

Curriculum Vitae Maria Ercsey-Ravasz

Degree: 2008 joint PhD degree in Physics (Babeş-Bolyai University, Romania) and Information Technology/Infobionics (Pázmány Péter Catholic University, Hungary)

Education and positions:

- 2008 – 2011 Postdoctoral researcher at the University of Notre Dame, Physics Department, Interdisciplinary Center for Network Science and Applications (iCeNSA), USA
- 2011 - 2014 Romanian Young Research Team Grant at the Physics Department of the Babes-Bolyai University, Romania
- 2012 - 2014 Marie Curie Fellowship at the Physics Department of the Babes-Bolyai University, Romania
- Since 2014 Research Fellow at the Physics Department of the Babes-Bolyai University, Romania
- Since 2016 Researcher at the Romanian Institute of Science and Technology, Romania

Role in the Project:

Her research interests involve two main directions: one of them is using chaotic dynamical systems for solving hard optimization problems and the second, - more relevant to this project – is related to network science and its interdisciplinary applications. In graph theory she developed novel methods for calculating centrality measures. During a previous collaboration with a French neuroscience group she studied the inter-areal cortical network of the macaque. She discovered the Exponential Distance Rule (EDR), which seems to be a strong physical law determining brain structure. She was also the main developer of the EDR random graph model, which explained many properties of the inter-areal cortical network. The experience she gained in graph-theoretical analyses and modelling will be crucial in this project.

Selected publications:

- Horvát Sz†, Gămănuț R†, **Ercsey-Ravasz M†**, Magrou L, Gămănuț B, Van Essen DC, Burkhalter A, Knoblauch K, Toroczkai Z, Kennedy H. Spatial embedding and wiring cost constrain the functional layout of cortical networks in rodents and primates, PLoS Biology 14: e1002512, 2016. († indicates equal contribution)
- Ercsey-Ravasz M**, Markov NT, Lamy C, Van Essen DC, Knoblauch K, Toroczkai Z, Kennedy H. A predictive network model of cerebral cortical connectivity based on a distance rule, Neuron 80: 184-197, 2013.
- Markov NT, **Ercsey-Ravasz M**, Van Essen DC, Knoblauch K, Toroczkai Z, Kennedy H. Cortical High-density Counterstream Architectures, Science 342: 1238406, 2013.
- Markov NT, **Ercsey-Ravasz M**, Lamy C, Gomes AR, Magrou L, Misery P, Giroud P, Barone P, Dehay C, Toroczkai Z, Knoblauch K, Van Essen DC, Kennedy H. The role of long-range connections on the specificity of the macaque interareal cortical network, PNAS 110: 5187-5192, 2013.
- Ercsey-Ravasz M**, Toroczkai Z. Optimization hardness as transient chaos in a continuous-time approach to constraint satisfaction, Nature Physics, 7: 966-970, 2011.