NIPS International Workshop 2013
Frontier of Cognitive Neuroscience:
Metacognition and Uncertainty

18-19 October 2013, Okazaki, Japan

Preliminary program

Ver.1.05 (20131009)

Sponsored by the National Institute for Physiological Sciences (NIPS)

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[Version history of this preliminary program]

Ver.1.00 (Aug 30):

　　　* Available for download from the workshop web site.

Ver.1.01 (Sep 17):

　　　* Corrected typos.

Ver.1.02 (Oct 1):

　　　* Change in schedule and registration fee. Added names of discussants. Added titles
　　　　and abstracts.

Ver.1.03 (Oct 3):

　　　* Change in timetable. Added a title and an abstract.

Ver.1.04 (Oct 7):

　　　* Change in timetable. Added a title and an abstract.

Ver.1.05 (Oct 9):

　　　* Added a title and an abstract.

[Introduction]

NIPS International Workshop 2013 Frontier of Cognitive Neuroscience: Metacognition and Uncertainty will be held at the Okazaki Conference Center (Aichi, Japan) in October 18-19, 2013.

- Date: From Oct 18, 1:30pm to Oct 19, 1pm
- Venue: Okazaki Conference Center
- Fee: Free
- Banquet fee: 1,000 JPY for graduate student and 3,000 JPY for others
- Organizers: Yutaka Komura (AIST, Tsukuba), Tadashi Isa (NIPS, Okazaki) and Masatoshi Yoshida (NIPS, Okazaki)
- Contact: Masatoshi Yoshida (myoshi@nips.ac.jp)

All the presentation will be given in English.

It is supported by National Institute of Physiological Studies (NIPS) in Japan.

[Instruction for participants]

The workshop will be held at the Okazaki Conference Center.　For access, go to [how to get to the venue].

The floor map of the venue is available in [Floor map of Okazaki Conference Center].

The reception desk opens at 12:30 am of October 18.

The desk is in the entrance of the Okazaki Conference Center (See the floor map).

Check your name on the list and take the badge.

Please pay the following fee at the registration if you chose them at the online registration;

       Banquet : 3,000 yen. (For graduate and undergraduate students, 1,000 yen.)

       Accomodation at Mishima Lodge: 2,400 or 2,600 yen

           (For detail, go to [accommodation - Mishima Lodge].)

Prepare cash in Japanese yen.　We don't accept foreign money and credit card.

We have no cloak room but we can put your baggage in a lockable room ('Guest room' on the floor map) but do not guarantee safety. It will be open only at the beginning and the end of the conference for each day.

[How to get to the venue]

1) To arrive at Higashi-Okazaki station (Meitetsu-railway);

●From Tokyo

Change the train to Meitetsu at Toyohashi Station and get off at Higashi-Okazaki Station (about 20min between Toyohashi and Higashi-Okazaki).   Do not forget to get to the express train, not the local train.

●From Osaka

Change the train to Meitetsu at Meitetsu-Nagoya Station and get off at Higashi-Okazaki Station (about 30min. between Meitetsu-Nagoya and Higashi-Okazaki).   Do not forget to get to the express train, not the local train.

●From Central Japan International Airport

By bus: take the Meitetsu Bus bound for Okazaki and get off at Higasi- Okazaki Bus Station. (65 min, 1600 yen)

By train: take the Meitetsu Airport limited express bound for Toyohashi and get off at Higasi-Okazaki Station. (65 min, 1210 yen)
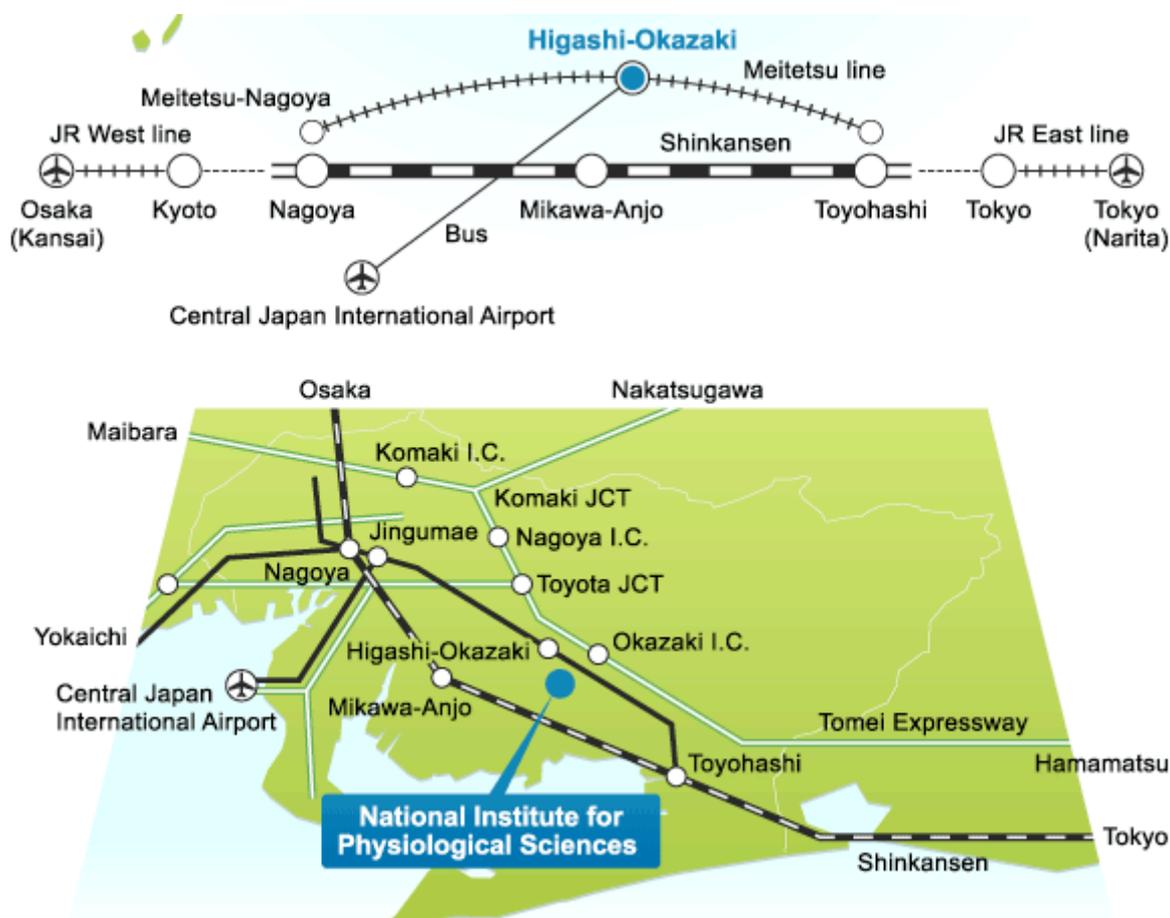
2) From Higashi-Okazaki to the venue (Okazaki Conference Center)

- By walk

  It is a 10-minutes walk from Higashi-Okazaki Station. (It is a long slope.)

- By taxi

  Taxi is available in front of the South Exit. It costs around 650 yen.

- By bus

  Bus is available in front of the South Exit. Take the bus bound to 'Tatsumigaoka-Junkan' and get off the first stop ('Okazaki koko-mae', red asterisk on the map). Then it is 2 two-minutes walk to the Okazaki Conference Center. The bus runs every 20 minutes. It costs around 160 yen.
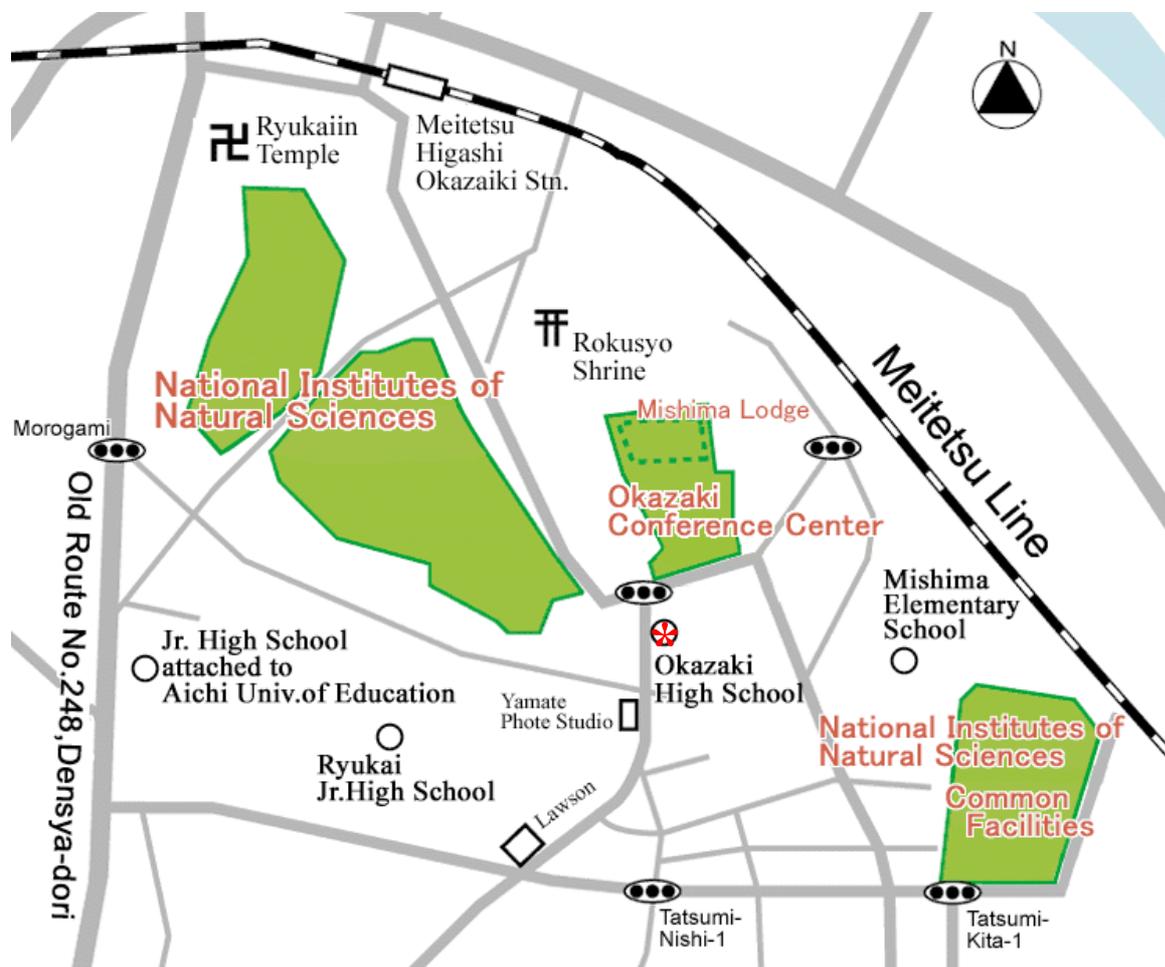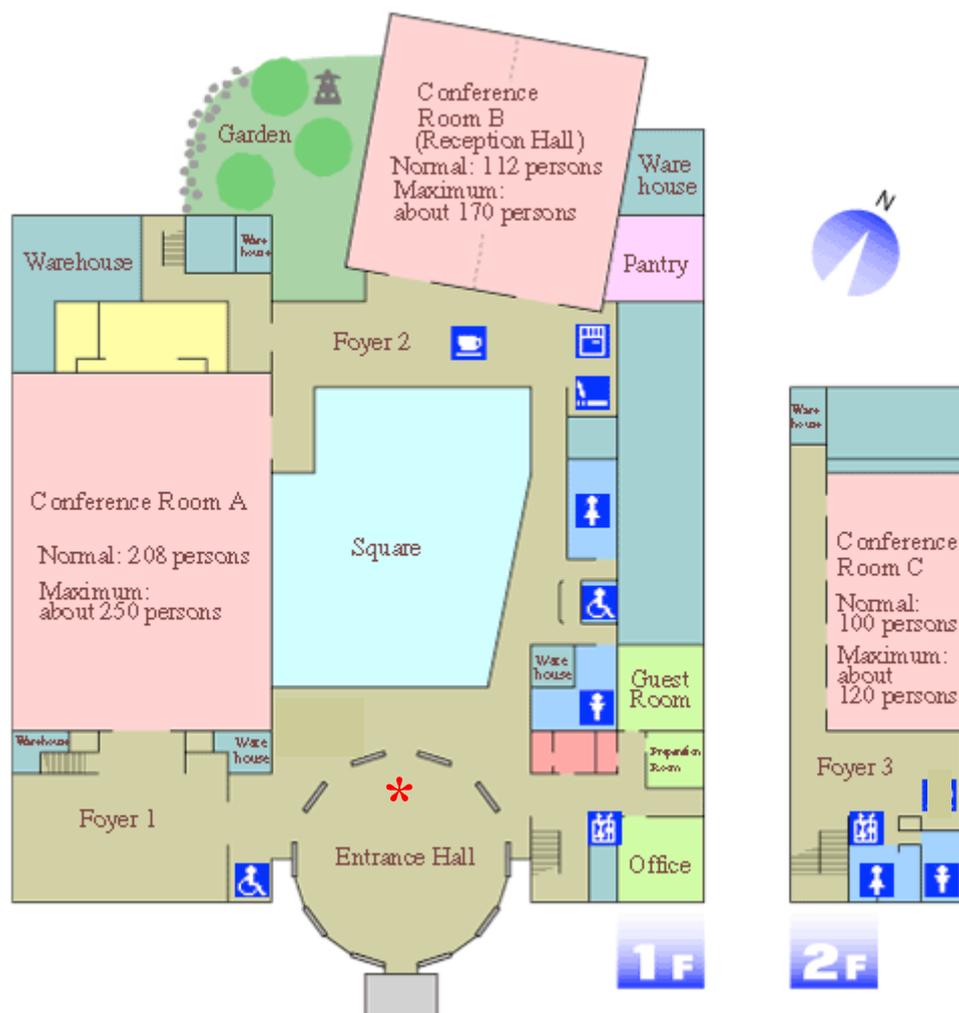
[Floor map of the venue]

The venue is the Okazaki Conference Center.

  For talk, go to the Conference Room B.

  For coffee break, go to Foyer 2.

	Coffee Break Area		Vending Machine
	Lavatory (Men)		Elevator
	Lavatory (Women)		Smoking Corner
	Lavatory (Special Facilities)	*	Reception Desk

[Accommodation - Mishima Lodge]

The Institute has one accommodation facility (Mishima Lodge) for visiting researchers. It is the next building to The Okazaki Conference Center. We can reserve your room at Mishima Lodge via online registration site.

For those who already reserved a room for Mishima Lodge:

- Please pay the accommodation fee at the reception desk. The accommodation fee is 2,400 or 2,600 yen, depending on the room type.
- You will receive the room key and receipt.
- If you reserved a room for October 17, you have to pick up your key at the Institute. The secretary will contact you for detail.
- Breakfast is not available. The nearest corner store ("KONBINI") is Lawson store, 5-min walk away (see the map on p.6).
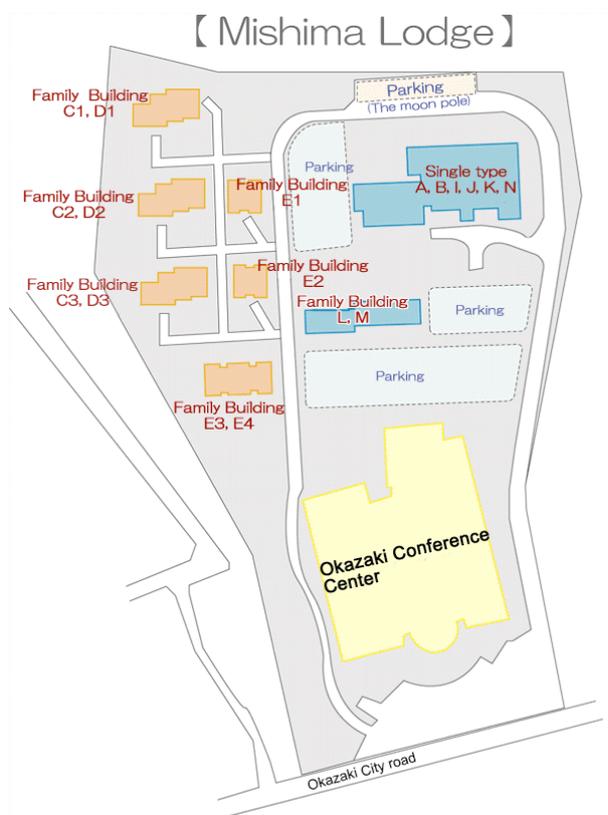
[Accommodation - Other Hotels]

If you prefer to reservation, please reserve a hotel room by yourself.

A hotel list is available (written in Japanese): http://www.nips.ac.jp/profile/access/stay.html

For English-speaking persons, we recommend two hotels that have web sites written in English.

* Okazaki New Grand Hotel: http://www.newgrand.yad.jp/english/facilities_information/index.html

* Okazaki Central Hotel: http://www.okazaki-centralhotel.com/english/index.htm

[Instruction for Speakers]

Bring your laptop. If you cannot, a windows PC is available. In that case, bring USB memory or some storage media containing your PowerPoint file.
Setup your PC before your session begins.

The presentation time is 60 min, including your talk (45 min) and questions (15 min).
For active discussion, question during the talk is permitted for the audience.

[Program]

October 18 (Friday)

at Okazaki Conference Center Room B (岡崎カンファレンスセンター1F　中会議室)

(The desk will open at 12:30.)

13:30-13:35　　Opening Remarks

Tadashi Isa (Laboratory of Behavioral Development, National Institute for Physiological Sciences (NIPS), Japan)

13:35-13:40　　Introduction

Yutaka Komura (Human Technology Research Institute, National Institute of Advanced Industrial Science and Technology (AIST), Japan)

13:40-15:40　　Session 1: What is Metacognition?

1. "Sources of stimulus control for metacognition: A case of corvid species"

Kazuhiro Goto (Sagami WU, Japan)

Chair:　Masatoshi Yoshida (Laboratory of Behavioral Development, National Institute for Physiological Sciences (NIPS), Japan)

2. "Expectation facilitates metacognition for perceptual judgements"

Ryota Kanai (University of Sussex, UK)

Chair:　Kosuke Takahashi (Univ Tokyo)

15:40-16:00　　Coffee break

16:00-18:00　　Session 2: Neural Correlates of Metacognition

3. "Neuronal circuits for monitoring decisions and actions"

Marc Sommer (Duke University, USA)

Chair:　Kenji Matsumoto (Tamagawa Univ)

4. (Title Not available)

Akio Tanaka (Kyoto Univ)

Chair:　Yutaka Komura (Human Technology Research Institute, National Institute of Advanced Industrial Science and Technology (AIST), Japan)

18:00 -20:00　　Banquet at Foyer 2, in Room B (中会議室前ホワイエ 2)

October 19 (Saturday)

at Okazaki Conference Center Room B (岡崎カンファレンスセンター1F　中会議室)

(The desk will open at 9:00.)

9:30-11:30　　　　Session 3: Uncertainty & Decision

5. "Tracking salience acquired through associative learning, not risk, in Orbitofrontal
Neurons"

Masaaki Ogawa (NIPS, Japan)

Chair:　Kosuke Sawa (Sensyu Univ)

6. "The pulvinar houses a confidence map of vision"

Yutaka Komura (Human Technology Research Institute, National Institute of Advanced
Industrial Science and Technology (AIST), Japan)

Chair:　Kazuyuki Samejima (Tamagawa Univ)

11:30-11:50　　　　Coffee break

11:50-12:50　　　　Session 3 (continued)

7. "A social interpretation of metacognition"

Bahador Bahrami (UCL, UK)

Ryota Kanai (University of Sussex, UK)

12:50-13:00　　　　Closing Remarks

Masatoshi Yoshida (Laboratory of Behavioral Development, National Institute for
Physiological Sciences (NIPS), Japan)

[Abstract-1] Kazuhiro Goto (Sagami WU, Japan)

Title:
Sources of stimulus control for metacognition: A case of corvid species

Abstract:
Metacognition refers to a self-reflective process such as monitoring and reporting of ones' own mental state. Comparative psychologists developed nonverbal tests of metacognition to understand whether such a private event become a stimulus to control one's own behavior despite being extraneously unobservable. Exploring for the prevalence of metacognition in the animal kingdom, evidence for metacognition is abundant in rhesus monkeys but it is yet sparse in other species. We thus examined whether crows (*Corvus macrorynchos*) flexibly modulate their behavior by monitoring their internal state when performing a memory task. Crows performed a delayed matching-to-sample task, and they were given either an escape option to decline taking test or a low-risk option to report "not confident" after taking the test. Accurate memory performance yielded a reward with a higher probability, whereas inaccurate memory performance resulted in no such recompense. The escape option yielded a reward with a lower probability. We found they escaped no more frequently when the item-to-remembered is omitted than when they were present, indicating that the crows decline the test by using the delay interval as a cue. In contrast, when reporting confidence retrospectively, the crows utilized the escape option to maximize reward probability. These results suggest crows retrospectively recognize confidence, whereas evidence for prospective memory monitoring was not confirmed.

[Abstract-2] Ryota Kanai (University of Sussex, UK)

Title:

Expectation facilitates metacognition for perceptual judgements

Abstract:

Recent evidence suggests that probabilistic and temporal expectations about target presentation can facilitate perceptual processing. We asked whether prior expectation about the probability of target presentation can increase metacognitive sensitivity for perceptual decision. To dissociate expectation from attention we used a dual-task paradigm. Expectation was manipulated by changing the frequency with which a peripheral Gabor patch is presented in a block, and attention by presenting participants with a concurrent, central visual search task. We found that metacognitive sensitivity increased for expected compared to unexpected perceptual events but only under full attention. We successfully modelled these results using a Bayesian signal detection theoretic framework, showing how a bottom-up signal detection model can be reconciled with top-down influences.

[Abstract-3] Marc Sommer (Duke University, USA)

Title:

Neuronal circuits for monitoring decisions and actions

Abstract:

Two of the major jobs of the brain are to think and to act. But once the brain initiates a thought or action, how does the brain monitor it? Lack of monitoring would impair learning and lead to ambiguity about the source of events. The brain monitors its own functions explicitly (sensory feedback) and implicitly (internal circuits). Internal circuits have advantages such as speed; they are predictive rather than reactive. My laboratory has studied the internal circuits for action in detail, and I will review those findings. Studying the internal circuits for thought is more difficult, but recently we have made progress. We recorded from neurons in three areas of frontal cortex as monkeys made decisions. They had to keep track of their decisions so that later in the task, they could wager on whether they were correct or not. This is an example of "metacognitive monitoring."   We found activity correlated with metacognition, persisting from decision to bet, in only one frontal cortical area: the supplementary eye field (SEF). The results suggest that the SEF is one node in a circuit for metacognition. Presently, we are testing whether the SEF is also involved in metacognitive control of decisions. The overall goal is to understand the internal circuits for continuity of thought.

[Abstract-4] Akio Tanaka (Kyoto Univ, Japan)

Title:
(Not available)

Abstract:

[Abstract-5] Masaaki Ogawa (NIPS, Japan)

Title:

Tracking salience acquired through associative learning, not risk, in Orbitofrontal Neurons

Masaaki Ogawa [1, 4], Matthijs A. A. van der Meer [2], Guillem R. Esber [3], Domenic H. Cerri [1], Thomas A. Stalnaker [3], and Geoffrey Schoenbaum [1,3]

[1] University of Maryland School of Medicine, Baltimore, USA;

[2] University of Waterloo, Waterloo, Canada;

[3] NIDA-Intramural Research Program, Baltimore, USA;

[4] National Institute for Physiological Sciences, Okazaki, Japan

Abstract:

Decision-making is impacted by reward risk (i.e. variance). Activity in the orbitofrontal cortex, an area implicated in decision-making, has been shown to covary with this quantity. However, this activity could reflect the heightened salience of situations in which multiple outcomes -reward and reward omission - are expected. To resolve these accounts, rats were trained in a simple odor-cued response task, in which 4 different odor cues were associated with 4 different probabilities of reward, 100, 67, 33 and 0%, respectively. Consistent with prior reports, some orbitofrontal neurons (36%) fired differently in anticipation of uncertain (33% and 67%) versus certain reward (100% and 0%). However, over 90% of these neurons also fired differently prior to 100% versus 0% reward (or baseline), or prior to 33% versus 67% reward. These responses are inconsistent with risk, but fit well with the representation of acquired salience linked to the sum of cue-outcome and cue-no-outcome associative strengths, as predicted by a new model of attention in associative learning. Thus, these results suggest a novel mechanism whereby the orbitofrontal cortex might regulate learning and behavior.

Reference:
1. Ogawa et.al, (2013) *Neuron* 77 (2), 251-258

[Abstract-6] Yutaka Komura (AIST, Japan)

Title:

The pulvinar houses a confidence map of vision

Abstract:

The pulvinar, a visual thalamic nucleus, shows a marked evolutionary expansion, and interconnects with multiple visual cortices. Despite of its anatomical importance in vision, the functional role of the pulvinar in a subject's visual experience has been not well understood. Recently we discovered that trial-by-trial fluctuations of pulvinar responses predicted monkeys' upcoming behaviors of confidence reports. Computational modeling suggested that such fluctuations reflected internal noise. Moreover, functional silencing of the pulvinar affected the confidence reports only when a visual target appeared in the contralateral visual field. These results indicate that the pulvinar activities contribute to a subject's confidence in visual percepts and also provide a generative view of metacognition.

[Abstract-7] Bahador Bahrami (UCL, UK)

Title:
A social interpretation of metacognition

Abstract:
A long history of research is dedicated to how decision, reaction time and confidence are connected to one another in the context of perceptual/motor tasks. More recently, the same ideas have been extended to economic decision making. I will discuss the possibility that confidence in a decision is not just a consequence of perceptual evidence and economic gain/loss but in fact a means for social interaction among decision making agents. The fact that we often resolve disagreements by comparing how confident we are in our opinions demonstrates this point clearly. In my talk I will explore the social nature of decision confidence and discuss a few empirical and theoretical approaches we have taken to understand the cognitive and computational basis of collective decision making.