Rei Akaishi

Curriculum Vitae

Business Address: Center for Brain Science, East Building
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Birth Date: 02/14/1981
Birth Place: Tokyo, Japan
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EDUCATION and TRAINING

Undergraduate:

2000-2004   University of Minnesota (Minneapolis)   B.S., 2004   Child Psychology

Graduate:

2005-2007   The University of Tokyo   M.S., 2007   Medical Science
2007-2011   The University of Tokyo   PhD. 2011   Medicine

Post-doctoral:

2011-2012   Post-doctoral research fellow at The University of Tokyo

2012-2014   Post-doctoral research fellow at University of Oxford

2014-2015   Post-doctoral research fellow at Tokyo Metropolitan Institute of Medical Science

2016-2018   Post-doctoral research fellow at University of Rochester

2018-2019   Post-doctoral research fellow at *Center for Information and Neural Networks*

PI:

2019-current Unit Leader at RIKEN-CBS-Toyota Collaboration Center, RIKEN-Center for Brain Science

Awards and Fellowships
2000-2004 Six times on the Dean's list for academic excellence.

2010-2012 JSPS DC2 fellowship for a graduate student and post-doctoral fellowship
2012-2013 Fellowship of Canon Foundation in Europe
2013-2014 Post-doctoral fellowship of Uehara Memorial Foundation
2014-2017 JSPS post-doctoral fellowship
2015 Participation in Lindau Nobel Laureate Meeting (Interdisciplinary)

Skills
MATLAB programming for designing behavioral experiments and data analysis
EEG data recording and analysis,
Eye-movement recording and analysis in humans and monkeys
Technique combining TMS and EEG to examine the brain state with high time resolution
Functional and structural MRI data recording and data analysis
Analysis with computational models of learning/memory and decision making
Monkey behavioral training with touch screen and free eye-movement
Behavioral training of monkeys with virtual reality navigation task

PUBLICATIONS
Morishima, Y., **Akaishi, R.**, Yamada, Y., Okuda, J., Toma, K. & Sakai, K. (2009). Task-specific signal transmission from prefrontal cortex in visual selective attention. *Nature Neuroscience*, 12(1), 85-91.

Soga R, **Akaishi R**, Sakai K. Predictive and postdictive mechanisms jointly contribute to visual awareness. *Consciousness and Cognition*, 18(3), 578-592.

Akaishi, R., Morishima, Y., Rajeswaren, V., Aoki, S. & Sakai, K. Stimulation of the frontal eye field reveals persistent effective connectivity after controlled behavior**.** *The Journal of Neuroscience*, 30(12), 4295-4305.

Akaishi, R., Ueda, N., & Sakai, K. (2013). Task-related modulation of effective connectivity during perceptual decision making: Dissociation between dorsal and ventral prefrontal cortex. *Frontiers in Human Neuroscience*, 15 July 2013

Akaishi, R., Umeda, K., Nagase, A., & Sakai, K. (2014). Autonomous mechanism of internal choice estimate underlies decision inertia. *Neuron*, 81(1), 195-206.

Akaishi, R. (2015) Changing concepts of decision. *The Brain & Neural Networks*, 22(1):30-36.

Akaishi, R., Kolling, N., Brown, J., & Rushworth, M. (2016) Neural mechanisms of credit assignment in a multi-cue environment. *The Journal of Neuroscience*, 36(4): 1096-1112

Akaishi, R. & Hayden, B. (2016). A spotlight on reward. *Neuron*, 90(6):1148-1150

Wittmann, M., Kolling, N., **Akaishi, R.**, Chau, KHB., Brown, JW., Nelissen, N., & Rushworth, MFS. Predictive decision making driven by multiple time-linked reward representations in the anterior cingulate cortex. *Nature Communications*, 7(12327)

Eisenreich, B., **Akaishi, R.**, Hayden, B. Control without controllers: Towards a distributed neuroscience of executive control. *Journal of Cognitive Neuroscience*, 29(10): 1684-1698.

Mitsuto-Nagase, A., Onoda, K., Foo, J. C., Haji, T., **Akaishi, R**., Yamaguchi, S., Sakai, K., & Morita, K. Neural Mechanisms for Adaptive Learned Avoidance of Mental Effort. *Journal of Neuroscience,* 38 (10), 2631-2651.

Akaishi, R. & Hoshi, E. Information seeking and simulation: Roles of attention in guiding a goal-directed behavior. *Under Review* (preprint in bioRxiv, https://doi.org/10.1101/104091)

TEACHING EXPERIENCE
Undergraduate Level
Co-instructor in BCS 208, Lab in Perception and Cognition, at University of Rochester
Instructor in BCS/NSC248, Neuroeconomics, at University of Rochester
Graduate Level
Mentoring a graduate student (Marco Wittmann) for a project of reward-based decision making at University of Oxford

RESENTATIONS
Oral Presentation
Akaishi, R., Morishima, Y., Rajeswaren, V. & Sakai, K. (2008) Effective Connectivity during Task Set Reconfiguration (14th Annual Meeting of the Organisation for Human

Brain Mapping, Melbourne, Australia)

Akaishi, R., Mitsuto, A. & Sakai, K. (2009) Neural Basis of Decision Inertia (the 39th Annual Meeting of Society for Neuroscience, Chicago, U.S.A.)

Akaishi, R. (2014) Active Mechanisms of Learning and Decision Making. (12th International Conference on Cognitive Neuroscience, Brisbane, Australia)

Akaishi, R. (2015). What visual fixations reveal about evidence accumulation during decision making. (Departmental Seminar, Department of Experimental Psychology, University of Oxford)

Poster Presentation
Akaishi, R. & Sakai, K. (2006). Previous experience of visually guided movement influences body image during movement. (the 36th Annual Meeting of Society for Neuroscience, Atlanta, U.S.A.).

Akaishi, R., Morishima, Y., Rajeswaren, V., Aoki, S. & Sakai, K. (2008). Transitional Network State during Task Set Reconfiguration (the 31st Annual Meeting of the Japanese Neuroscience Society, Tokyo, Japan)

Akaishi, R., Morishima, Y., Rajeswaren, V. & Sakai, K. (2008). Effective connectivity during task preparation reflects carry-over from a previous task. (the 38th Annual Meeting of Society for Neuroscience, Washington, U.S.A.)

Akaishi, R., Mitsuto, A. & Sakai, K. (2009) Neural Correlate of Decision Inertia (the 32nd Annual Meeting of the Japanese Neuroscience Society, Tokyo, Japan)

Akaishi, R. & Sakai, K. (2010) Persistent influence of previous choices in perceptual decision making (Gordon Research Conference, Neurobiology of Cognition, Waterville Valley Resort, Waterville Valley, NH, U.S.A.)

Akaishi, R. & Hoshi, E. (2015) Attention and integration processes in gaze behavior (the 38nth Annual Meeting of the Japanese Neuroscience Society, Kobe, Japan)

Akaishi, R. & Hoshi, E. (2015) Attention-accumulation process in gaze behavior during

multi-cue decision making with manual response and free eye-movement (the 45th Annual Meeting of Society for Neuroscience, Chicago, U.S.A.)

Akaishi, R. & Hayden B. (2016) Navigation and decision in a virtual foraging task for monkeys (the 46th Annual Meeting of Society for Neuroscience, San Diego, U.S.A.)

Other academic activities
2006   Participation in the RIKEN Brain Science Institute summer school
2010   Participation in Summer School of Cold Springs Harbor Asia: Computational and Cognitive Neuroscience (organized by Xiao-Jing Wang, Zachary F Mainen)
2015 Participation in Lindau Nobel Laureate Meeting (Interdisciplinary)

RESEARCH INTEREST
I study learning and decision making from ecological perspectives. When an animal engages with its environment, it is an active agent in its interaction with the surroundings. It actively explores with clear ideas of consequences in mind. Similar ideas have been put forward by philosophers and psychologists. However, the neural bases of these mechanisms remain elusive. My studies tackle these problems by applying the computational ideas inspired by ecological views to neural systems.