CURRICULUM VITAE

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EDUCATION

B.Sc. in Physics, solid state (2004-2008)
Kharazmi university (Training Teacher University), Tehran, Iran.

M.Sc. in Physics, soft condensed matter (2008-2011)
Institute for Advances Studies in Basic Science (IASBS), Zanjan, Iran.

Ph.D. in Computer science (May 2012-January 2016)
INRIA CR Nancy and Universite de Lorraine, France.

Research Experience

Master dissertation (2008-2011)
"Effect of the duration of the synaptic activity on a neural loop with delayed feedback ".
Advisor: Dr. A. Valizadeh

Contents:
- Electrophysiology of neuron and Hodgkin-Huxley model.
- Dynamical system in 2-dimension.
- Simple neuron models (FHN, ML, Izhikevich models).
- Effect of duration of synaptic activity on spike rate of a Hodgkin-Huxley neuron*.*

Doctoral dissertation (2012-2016)
"Analytical and numerical studies of thalamo-cortical neural population models during general anesthesia".
Advisor: Dr. Axel Hutt

Contents:
- Neuroscience of general anesthesia.
- Studying neural population models of EEG activity.
- Modeling the anesthetic action on synaptic and extra-synaptic receptors.
- Modeling of EEG power spectrum over frontal and occipital head regions during propofol sedation.
- Spectral power fitting using evolutionary algorithms.

PUBLICATIONS

M. Hashemi, A. Valizadeh, and Y. Azizi, **Effect of duration of synaptic activity on spike rate of a Hodgkin-Huxley neuron**, Phys. Rev. E, **85:** 021917 (2012).

M. Hashemi, A. Hutt and J. Sleigh, **Anesthetic action on extra-synaptic receptors: the effects in neural population models of EEG activity**, *Frontiers in System Neuroscience*, **8**:232 (2014).

M. Hashemi, A. Hutt and J. Sleigh, **How the cortico-thalamic feedback affects the EEG power spectrum over the frontal and occipital regions during the propofol-induced general anesthesia**, *Journal Of Computational Neuroscience*, **39**(2): 155-179 (2015).

M. Hashemi and A. Hutt, 2015, **A thalamocortical feedback model to explain EEG during anesthesia**, *book chapter*, In: A. Pelster and G. Wunner (Eds.), Self organization in Complex Systems: The Past, Present, and Future of Synergetics, Understanding complex systems. Springer (2015), pp 305-312.

A. Hutt, M. Hashemi, and P. beim Garben, 2015, **How to render neural field more realistic**, *book chapter*, In: B. Bhattacharya and F. N. Chowdhury (Eds.), Validating Neuro-Computational Models of Neurological and Psychiatric Disorders, Springer Series in Computational Neuroscience (2015), pp 141-159.

M. Hashemi, A. Hutt, L. Buhry, and J. Sleigh, **Optimal model parameter fit to EEG power spectrum using evolutionary algorithms**, *in preparation*.

M. Hashemi, A. Hutt, and J. Sleigh, **The role of thalamo-cortical delay in reproducing the characteristic features observed experimentally during propofol-induced anesthesia**, *in preparation.*

PUBLISHED ABSTRACTS

M. Hashemi and A. Hutt, **A thalamocortical model to explain EEG during anesthesia**, *BMC Neuroscience (CNS 2013)* **14**: P177.

M. Hashemi, A. Hutt, J. Sleigh, and P. beim Garben, **Reproduction of EEG power spectrum over frontal region during the propofol-induced general anesthesia**, *BMC Neuroscience (CNS 2014)* **15**: P211.

M. Hashemi, A. Hutt, J. Sleigh, **Thalamo-cortical mechanisms of the observed Specific changes in frontal and occipital EEG rhythms during the propofol-induced sedation**, *BMC Neuroscience (CNS 2015)* **16**: P232.

M. Hashemi, A. Hutt, J. Sleigh, **fitting a thalamo-cortical model to EEG power spectrum using evolutionary algorithms**, *ICMNS 2015*, Antibes- Juan les Pins, France.

RESEARCH INTERESTS

- Mathematical analysis and computational modeling of neural networks and systems neuroscience.
- Stochastic dynamics and dynamical system application in systems neuroscience.
- Studying cortical dynamics and the role of neural circuits in emergent brain behaviors.
- Neural network analysis and statistical technique for analyzing brain neuroimaging data.
- Modeling and processing of EEG and brain rhythmic activities.
- Spiking neuron models and their link to neural population activities.
- Bayesian analysis, Inverse problem and optimization methods.

REFERENCES

Dr. Axel HUTT   Head of team Neurosys, INRIA CR Nancy, France.   Email: axel.hutt@inria.fr

Dr. Alireza VALIZADEH IASBS Theoretical Neuroscience Group, Iran.   Email: valizade@iasbs.ac.ir

Prof. Jamie SLEIGH   University of Auckland, New Zealand.   Email: jamie.sleigh@waikatodhb.health.nz

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