



## Workshop

# “Population Codes: From Data Analysis to Mechanisms”

Tutzing 2014

## Introduction

As new recording technologies allow one to record from more and more neurons in parallel, new challenges in extracting information from these data arise. At the same time, the data provide exciting opportunities to test and revise mechanistic models of how large neuron populations represent and learn to extract relevant information.

The communities that develop new data analysis techniques and new cellular/circuit models rarely overlap. As a consequence, new ideas for neural coding mechanisms are often not checked experimentally. Similarly, data analysis is mostly driven by coding and information theoretic questions and rarely takes into account the constraints of physiology. In this workshop, we intend to bring together neuroscientists who have expertise in data analysis and computational modeling to foster the exchange of ideas, trigger new collaborations, and approach mechanistic questions of collective neuronal computations.

# Program

## Tuesday, July 1<sup>st</sup>

12:30	<b>Lunch</b>
13:30	<b>Coffee and Poster Preview</b>
14:00	<b>Welcome and Introduction</b>
14:05	<b>Surya Ganguli</b> (Stanford, USA) A theory of multineuronal dimensionality, dynamics, and measurement
14:45	<b>Jakob Macke</b> (Tübingen, Germany) Statistical models for characterizing neural population activity
15:25	<b>Robert Gütig</b> (Göttingen, Germany) Neural processing of continuous sensory streams
16:05	<b>Poster Session and Coffee Break</b>
17:00	<b>Benedikt Grothe</b> (Munich, Germany) tba
17:40	<b>Nicholas Lesica</b> (London, UK) Population coding of speech
18:20	<b>Brice Bathellier</b> (Gif sur Yvette, France) Some thoughts about auditory coding, perception and learning in mice
19:00	<b>Dinner, followed by discussions and drinks</b>

## Wednesday, July 2<sup>nd</sup>

08:00	<b>Breakfast</b>
09:00	<b>Stefano Panzeri</b> (Rovereto, Italy) Millisecond scale spike times of cortical neurons contribute to behaviour in a somatosensory discrimination task
09:40	<b>Alexander Mathis</b> (Harvard, USA) Figure-ground segregation of odorants in rodents: A simple model linking imaging and behavior
10:20	<b>Coffee Break</b>
10:40	<b>Christian Leibold</b> (Munich, Germany) Task-related plasticity of the V1 population code
11:20	<b>Mark van Rossum</b> (Edinburgh, UK) Perceptual consequences of V1 tuning curves
12:30	<b>Lunch</b>

## Posters

- 1 **Decoding continuous EEG signals using ensemble of SVM classifiers**  
Sarah Alizadeh, Hamidreza Jamalabadi, Monika Schönauer, and Steffen Gais
- 2 **Neural correlates of spatial unmasking: population coding of vowels in noise in the inferior colliculus**  
Lucile A C Belliveau, Lutz Wiegrebe, Michael Pecka, and Nicholas A Lesica
- 3 **Nonlinear transfer of signal and noise correlations in cortical networks**  
Dmitry R Lyamzin, Samuel J Barnes, Tara Keck, and Nicholas A Lesica
- 4 **Neural representations of physical space: Benefits of multi-scale codes & phase precession**  
Alexander Mathis, Eric Reifenstein, Johannes Nagele, Richard Kempfer, Susanne Schreiber, Martin Stemmler, and Andreas V M Herz
- 5 **The variability of grid and place cell firing**  
Johannes Nagele, Alexander Mathis, Martin Stemmler, and Andreas V M Herz
- 6 **Decoding-accuracy versus integration-time for dynamic stimuli**  
Johannes Zirkelbach, Alexander Mathis, Martin Stemmler, and Andreas V M Herz
- 7 **Contextual interactions in a non-uniform population code: An application to human color vision**  
Christian J Kellner, Olivia Haas, and Thomas Wachtler
- 8 **Neural spike sorting for high-density microelectrode arrays with convolutive ICA**  
Christian Leibig, Mads Dyrholm, Thomas Wachtler, and Günther Zeck

# Index of Authors

Alizadeh, Sarah	Keck, Tara	Panzeri, Stefano
1 – 3	3 – 3	<b>Talk</b> – 2
Barnes, Samuel J	Kellner, Christian J	Pecka, Michael
3 – 3	7 – 3	2 – 3
Bathellier, Brice	Kempter, Richard	Reifenstein, Eric
<b>Talk</b> – 2	4 – 3	4 – 3
Belliveau, Lucile A C	Leibig, Christian	Rossum, Markvan
2 – 3	8 – 3	<b>Talk</b> – 2
Dyrholm, Mads	Leibold, Christian	Schönauer, Monika
8 – 3	<b>Talk</b> – 2	1 – 3
Gütig, Robert	Lesica, Nicholas	Schreiber, Susanne
<b>Talk</b> – 2	<b>Talk</b> – 2	4 – 3
Gais, Steffen	Lesica, Nicholas A	Stemmler, Martin
1 – 3	2 – 3	6 – 3
Ganguli, Surya	3 – 3	4 – 3
<b>Talk</b> – 2	Lyamzin, Dmitry R	5 – 3
Grothe, Benedikt	3 – 3	
<b>Talk</b> – 2		
Haas, Olivia	Macke, Jakob	Wachtler, Thomas
7 – 3	<b>Talk</b> – 2	7 – 3
Herz, Andreas V M	Mathis, Alexander	8 – 3
6 – 3	6 – 3	Wiegrebe, Lutz
4 – 3	<b>Talk</b> – 2	2 – 3
5 – 3	4 – 3	
	5 – 3	
Jamalabadi, Hamidreza	Nagele, Johannes	Zeck, Günther
1 – 3	4 – 3	8 – 3
	5 – 3	Zirkelbach, Johannes
		6 – 3

# General Information



The Workshop will be held at the “Evangelische Akademie Tutzing” (Schloßstraße 2-4, 82327 Tutzing; [www.ev-akademie-tutzing.de/](http://www.ev-akademie-tutzing.de/)).

## Talks and posters

The talks will take place in the *Auditorium* and poster sessions in the *Festsaal*. The poster boards are 118.5 cm wide x 146 cm high. Please put up the posters in the coffee break after lunch on Tuesday, July 1st. Remove them during the coffee break on Wednesday, July 2nd.

## Accommodation

**Check in.** On Tuesday, July 1st you can check in all day long. The rooms will be available from about 12 p.m.

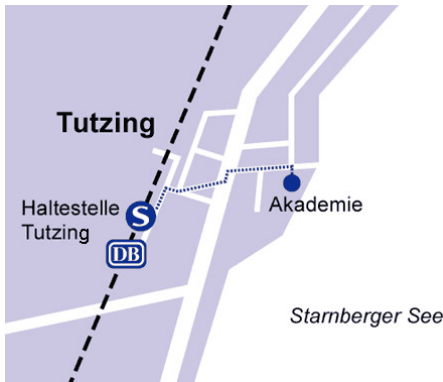
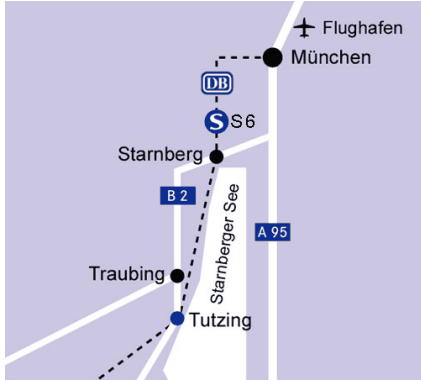
**Check out.** We need to check out on Wednesday, July 2nd until 9 a.m.!

## Internet access

Free internet access is available in the *Auditorium* and *Festsaal*.

## From Munich to the Evangelische Akademie Tutzing

Tutzing is located about 40 km in the south of Munich at the western shore the Starnberger See.

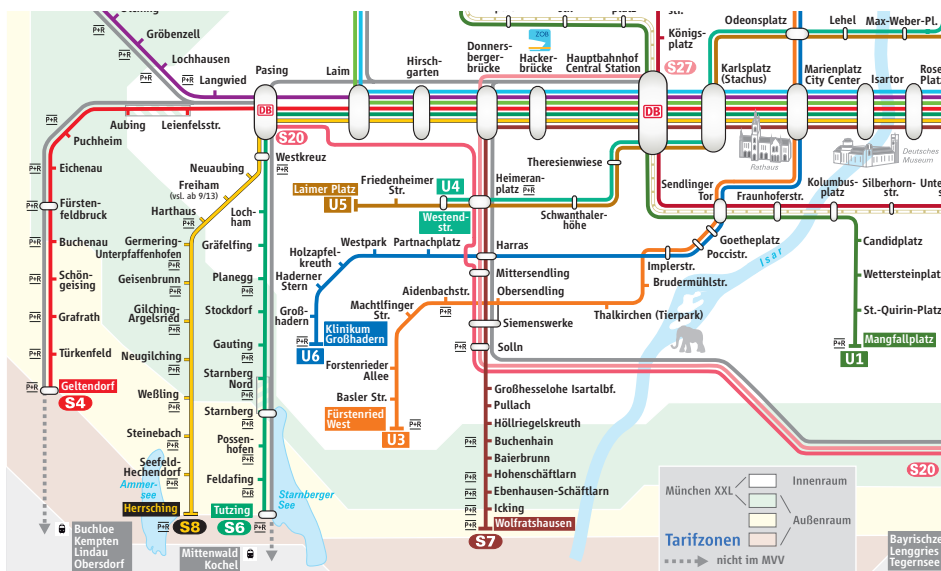


By public transport. The village can easily be reached by public transport including regional trains from Munich with destination Garmisch-Partenkirchen or Kochel or the S6 Munich public transport line from Munich to its final destination Tutzing.

It takes you about 10 minutes to walk from Tutzing station to the Evangelische Akademie via Bahnhofstrasse, Hallberger Allee and Hauptstrasse.

By car. Going by car and approaching from Munich you take the motorway A95 towards Garmisch-Partenkirchen with destination Starnberg. In Starnberg you either choose the state road at the lake's western shore in southern direction with destination Tutzing or you take the B2 federal road towards Weilheim with destination Traubing. In Traubing you turn left and follow the signs guiding you to Tutzing.

There are about 50 parking spaces available directly in front of the building.



## Organisers



**Prof. Dr. Christian Leibold**

Neurobiology, Department Biology II, Ludwig-Maximilians-Universität München  
Großhaderner Str. 2, 82152 Planegg-Martinsried  
Phone: +49 (0)89 2180 74800, Fax: +49 (0)89 2180 74803  
Email: leibold@bio.lmu.de

**Dr. Kay Thurley**

Neurobiology, Department Biologie II, Ludwig-Maximilians-Universität München  
Großhaderner Str. 2, 82152 Planegg-Martinsried  
Tel: +49 (0)89 2180 74823, Fax: +49 (0)89 2180 74803  
Email: thurley@bccn-munich.de

# About BCCN Munich

## Coordinator

**Prof. Dr. Andreas V.M. Herz**

Department Biology II, Ludwig-Maximilians-Universität München

Großhaderner Str. 2, 82152 Planegg-Martinsried

Phone: +49 (0)89 2180 74800, Fax: +49 (0)89 2180 74803

Email: [herz@bccn-munich.de](mailto:herz@bccn-munich.de)

## Office

Email: [office@bccn-munich.de](mailto:office@bccn-munich.de)

## Dr. Kay Thurley

Department Biologie II, Ludwig-Maximilians-Universität München

Großhaderner Str. 2, 82152 Planegg-Martinsried

Tel: +49 (0)89 2180 74823, Fax: +49 (0)89 2180 74803

Email: [thurley@bccn-munich.de](mailto:thurley@bccn-munich.de)

## Participating Institutions



Sponsored by the

