



Neuroscientist Petri Ala-Laurila brings new area of brain research to Aalto University

12.03.2014

Petri Ala-Laurila has been appointed an Assistant Professor at the Aalto University School of Science for four years starting from 1 March, 2014. This appointment is in the area of biophysics in the Department of Biomedical Engineering and Computational Science (BECS).

Ala-Laurila's work examines the neural circuits of the retina to reveal fundamental principles of neural computation. *"The retina is an accessible part of the brain which has a well-defined structure and the possibility to use light as a natural and precise stimulus. It offers a unique opportunity to study neural circuit function. Finland has a rich history in this field starting from the work of [Ragnar Granit](#) – a Nobel Prize winner"*, says Ala-Laurila.

Ala-Laurila's current research focuses on the fidelity of encoding sparse signals in neural circuits. This is a problem faced by every neural circuit as well as man-made detectors at their sensitivity limits. His research with his colleagues shows that nonlinear dynamics of signal processing play a major role in the fidelity of neural code. Ala-Laurila and his research team are tracking signals at single-quantum resolution through retinal circuits and correlating circuit function with the performance of the entire visual system as measured in behavioral experiments on mice.

Ala-Laurila's studies will reveal basic mechanisms of novel adaptive computations in neural circuits at quantal resolution and they will provide a better understanding of certain defects of vision that originate from a failure of retinal signal transmission. They will also allow development of algorithms relying on nonlinear dynamics to improve man-made night vision devices.

Petri Ala-Laurila did his PhD in Finland (2000- 2003, Engineering Physics, Helsinki University of Technology) and thereafter moved to the USA, where he did two distinct postdoctoral periods: in Boston (2004-2008, [Laboratory of Dr. Carter Cornwall](#)) and in Seattle (2008-2012, [Laboratory of Dr. Fred Rieke](#)). In 2012, Ala-Laurila returned to Finland to establish his research program at The University of Helsinki as an Academy of Finland Research Fellow. His research has been published in high impact journals including Nature, Science and Nature Neuroscience ([see Ala-Laurila's publications](#)).

Contact information

Petri Ala-Laurila

petri.ala-laurila@aalto.fi

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