

NSF US-Hungarian Workshop on Large Scale Random Graphs Methods for Modeling Mesoscopic Behavior in Biological and Physical Systems

August 28 – September 4, 2006

Alfred Renyi Institute of Mathematics
Budapest, Hungary

Program in a Nutshell

August 27:	Arrival at Hotel Peregrinus, Budapest
August 28 – 31:	Workshop events at Alfred Renyi Institute of Mathematics, Budapest
September 1:	Workshop Session at KFKI Institute for Physics, Budapest, Hungary
September 2 – 3:	Excursion to Szeged and the South Region of Hungary
September 4:	Departure from Hotel Peregrinus, Budapest

<u>Workshop Venue:</u>	Alfred Renyi Institute of Mathematics
Address:	13-15 Realtanoda utca, H-1053 Budapest, Hungary
Phone:	36-1-483-8300
Fax:	36-1-483-8333

<u>Workshop Hotel:</u>	Hotel Peregrinus ELTE
Address:	Szerb u. 3, H-1056 Budapest, Hungary
Phone:	36-1-266-4911
Fax:	36-1-266-4913

<u>Organizers:</u>	
Program Co-Chairs:	Robert Kozma and Bela Bollobas
Program Committee:	Peter Erdi, Gabor Tusnady, Tamas Vicsek
Local Committee:	Dezso Miklos (chair), Veronika Pandi
Contact:	rkozma@memphis.edu dezso@renyi.hu
URL:	http://www.renyi.hu/large/

Co-Sponsored by: National Science Foundation, USA, International Neural Network Society INNS, Alfred Renyi Institute of Mathematics, Eotvos Lorand University, Budapest, KFKI/RMKI Research Institute, Budapest, Hungary

Program

Monday, August 28

08:00 - 09:00 am	Registration & Refreshments
09:00 - 09:30 am	Opening Address Mark A Suskin (Head, NSF European Office, Paris, France)
	Welcome Address <i>Peter P. Palfy (Corresponding Member HAS, Director, Alfred Renyi Institute of Mathematics, Hungary)</i>
	Announcements
09:30 - 10:30 am	<u>Plenary Talk</u> Inhomogeneous Random Graphs Bela Bollobas (University of Cambridge, UK & Univ. of Memphis, USA)
10:30 - 10:45 am	Coffee Break
10:45 - 11:30 am	<u>Invited Talk</u> Hamiltonian Cycles in Sparse Random Graphs <i>Tom Bohman (Carnegie Mellon University, USA)</i>
11:30 - 12:30 pm	<u>Panel Session A</u> Challenges in Large Scale Random Network Theory & Applications. <i>Panelists: Bela Bollobas, Tom Bohman, Balint Toth, Walter J. Freeman, Reka Albert, Gabor Tusnady</i>
12:30 - 14:00 pm	Lunch Break
Session: Theory of Random Graphs and Networks	
14:00 - 14:30 pm	Random Trees and General Branching Processes <i>Anna Rudas, Balint Toth, Benedek Valko (Technical University, Budapest)</i>
14:30 - 15:00 pm	
15:00 - 15:30 pm	Old Methods Wanted: Applications of Deterministic and Stochastic Formal Reaction Kinetics to Systems Biology <i>Janos Toth (Technical University, Budapest)</i>
15:30 - 16:00 pm	Using Citations and Collaborations to Evaluate Papers, Journals, and Scientists <i>Michael Stringer (Northwestern University, USA)</i>
16:00 - 16:30 pm	Network of Interacting Reactions in Metabolic Networks <i>József Bruck, Oliver Ebenhöf, Reinhart Heinrich (Humboldt University, Germany)</i>
16:30 - 18:30 pm	Free Time
18:30 - 20:00 pm	Welcome Reception at Renyi Institute

Tuesday, August 29

- 08:00 - 08:30 am Refreshments
- 08:30 - 08:45 am Opening Remarks & Announcements
- 08:45 - 09:45 am Plenary Talk:
Two Types of Global Neural Field in Forebrains Serve as Targets for Simulation Using Random Graph Theory
Walter J. Freeman (UC Berkeley, USA)
- 09:45 - 10:00 am Coffee Break
- 10:00 - 10:45 am Invited Talk:
Large-Scale Cortical Oscillatory Network Graphs
Steven Bressler (Florida Atlantic University, USA)

Session: Networks in Neuroscience and Biology (Part 1)

- 10:45 - 11:15 am **Predicting Uncharted Connections with Szemerédi's Regularity Lemma in the Cerebral Cortical Network**
Tamas Nepusz, Ferenc Bazso, P. Hussami, Laszlo Nagyessy, Gabor Tusdnady (Semmelweis Medical University, Central European University, KFKI/RMKI, Renyi Institute, Hungarian Academy of Sciences, Hungary)
- 11:30 - 12:30 pm Panel Session B:
Open Problems in Networks of Neuroscience and Biology.
Walter J Freeman, Steven Bressler, Andras Lorincz, Bela Bollobas, Robert Kozma, Dirk Aeyels, Peter Erdi
- 12:30 - 14:00 pm Lunch Break

Session: Networks in Neuroscience and Biology (Part 2)

- 14:00 - 14:30 pm **Echotron : Critical Network Model of Superficial Layers**
Marton A Hajnal, Andras Lorincz (Eotvos University Budapest, Hungary)
- 14:30 - 15:00 pm **Time Constraints and the Evolution of Scale-Free Properties in Associative Networks**
Derek Harter (Texas A&M University, USA)
- 15:00 - 15:30 pm **Partial Entrainment in the Kuramoto-Sakaguchi model**
Filip De Smet, Dirk Aeyels (Ghent University, Belgium)
- 15:30 - 16:00 pm **Nicotinic Modulation of Cortical Connectivity in a Working Memory Task Evaluated by Path Analysis**
Clara A. Scholl (NIH/NIDA-IRP/Neuroimaging Research Branch, USA)
- 16:00 - 16:30 pm **Estimating the Dynamics of Kernel-based Evolving Networks**
Gabor Csardi, Elliot Paquette, Peter Erdi (KFKI/RMKI of Hungarian Academy of Sciences & Kalamazoo College, USA)
- 16:30 - 18:30 pm Free Time
- 18:30 - 21:00 pm Cultural Program

Wednesday, August 30

- 08:00 - 08:30 am Refreshments
- 08:30 - 08:45 am Opening Remarks & Announcements
- 08:45 - 09:45 am Plenary Talk:
Uncovering the Overlapping Cohesive Groups of Complex Networks from Molecular to Social
Tamas Vicsek (Eotvos Lorand University, Budapest)
- 09:45 - 10:00 am Coffee Break
- 10:00 - 10:45 am Invited Talk:
Towards Understanding the Structure and Function of Cellular Interaction Networks
Reka Albert (PennState University, USA)

Session: Modeling Large-Scale Networks: Physics, Biology, Society (Part 1)

- 10:45 - 11:15 am **Sociodemographic Exploration of Telecom Communities**
Andras Benczur, Karoly Csalogany, Miklos Kurucz, Andras Lukacs, Laszlo Lukacs (Computer & Automation Research Institute, Hungarian Academy of Sciences, Hungary)
- 11:30 - 12:30 pm Panel Session C:
Open Problems in Physics and Modeling of Large Scale Networks.
Tamas Vicsek, Reka Albert, George Kampis, Andras Lorincz, Andras Lukacs, Steven Bressler, Tom Bohman
- 12:30 - 14:00 pm Lunch Break

Session: Modeling Large-Scale Networks: Physics, Biology, Society (Part 2)

- 14:00 - 14:30 pm **The Dynamics of SIR-type Epidemics in Static Random Networks**
Erik Volz and Steven Strogatz (Cornell University, USA)
- 14:30 - 15:00 pm **Robust Networks from Local Optimization: A Bottom-up Model to Generate Networks with Skewed Degree Distributions**
Laszlo Gulyas (AITIA Inc & Eotvos University, Budapest, Hungary)
- 15:00 - 15:30 pm **Directed Connectivity Among Fish Populations in a Riverine Network**
Robert Schick, S.T. Lindley, A.L. Lloyd, P.N. Halpin, D.R. Urban (Duke University, USA)
- 15:30 - 16:00 pm **Network Formation and the Structure of the Commercial World Wide Web**
Zsolt Katona, Miklos Sarvary (Technical U. Budapest, INSEAD, France)
- 16:00 - 16:30 pm **A Graph-theoretic Approach for Evaluating Marine Population Connectivity: Ecological Implications and Conservation Recommendations**
Eric A. Trembl, Patrick N. Halpin, Dean L. Urban (Duke University, USA)
- 16:30 - 18:30 pm Free Time
- 18:30 - 20:00 pm Boat Cruise on the Danube

Thursday, August 31

- 08:00 - 08:30 am Refreshments
- 08:30 - 08:45 am Opening Remarks & Announcements
- 08:45 - 10:00 am Meetings of Working Groups:
Open Questions & Challenges in Large Scale Networks in Various Research Areas
Math/graph theory: Coordinator Tom Bohman
Neuroscience/biology: Coordinator Steve Bressler
Physics/modeling: Coordinator Andras Lorincz & Andras Lukacs
- 10:00 - 10:30 am Coffee Break

Integration Session:

- 10:30 - 11:00 am **Presentation of the three group's findings (10 min each)**
Tom Bohman (Carnegie Mellon University), Steve Bressler (Florida Atlantic University), Andras Lorincz & Andras Lukacs
- 11:00 - 12:30 am **Open discussions on the significance of findings in broad areas**
Panelists: Bela Bollobas, Peter Erdi, Walter J Freeman, Robert Kozma, Andras Lorincz, Andras Lukacs, Mark Suskin, Balint Toth, Gabor Tusnady
- 12:30 - 14:00 pm Lunch Break

Round Table Discussion Session

- 14:00 - 16:00 pm **Perspectives & Recommendations**
Reka Albert, Tom Bohman, Bela Bollobas, Steven Bressler, Peter Erdi, Walter J Freeman, Yannet Interian, Robert Kozma, Andras Lorincz, Andras Lukacs, Dezso Miklos, Anna Rudas, Mark Suskin, Balint Toth, Gabor Tusnady, Tamas Vicsek & all interested attendees
- 16:00 - 18:30 pm Free Time
- 18:30 - 21:00 pm Conference Banquet

Friday, September 1***Cortico-Hippocampal Dynamics: Navigation and Neuromodulation****Workshop at KFKI Research Institute*

Coordinator: Peter Erdi (KFKI Neuroscience Group, Budapest)

Location: KFKI Research Institute, Csillebér (Buda Hills)

URL: <http://cneuro.rmki.kfki.hu/events>

10.00	Introduction (Péter Érdi)
10.05 - 10.45:	Granger causality in neuroscience: scope and limits S. Bressler (Center for Complex Systems and Brain Sciences, Florida Atlantic University)
10.45 - 11.25	Prefrontal cortex - hippocampal interaction: data analysis by Granger's method T. Kiss (Cneuro-Budapest)
Break	
11.40 - 12.05	An interpretation of effective connectivity using fMRI time series C. Scholl (NIH/NIDA-IRP/ Neuroimaging Branch, Baltimore)
12.05 - 12.30	Competing models of theta synchronization in the medial septum B. Ujfalussy (Cneuro-Bpest)
Lunch break	
14.00 - 14.40	Interactions between self-organizing fields in neocortical activity and feed-forward neuromodulatory fields from brain stem nuclei under cortical control W. Freeman (Dept. Mol. and Cell Biol. UC Berkeley)
14.40 -15.20	From K models to navigating algorithm R. Kozma (CNeurodynamics Lab, Univ. Memphis)
Break	
15.30 - 15.55	Zs. Huhn (Cneuro-Bpest): The role of grid cells in distance determination
15.55 - 16.30	M. Lengyel (Gatsby CNS, UCL): Uncertainty, phase and oscillatory hippocampal recall
16.30 - 17.00	Z. Somogyvári (Cneuro-Bpest): TBA
17.00 - 17.15	Closing discussions

September 2-3: Excursion to Szeged & Hungarian countryside**Saturday, September 2**

- 09:00 am: Vans leave from Peregrinus Hotel, Budapest
12:00 am: Lunch at Szeri Csarda, Opusztaszer
01:30 pm: Visit Opusztaszer Hungarian Millenium Historical Site
05:00 pm: Arrival at Szeged, visit/wreathe statues of Hungarian mathematicians
06:00 pm: Check in to Hotel Novotel Szeged
http://www.accor-pannonia.hu/novotel_szeged_szalloda.php
07:00 pm: Dinner

Sunday, September 3

- 09:30 am: Visit Szeged University
10:30 am: Attend Szeged Paprika Festival and Fish Soup Contest
12:00 am: Lunch in Szeged
01:30 pm: Leave Szeged
02:30 pm: Visit Bugac traditional horse riding attractions
06:30 pm: Dinner at Mizsei Csarda
08:00 pm: Arrival at Hotel Peregrinus in Budapest

Monday, September 4

- Morning: Departure from Hotel Peregrinus, Budapest