

CURRICULUM VITAE

Personal details

Name:	Ken-ichi Amemori	Sex:	Male
Position:	Research Scientist	Date of birth:	24 August 1973
Email:	amemori@mit.edu	Nationality:	Japan
WWW:	http://graybiel-lab.mit.edu/members-kamemori.php		

Research and Professional Positions

2009-present	Research Scientist , Department of Brain and Cognitive Sciences and the McGovern Institute for Brain Research, Massachusetts Institute of Technology, Cambridge, Massachusetts
2008-2009	Postdoctoral Associate , Department of Brain and Cognitive Sciences and the McGovern Institute for Brain Research, Massachusetts Institute of Technology, Cambridge, Massachusetts
2006-2008	National Parkinson Foundation Lynn Diamond Fellow , Department of Brain and Cognitive Sciences and the McGovern Institute for Brain Research, Massachusetts Institute of Technology, Cambridge, Massachusetts
2005-2006	Postdoctoral Associate , Department of Brain and Cognitive Sciences and the McGovern Institute for Brain Research, Massachusetts Institute of Technology, Cambridge, Massachusetts
2002-2005	Instructor (equivalent to Assistant Professor in U.S.), Hokkaido University Graduate School of Medicine, Sapporo, Hokkaido, Japan
2001-2002	Postdoctoral Researcher , Nara Institute of Science & Technology, Ikoma, Nara, Japan

Education

- 1999-2001 PhD. in Computational Neuroscience,
Graduate School of Information Science,
Nara Institute of Science and Technology, Japan.
(Thesis title) *Analysis of dynamics and learning for stochastic spiking
neuron model.*
(Supervisor) Professor, Shin Ishii
- 1997-1999 MSc in Information Science, *with the best student award*,
Graduate School of Information Science,
Nara Institute of Science and Technology, Japan.
- 1993-1997 BSc in Physics, Faculty of Integrated Human Studies,
Kyoto University, Japan.

Honors

- 2006 National Parkinson Foundation Lynn Diamond Fellow
- 2002 Best paper award, Institute of Systems, Control & Information
Engineers, Japan
- 1999 Best student award, Nara Institute of Science & Technology

Grants and Awards

- 2005-present **NIH Research Project Fund (R01)** from National Institute of
Neurological Disorders and Strokes, National Institute of Health
“Extrapyramidal Systems” (PI: Ann. M. Graybiel)
Role: Postdoctoral Associate / Staff Scientist / Key Personnel
- 2013-present **NIH Research Project Fund (R01)** from National Institute of
Biomedical Imaging and Bioengineering
“A New Device for Electrical and Chemical Modulation of Pathological
Neural Activity” (PIs: Robert S. Langer, Michael J. Cima and Ann. M.
Graybiel)
Role: Staff Scientist
- 2012-present **Preclinical Grant** from CHDI foundation
“Toward Targeting Therapeutic Approaches to Brain Circuits Affected
in Huntington’s disease: New Approaches to Analysis of Cortico-Basal
Ganglia Circuits” (PI: Ann. M. Graybiel)
Role: Staff Scientist
- 2012-2013 **Seed Grant** from Simons Center for the Social Brain at MIT
“Control of cortico-basal ganglia pathway mediating valuation of social
attachment in non-human primates” (PI: Ann. M. Graybiel)
Role: Staff Scientist

- 2007-2012 **Research Grant** from Office of Naval Research
 “Capitalizing on Research on Animal and Human Brain Plasticity” (PI: Art Kramer and Ann. M. Graybiel)
 Role: Postdoctoral Associate / Staff Scientist
- 2006-2008 **Lynn Diamond Postdoctoral Fellow** from National Parkinson Foundation
 “Analysis of cortico-basal ganglia loop function in macaque” (PI: Ann. M. Graybiel)
 Role: Postdoctoral Fellow
- 2004-2005 **Grant-in-Aid for Young Scientist** from Japan Society for the Promotion of Science, Japan
 “Experimental and theoretical studies on the competitive mechanism of decision-making”
 Role: Principal Investigator
- 2003-2005 **Grant-in-Aid for Exploratory Research** from Japan Society for the Promotion of Science, Japan
 “Study on the development of functional left/right localization of brain using optical recording” (PI: Toshiyuki Sawaguchi)
 Role: Research Associate
- 2003-2005 **Grant-in-Aid for Scientific Research (B)** from Japan Society for the Promotion of Science, Japan
 “Model identification method for reinforcement learning and brain analysis, and its engineering application” (PI: Shin Ishii)
 Role: Research Associate
- 2003-2004 **Grant-in-Aid for Scientific Research on Priority Areas** from Japan Society for the Promotion of Science, Japan
 “Elucidation of modulatory effect of monoamine on functional column dynamics in the frontal association area” (PI: Toshiyuki Sawaguchi)
 Role: Research Associate
- 2002-2004 **Grant-in-Aid for Scientific Research (B)** from Japan Society for the Promotion of Science, Japan
 “The role of monoamines in reward processing in the prefrontal cortex” (PI: Toshiyuki Sawaguchi)
 Role: Research Associate
- 2001-2005 **Core Research for Evolutional Science and Technology (CREST)** from Japan Science and Technology Corporation
 “Metalearning, neuromodulation and emotion”, (PI: Kenji Doya)
 Role: Research member

Key skills

Neuroscience and Neurophysiology: Multi-unit recordings unit and local field potential activity of behaving animals (especially primates). Electrical microstimulation, chemical infusion and behavioral testing. Anatomical tracing of brain circuit. Surgical

operation to implant recording chamber. Analysis of neural activity in humans and animals.

Physics, Computation and Mathematics: Computational modelling of neuronal activity and behaviors of humans and animals. Mathematical analysis of stochastic process. Simulation and statistics.

Publication

1: Peer-Reviewed Journal

Theresa M. Desrochers, Ken-ichi Amemori & Ann M. Graybiel (2015).
Habit learning by naïve macaques is marked by dynamic response sharpening of striatal neurons representing the cost and outcome of acquired action sequences.
Neuron, in press.

A. Friedman, D. Homma, L. Gibb, K. Amemori, S. Rubin, A. Hood, M. Riad & A. M. Graybiel (2015).
A corticostriatal path targeting striosomes controls decision-making under conflict.
Cell, 161, 1320-1333.

Ken-ichi Amemori, Satoko Amemori & Ann M. Graybiel (2015).
Motivation and affective judgments differentially recruit neurons in the primate dorsolateral prefrontal and anterior cingulate cortex.
Journal of Neuroscience, 35, 1939-1953.

Satoko Amemori, Ken-ichi Amemori, Margaret L. Cantor & Ann M. Graybiel (2015).
A non-invasive head-holding device for chronic neural recordings in awake behaving monkeys.
Journal of Neuroscience Methods, 240, 154-160.

Ken-ichi Amemori & Ann M. Graybiel (2012).
Localized microstimulation of primate pregenual cingulate cortex induces negative decision-making.
Nature Neuroscience, 15, 776–785.

- This article was recommended by four faculties of F1000 and evaluated by Michael Frank and James Cavanagh as “Exceptional”.
(<http://f1000.com/prime/717957809>)
- This article was highlighted by news and views of this issue: S. W. Kennerley (2012). “Is the reward really worth it?” **Nature Neurosci.** 15, 647-649.

Joseph Feingold, Theresa M. Desrochers, Naotaka Fujii, Ray Harlen, Patrick L. Tierney, Hideki Shimazu, Ken-ichi Amemori & Ann M. Graybiel (2012).
A system for recording neural activity chronically and simultaneously from multiple cortical and subcortical regions in non-human primates
Journal of Neurophysiology, 107, 1979-95.

Ken-ichi Amemori*, Leif G. Gibb* & Ann M. Graybiel (2011).
Shifting responsibly: the importance of striatal modularity to reinforcement learning in uncertain environments.
Frontiers in Human Neuroscience, 5, 47.

* equal contribution

Ken-ichi Amemori & Toshiyuki Sawaguchi (2006).
Contrasting effects of reward expectation on sensory and motor memories in primate prefrontal neurons.
Cerebral Cortex, 16, 1002-1015.

Ken-ichi Amemori & Toshiyuki Sawaguchi (2006).
Rule-dependent shifting of sensorimotor representation in the primate prefrontal cortex.
European Journal of Neuroscience, 23, 1895-1909.

- A figure of this article was used as the cover page picture.

Ken-ichi Amemori & Shin Ishii (2004).
Self-organization of delay lines by spike-time-dependent learning.
Neurocomputing, 61, 291-316.

Ken-ichi Amemori & Shin Ishii (2001).
Gaussian process approach to spiking neurons for inhomogeneous Poisson inputs.
Neural Computation, 13, 2763-2797.

Ken-ichi Amemori & Shin Ishii (2000).
Self-organization and association for fine spatio-temporal spike sequences.
Transactions of Institute of Systems, Control and Information Engineers, 13, 308-317. (In Japanese)

- This article was awarded as the best paper of this year by the Institute of Systems, Control and Information Engineers, Japan.

Kenichi Amemori & Shin Ishii (2000).
Ensemble average and variance of a stochastic spiking neuron model.
IEICE Transactions on Fundamentals of Electronics, Communications and Computer Sciences, E83-A, 575-578.

2: Peer-Reviewed Conference Proceedings

T. M. Desrochers, K. Amemori, A. M. Graybiel (2014).
Striatal neuronal activity of macaque tracks local and global changes during natural habit formation.
Cosyne 2014, III-83.

R. R. Fletcher, K. Amemori, M. Goodwin & Ann M. Graybiel (2012).
Wearable wireless sensor platform for studying autonomic activity and social behavior in non-human primates.
Conf Proc IEEE Eng Med Biol Soc. 4046-9.

Ken-ichi Amemori & Shin Ishii (2001).
Resonance of stochastic spiking neurons that mimic the Hodgkin-Huxley model.
Lecture Notes in Computer Science, 2130, 361-368.

Ken-ichi Amemori & Shin Ishii (2001).
Gaussian process approach to stochastic spiking neurons with resets.
Lecture Notes in Computer Science, 2130, 1087-1094.

Ken-ichi Amemori & Shin Ishii (2000).
Effect of the synaptic time constant on stochastic spiking neuron.
ICONIP-2000 Proceedings, 1, 6-11.

Kenichi Amemori & Shin Ishii (1999).
Self-organization and association for temporal coding.
ICANN99: Artificial Neural Networks, 1, 162-167.

Kenichi Amemori & Shin Ishii (1998).
Unsupervised learning for sub-millisecond temporal coded sequence.
JCIS '98 Proceedings, 2, 80-83.

Kenichi Amemori & Shin Ishii (1998).
Self-organizing network learning of sub-millisecond temporal coded information.
Fifth International Conference on Neural Information Processing, 3, 1285-1288.

3. Other Conference Proceedings and Abstracts

T. M. Desrochers, K. Amemori, A. M. Graybiel (2014).
Neural responses in striatum related to cost and outcome can drive unsupervised learning in the macaque.
Society for Neuroscience Abstract, 342.01.

A. M. Graybiel & K. Amemori (2013).
Control of primate's benefit-cost ratio by manipulating localized circuits in the frontostriatal network.
Society for Neuroscience Abstract, 18.02.

- Oral presentation at Nanosymposium

K. Amemori, S. Amemori & A. M. Graybiel (2013).
Primate dorsolateral prefrontal and anterior cingulate neurons are differentially recruited during decision-making under approach-avoidance conflict.
Society for Neuroscience Abstract, 92.03.

S. Amemori, K. Amemori & A. M. Graybiel (2013).
Low-dose NMDA antagonist treatment induces frequency-specific changes in lfp across primate cortico-striatal circuits during approach-avoidance decision-making.
Society for Neuroscience Abstract, 858.21.

S. Amemori, K. Amemori & A. M. Graybiel (2012).
Microstimulation of macaque subgenual anterior cingulate cortex alters approach-avoidance decision-making.
Society for Neuroscience Abstract, 273.04.

K. Amemori, S. Amemori & A. M. Graybiel (2012).
Functional clustering of neurons in primate caudate nucleus related to outcome evaluation for approach-avoidance decision-making.
Society for Neuroscience Abstract, 273.05.

- K. Amemori, S. Amemori & A. M. Graybiel (2011).
Microstimulation of the macaque caudate nucleus induces changes in outcome evaluation for approach-avoidance decisions.
Society for Neuroscience Abstract, 99.20.
- L. G. Gibb, K. Amemori & A. M. Graybiel (2011).
The striatum as a context-sensitive modular reinforcement learning system adaptable to changing environments.
Society for Neuroscience Abstract, 99.19.
- S. Amemori, K. Amemori & Ann M. Graybiel (2011).
Effects of anxiolytic drug administration on macaque decision-making under approach-avoidance conflict.
Society for Neuroscience Abstract, 99.18.
- Ken-ichi Amemori & Ann M. Graybiel (2010).
Localized microstimulation of macaque pregenual anterior cingulate cortex increases rejection of cued outcomes in approach-avoidance decision-making.
Society for Neuroscience Abstract, 306.4.
- Ken-ichi Amemori & Ann M. Graybiel (2009).
Stimulation of the macaque rostral anterior cingulate cortex alters decision in approach-avoidance conflict.
Society for Neuroscience Abstract, 194.1.
- T. M. Desrochers, K. Amemori, D. Z. Jin & A. M. Graybiel (2009).
Monkey eye movement patterns in a free-viewing scan task: Reward and reduction of entropy as drives.
Society for Neuroscience Abstract, 71.14.
- Ken-ichi Amemori & Ann M. Graybiel (2008).
Enhancement of neuronal activity in the primate anterior cingulate cortex during approach-avoidance conflict.
Society for Neuroscience Abstract, 590.22.
- Ken-ichi Amemori & Toshiyuki Sawaguchi (2004).
Different motivational effects on the neuronal activities for sensory memory and saccade preparation in the primate frontal eye field.
Society for Neuroscience Abstract, 438:12.
- Ken-ichi Amemori & Toshiyuki Sawaguchi (2004).
Functional differences between primate prefrontal and frontal eye field neurons during a memory-guided sensorimotor transformation.
Neuroscience Research, 50: Supplement 1, S201.
- Ken-ichi Amemori & Toshiyuki Sawaguchi (2003).
Different motivational effect on the neuronal activities in the primate prefrontal cortex during a sensorimotor transformation task.
Society for Neuroscience Abstract, 90:4.
- Ken-ichi Amemori & Toshiyuki Sawaguchi (2003).
Neuronal representations in the primate dorsolateral prefrontal cortex during memory-guided sensorimotor transformation process.
Neuroscience Research, 46: Supplement 1, S195.

4: Publications that do not have an international circulation

Satoko Kuboshima, Ken-ichi Amemori, Yuichi Sakumura & Shin Ishii (2002).
Change in the single spike response of the Hodgkin-Huxley neuron based on
excitatory and inhibitory background inputs.
IEICE technical report, 101(615): 119-126.

Ken-ichi Amemori & Shin Ishii (2000).
Variation of the response functions in stochastic spiking neuron model.
IEICE technical report, 100(127): 1-8.

Dai Keyakidani, Kenichi Amemori & Shin Ishii (2000).
Spike-based Hebbian delay adaptation.
IEICE technical report, 99(715): 83-90.

Kenichi Amemori, Masayoshi Kubo & Shin Ishii (2000).
Response of spiking neurons to Poisson spikes.
IEICE technical report, 99(685): 193-200.

Kenichi Amemori & Shin Ishii (1999).
Association of fine spatio-temporal sequence by a Hebbian spike-based learning rule.
IEICE technical report, 98(673): 99-106.

Kenichi Amemori & Shin Ishii (1998).
Unsupervised learning of temporal sequence coded by small interval differences.
IEICE technical report, 98(219): 93-100.