

Seminar on Computational Neuroscience

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Who and Why?

- your reasons to join
- your expectations



Computational Neuroscience Seminar 2017/18

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Computational Neuroscience

Seminars: Wednesdays 12:15, Ülikooli 17 - 218

Questions:

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- Raul Vicente (raulvicente@gmail.com)
- <http://neuro.cs.ut.ee>

About the course

The course is mainly addressed to the Master and interested in acquiring a perspective in modern n

The pipeline

1. Read an article
2. Explain it to others
3. Get feedback
4. Evaluate your audience
5. Participate in discussions

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Papers

Before even looking at the list below, we encourage you to google for a *recent* paper which is of interested to you.

Computational Neuroscience

- [Spiking neurons can discover predictive features by aggregate-label learning](#) by Robert Gütig, 2016 in Science
- [Bits from Biology for Computational Intelligence](#) by Michael Wibral, Joseph T. Lizier, Viola Priesemann., 2014
- [Cortical Learning via Prediction](#) by C. Papadimitriou and S. Vempala, 2015
- [On simplicity and complexity in the brave new world of large-scale neuroscience](#) by Peiran Gaoa and Surya Ganguli, 2015
- [The Inevitability of Probability: Probabilistic Inference in Generic Neural Networks Trained with Non-Probabilistic Feedback](#) by A. Emin Orhan and Wei Ji Ma, 2016
- [Similarity, kernels, and the fundamental constraints on cognition](#) by Reza Shahbazi, Rajeev Raizada, Shimon Edelman, 2016
- [A Unified Mathematical Framework for Coding Time, Space, and Sequences in the Hippocampal Region](#) by M. Howard et al., 2015
- [Sparseness and Expansion in Sensory Representations](#) by Baktash Babadi & Haim Sompolinsky, 2015
we address the computational benefits of expansion and sparseness for clustered inputs, where different clusters represent behaviorally distinct stimuli and intracluster variability represents sensory or neuronal noise
- [Noise as a Resource for Computation and Learning in Networks of Spiking Neurons](#) by Wolfgang Maass, 2014
- [Towards a Mathematical Theory of Cortical Micro-circuits](#) by Dileep George & Jeff Hawkins, 2009

The pipeline

1. Read an article
2. **Explain it to others**
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2. Explain it to others

- Read 3+ times to get detailed understanding:
 - What was the problem
 - Why authors wanted to solve it
 - How it was solved before
 - How did they approach it
 - What were the results

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- Explain in a 1-hour presentation (not less)

2. Explain it to others

- Read 3+ times to get detailed understanding:
 - What was the problem
 - Why authors wanted to solve it
 - How it was solved before
 - How did they approach it
 - What were the results
- Explain in a 1-hour presentation (not less)
 - 5 minutes for Feedback
 - 10 minutes for Test
 - 15 minutes for the right answers and discussion

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Timetable

31.08: Kick-off seminar

Introduction, organization of the seminar, questions.

[feedback](#) test

07.09: [Semantic representations in the temporal pole predict false memories](#) by M. Chadwick et al., 2016

presented by Ardi Tampuu

14.09:

presented by

21.09:

presented by

28.09:

presented by

05.10:

presented by

12.10:

presented by

19.10:

presented by

26.10:

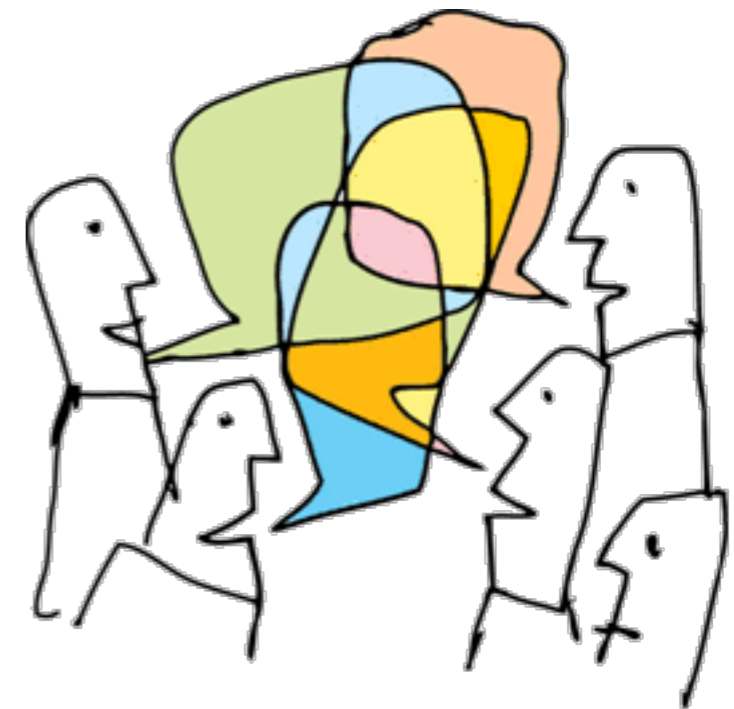
presented by

02.11:

presented by

09.11:

presented by



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Points

50 from presentation
20 from attendance
30 from test results

70+ to pass

Grading criteria

This is a pass/fail course. During the course you will collect points¹. To pass you need to collect 70 out of 100 points:

- Presenting an article gives you 50 points multiplied by the average score from the listener feedback (example: if listener feedback is 16 out of 20, then you get $50 \cdot 0.8 = 40$ points)
- Attending all seminars gives 20 points (~ 1.42 per seminar²)
- 30 points can be collected from the tests (answering all 4 questions correctly is worth ~ 2.1 points²)

Points **CNS Seminar 2016/17 Fall**

¹ This is the first time points-based system is applied in this course, rescaling might occur.

² Depends on the total number of seminars.

Q?

The pipeline

1. Read an article
2. Explain it to others
3. Evaluate them via short test
4. Get feedback
5. Participate in discussions