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# SNAP



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Signal and Noise along the Auditory Pathway

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organised by  
the Max Planck Research Group “Auditory Cognition”  
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**Disclaimer Note:** The attached slides do reflect *only* Jonas Obleser's reading, interpretation, and summary of the speakers' scientific talks. They serve the *sole purpose* of a "visual memory", and are not intended to (nor are they allowed to) be used for any other purpose. Ad-hoc inside jokes have been left, unmarked as such, in place for hilariousness only. **If you have any question please email the respective speakers directly.**

Thanks to all speakers for their valuable input in making SNAP 2013 such an overwhelming success.

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**Signal and Noise along the auditory pathway(s):**

**How to integrate all the knowledge from  
modelling,  
psychophysics,  
neuroscience,  
cognitive psychology?**

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## Ingrid Johnsrude

- Effort is only present when there is attention!
- Perceptual learning of degraded speech can only take place when there is attention!
- Familiarity of non-attended streams help segregation in younger, but not older listeners  
*(see also Bendixen, predictability)*
- Don't put Ketchup on the Baby Jesus



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## Torsten Dau

- Time- and modulation-freq. resolved envelope-SNRs (“sEPSM”) can account for speech intelligibility in a wide array of different masking noises
- Term of “informational masking” (maybe) not needed or at least not helpful as of yet
- Use simple models; make only more complicated as a mismatch with data calls for it



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## Alexandra Bendixen

- “Signal” vs “Noise” defined by the listener’s goals!
- No proof but diverse evidence that the brain is a prediction machine
- Predictability cues can (maybe stabilise, but definitely) structure our percepts
- “Analogy” experiments on different levels of complexity
- Rhythm is a dancer



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## Maria Chait

- How are regularities extracted in the first place?
- How long does it take (1.5 cycles)? Holds true for Brain/RMS signal
- Brain/RMS: Greater “gain” for regular sequences, with “set point” of gain
- Listeners are better in detecting emergence than violations of regularity (i.e., we hold on to it a bit longer than the evidence warrants)



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## Jonathan Peelle

- Speech is quasi-periodic – optimises neural “excitability timing”?
- Acoustic–Neural Coherence increases with intelligibility, might explain phoneme/speech rate effects
- Speech = “modulated noise with meaning”
- Time-resolved fMRI of sentence-level processing allows dissociation of contributions
- Verbal short-term memory is under fire from noisy speech
- I’ve got the Phase





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## Peter Lakatos



- Oscillations would be noise, were they not able to become reset by the environment
  - Spectro-temporal filtering by entraining best and non-best freq. to opposite phases
  - Attention controls the entrainment-up-setting system
  - Entrainment is set up by an independent system, independent from the system that transmits information
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## Nathan Weisz

- Variability in trials  $\neq$  nothing  $\neq$  noise
- Alpha cannot be claimed by one cognitive function, but potentially serves a parsimonious “inhibitory” function
- Synchronization in Networks by Alpha Power (Weisz et al., Nature Reviews Neuroscience 2014): Closed and open network states
- Predisposing network states predict perception and stimulus-evoked neural activity



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## Katharina von Kriegstein

- “Face benefit”: Exposure to faces helps voice (and speech) recognition later, more so with increasing noise
  - visual face movement areas (pSTS) are causally involved in face benefit
  - Direct connectivity / cross-talk of fusiform (face) and anterior STS (voice) regions, hypothesised to increase with noise
  - In speech, forward predictions are fed down to sensory thalamus
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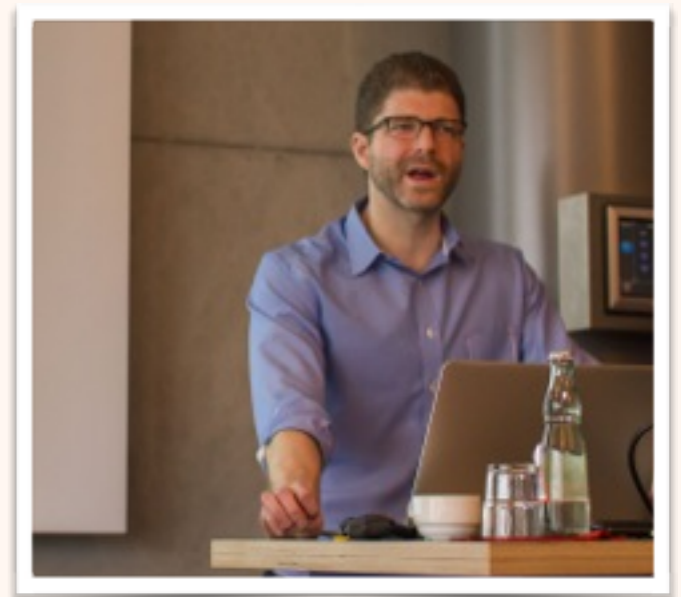
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\*) To my utter dismay, "Apache" seems to have been sampled by about 40,000 hip-hop producers, but never by the Frankfurt-based Eurodance project "SNAP"

## Josh McDermott

- One of the most famous drum breaks in the world \*) can be reconstructed only from the envelopes in a set of (say, 40) bands
- Sound textures provide simple statistical properties (envelope moments) that can be used to distinguish between them
- Listener prefer reconstructions based on biologically plausible constraints
- Evidence for listeners' (exclusive) usage of long-term statistics in sound textures (potentially a memory/buffer overflow constraint)

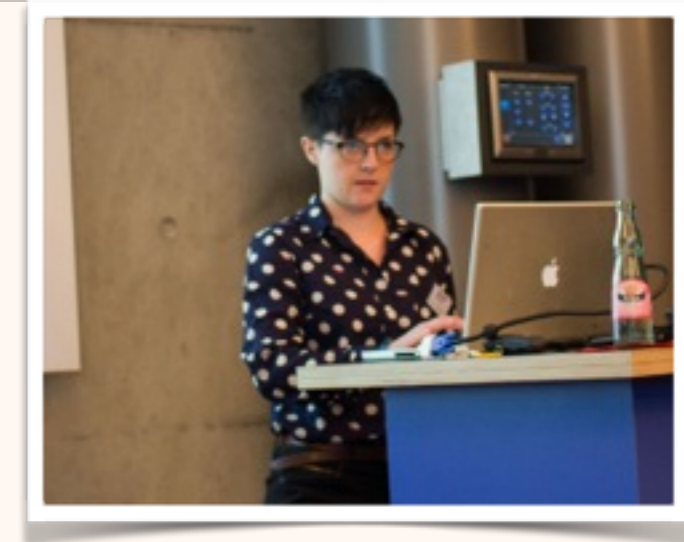


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## Carolyn McGettigan



- Left hemisphere areas in STG/STS do carry more *information* about intelligible speech (when using high-level baselines)
  - “Noise” (but see N. Weisz) in our data has many sources across participants, within participants, from tasks, from design choices
  - When and how activity occurs (see also J. Peelle) is the next frontier for functional neuroimaging approaches
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# SNAP SUPPORT



Margund Greiner

Dunja Kunke

Leo Waschke

Lee Miller

René Blank

Steven Kalinke

Mirja Kuhlencord

Jonathan Peelle

Rudolf Rübsamen

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