

**Lubomir Kostal, PhD**  
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## Education and affiliations

- 2014 – now: Leader of the Laboratory of *Computational Neuroscience*
- Postdoc stay in the lab of Dr. Jean-Pierre Rospars, INRA, Versailles, France (intermittently 2005-2009), member of the team in research projects *Barrande* and *ECO-NET 12644PF*
- 2007: PhD (biophysics), Charles University Prague (supervisor: Prof. Petr Lansky)
- 2003: MSc. (physics), Faculty of Mathematics and Physics, Charles University, Prague

## Selected publications

- Barta, T. & Kostal, L. (2024) Shared input and recurrency in neural networks for metabolically efficient information transmission. *PLoS Comput. Biol.*, **20**, e1011896.
- Rajdl, K. & Kostal, L. (2023) Estimation of the instantaneous spike train variability. *Chaos Solit. Fractals*, **177**, 114280.
- Barta, T. & Kostal, L. (2019) The effect of inhibition on rate code efficiency indicators. *PLoS Comput. Biol.*, **15**, e1007545.
- Kostal, L. & Kobayashi, R. (2019) Critical size of neural population for reliable information transmission. *Phys. Rev. E (Rapid Commun.)*, **100**, 050401(R).
- Levakova, M., Kostal, L., Monsempès, C., Jacob, V. & Lucas, P. (2018) Moth olfactory receptor neurons adjust their encoding efficiency to temporal statistics of pheromone fluctuations. *PLoS Comput. Biol.*, **14**, e1006586.
- Kostal, L., Lansky, P. & Stiber, M. (2018) Statistics of inverse interspike intervals: the instantaneous firing rate revisited. *Chaos*, **28**, 106305.
- Rajdl, K., Lansky, P. & Kostal, L. (2017) Entropy factor for randomness quantification in neuronal data. *Neural Netw.*, **95**, 57–65.
- Kostal, L. ✉ (2016) Stimulus reference frame and neural coding precision. *J. Math. Psychol.*, **71**, 22–27.
- Kostal, L., Lansky, P. & Pilarski, S. (2015) Performance breakdown in optimal stimulus decoding. *J. Neural Eng.*, **12**, 036012.
- Kostal, L., Lansky, P. & Pokora, O. (2013) Measures of statistical dispersion based on Shannon and Fisher information concepts. *Inform. Sciences*, **235**, 214–223.
- Kostal, L. (2010) Information capacity in the weak-signal approximation. *Phys. Rev. E*, **82**, 026115.
- Kostal, L., Lansky, P. & Rospars, J.-P. (2008) Efficient olfactory coding in the pheromone receptor neuron of a moth. *PLoS Comput. Biol.*, **4**, e1000053.
- Kostal, L. ✉, Lansky, P. & Rospars, J.-P. (2007) Review: Neuronal coding and spiking randomness. *Eur. J. Neurosci.*, **26**, 2693–2701.

Total: 41 papers in IF journals, 3 in peer-reviewed proceedings, 2 editorials  
Google Scholar: 674 citations, *h*-index: 16

## **Awards, memberships and organizational activities, invited talks**

- 2005: *Marie-Curie fellowship at INRA*, Versailles (France)
- 2012: *Otto Wichterle Award* from the Academy of Sciences of the Czech Republic
- *Neural Processing Letters*: member of the Editorial Board since 2016
- *BioSystems* and *Mathematical Biosciences and Engineering*: guest editor of the *Neural Coding 2016, 2018* special issues
- Main organizer of 3 international workshops in Prague: *Neural Coding (2012)*, *Information beyond Shannon (2013)*, *Information theory in Computational Neuroscience (CNS, 2015)*
- since 2015: Annual OCNS Workshops on Methods of Information Theory in Computational Neuroscience (chair and/or member of the organizing committee)
- since 2018: technical and program committee member for: ESSAN (European Symposium on Artificial Neural Networks) and ICMNS (International Conference on Mathematical NeuroScience) conference series
- External assessor and project reviewer for: The Czech Science Foundation (GACR), The French National Research Agency (ANR), Agency for the Evaluation of Universities and Research Centers, Italy (ANVUR), National Science Centre, Poland (NCN)
- Reviewer for 20+ scientific journals and proceedings, incl. (*J. Neural. Eng.*, *Neural Netw.*, *Phys Rev. E.*, *Plos Comput. Biol.*)
- 10+ invited talks in last 10 years (expenses covered by the inviting party)

## **External funding (5 most important grants, principal investigator)**

- 2020–2022: *Optimality of neuronal communication: an information-theoretic perspective*, The Czech Science Foundation (GACR), ( $\approx 261.000$  EUR)
- 2017–2019: *Neural coding precision and its adaptation to the stimulus statistics*, The Czech Science Foundation (GACR) ( $\approx 217.000$  EUR)
- 2015–2017: *Efficiency of information transfer and the role of energetic constraints in neuronal systems*, The Czech Science Foundation (GACR) ( $\approx 259.000$  EUR)
- 2012–2014: *Information-theoretic analysis of stimulus coding in sensory neurons*, The Czech Science Foundation (GACR) ( $\approx 56.000$  EUR)
- 2011–2013: *Neural Coding and Information beyond Shannon*, European Office of Aerospace Research and Development, Office of Naval Research Global (support for the respective workshops in 2012 and 2013,  $\approx 20.000$  EUR)

## **Miscellaneous**

- Teaching in the post-gradual course “Progress in Neuroscience” (PhD programme Neurosciences, *Doctoral Study Programmes in Biomedicine*) and in the “Opening Course” for PhD students at the Institute of Physiology CAS, Prague
- Supervisor and co-supervisor in: *Mathematical Modelling in Physics and Technology*, Faculty of Mathematics and Physics, *Biomedical Informatics*, First Faculty of Medicine, Charles University, Prague; *Probability, Statistics and Mathematical Modelling*, Faculty of Science, Masaryk University, Brno
- Initiated (jointly with Dr. R. Kobayashi) the *Memorandum of Understanding* between the *Institute of Physiology of the Czech Academy of Sciences, Czech Republic*, and the *National Institute of Informatics, Japan*, in the area of research and education in the fields of artificial intelligence and computational neuroscience (signed by the directors in 2016)