Communication and Cooperation in Humans,” NSF CAREER (PI; \$450,738)
- 2020 – 2022 “Hybrid Human-AI Systems to Change Collective Behavior,” Robert Wood Johnson Foundation (Co-PI; \$42,832)

## Awards and Honors

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- 2023 NSF CAREER award
- 2022 Outstanding Article Publication Award, ASA Section on Mathematical Sociology
- 2020 Marvin B. Sussman Best Dissertation Award, Yale Sociology
- 2016 Seed Grant Program, The National Institute of Social Science, USA
- 2007 Incentive Award, Chemical Society of Japan
- 2005 Best Poster Award, World Haptics
- 2005 Scholarship Award, Japan Scholarship Foundation

## Invited talks

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- 2023 *CMU-Portugal talk*, Interactive Technologies Institute, Instituto Superior Técnico, University of Lisbon, Portugal
- 2023 Mainen Lab, Champalimaud Centre for the Unknown, Portugal
- 2023 Sony Corporation, Japan (Remote)
- 2023 Group of AI for People and Society, INESC-ID, Instituto Superior Técnico, University of Lisbon, Portugal
- 2023 The 37<sup>th</sup> Annual Conference of the Japanese Society for Artificial Intelligence, Japan (Remote)
- 2023 *Frontiers of Network Science Discover workshop*, New York University Abu Dhabi Institute, USA
- 2023 *Industrial Engineering seminar*, University of Pittsburgh, USA
- 2023 *Computational Social Science seminar*, MIT Media Lab, USA
- 2023 People + AI Research team, Google, USA
- 2022 *Computational Social Science seminar*, S3D, School of Computer Science, Carnegie Mellon University, USA
- 2022 Sony CSL, Japan
- 2022 Division of Psychology and Sociology, University of Tokyo, Japan
- 2022 Max Planck Institute of Animal Behavior and University Konstanz, Germany
- 2022 Max Planck Institute for Human Development, Germany
- 2022 *Human Nature Lab seminar*, Yale University, USA (Remote)

- 2021 *9<sup>th</sup> Computational Social Science*, Conference on Complex System, Lyon, France (Remote).
- 2021 *Civic AI Lab seminar*, University of Amsterdam, the Netherlands (Remote).
- 2021 *CREST workshop*, University of Tokyo, Japan (Remote).
- 2021 *Human Nature Lab seminar*, Yale University, USA (Remote)
- 2021 *socialBRIDGES HCI conference*, Bundeswehr University Munich, Germany (Remote).
- 2020 *Kansai Social Psychology seminar*, Japan (Remote).
- 2020 *Center for Informed Democracy and Social-cybersecurity seminar*, Carnegie Mellon University, USA (Remote).
- 2020 University of Konstanz, Germany (Remote).
- 2020 Max-Planck Institute for Human Development, Germany (Remote).
- 2019 Princeton University, USA.
- 2019 Dartmouth College, USA.
- 2019 *ALIFE 2019*, Newcastle University, UK.
- 2019 *Workshop on Visualization and Control for Neural Dynamics*, National Institute for Physiological Science, Japan.
- 2018 *Conference on Artificial Intelligence and Social Science*, The University of Electro-Communications, Japan.
- 2018 *The 35<sup>th</sup> Annual Meeting of the Japanese Cognitive Science Society*, Ritusmeikan University, Japan.
- 2018 *Workshop on Collective Behavior, Social Media, and Systemic Risk*, Princeton University, USA.
- 2018 *Distributed, Collective Computation in Biological and Artificial Systems*, Howard Hughes Medical Institute, Janelia Research Campus, USA.
- 2017 *Association for the Advancement of Artificial Intelligence 2017 Spring Symposia*, Stanford University, USA.
- 2016 *Contexts of Social Inequality*, WZB Berlin Social Science Center, Germany.
- 2016 Graduate School of System Design and Management, Keio University, Japan.

### **Teaching: full courses offered**

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“Social Web,” Computer Science 05-320/820, Undergraduate and graduate course, Carnegie Mellon University, Spring 2020, 2021, 2022

“Social Data Science,” Computer Science 05-499/899-E, Undergraduate and graduate course, Carnegie Mellon University, Fall 2020, 2021

“Introduction to Human-Computer Interaction for Technology Executives,” Computer Science 05-863, Graduate course, Carnegie Mellon University, Fall 2022

“Social Perspectives in Human-Computer Interaction,” Computer Science 05-772, Graduate course, Carnegie Mellon University, Spring 2023

“Master of Human-Computer Interaction Capstone Project,” Computer Science 05-671, Graduate course, Carnegie Mellon University, Spring and Summer 2023.

## **Service to profession**

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### *Intramural*

- 2020-2021 Faculty Search Committee, Societal Computing, Institute for Software Research, Carnegie Mellon University
- 2021-2023 PhD Admissions Committee, Human-Computer Interaction Institute, Carnegie Mellon University
- 2022-2023 Award Committee, Human-Computer Interaction Institute, Carnegie Mellon University

### *Extramural*

- 2019- Organizer, Summer Institute in Computational Social Science Tokyo site (SICSS-Tokyo)
- 2020- Member, Society for Computational Social Science of Japan

### *Ad-hoc reviews*

American Sociological Review, European Sociological Review, IC2S2, iScience, Nature Communications, Nature Human Behavior, PLOS ONE, Science Advances, Scientific Reports, SIGCHI, Sociological Methods and Research, IEEE Transactions on Network Science and Engineering

## **Extra training**

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- 2017 Summer Institute in Computational Social Science, Princeton University, USA

## **Media coverage**

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“Interdisciplinary case study: understanding the cooperation of humans and robots through the collaboration of social and computer scientists”, *iScience*, 2020

“Behaving better online”, *BBC*, 2018

“Bad bots do good: Random artificial intelligence helps people coordinate,” *Science*, 2017

“Pushy AI bots nudge humans to change behavior,” *Scientific American*, 2017

“Dumb robots that make mistakes actually help humans solve problems,” *The Verge*, 2017

“How bots acting randomly can help speed human problem-solving,” *Live Science*, 2017

“Working with robots helps people get along”, *Science of Us*, 2017

“Making the scene: inequality,” *PBS*, 2015

## **Languages**

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Fluent English  
Native Japanese

## **References**

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### **Nicholas A. Christakis**

Professor of Sociology, Medicine, and Ecology and Evolutionary Biology, Yale University  
Co-director of Yale Institute for Network Science  
nicholas.christakis@yale.edu

### **Emily Erikson**

Professor of Sociology, Yale University  
emily.erikson@yale.edu

### **Malte F. Jung**

Associate Professor of Information Science, Cornell University  
mfj28@cornell.edu

### **Tatsuya Kameda**

Professor of Social Psychology, The University of Tokyo  
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### **Yasuaki Kakehi**

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