

**The 9th International Conference on Unsolved Problems of Noise
UPoN'24, Hungary, 3-7 June 2024**

Obuda University, Bécsi út 96/B, Budapest

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Program

Speakers: please bring your presentation on a flash drive and upload it into the podium computer during the break before your session.

June 3, Monday

15:00 Registration opens. Location: Aula.

16:00 Getting Together Reception. Aula.

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June 4, Tuesday. Room F-09.

8:00 Registration opens.

9:00-9:30 **Opening ceremonies.**

Session: Noise in biology and biomedicine - 1.

Chair: Peter McClintock

9:30-10:05 **Keynote talk:** Kovacs, Levente, Obuda Univ., Hungary:
Personalized Cancer Therapy by Model-based Optimal Robust Control Algorithm

10:05-10:30 **Invited talk:** Yakovlev, Vladislav, Texas A&M Univ., USA
Can we utilize a noise in biological systems?

10:30-10:50 **Coffee break**

Session: Noise in quantum systems - 1.

Chair: Gabor Vattay

10:50-11:25 **Keynote talk:** Zubairy, Suhail, Texas A&M Univ., USA
Counterfactual Communication: Protocol and Controversy

11:25-12:10 **Keynote talk:** Dyakonov, Michel, Univ. Montpellier, France:
*On the impossibility (of practical) quantum computing + **DISCUSSION***

12:10-12:35 **Invited talk:** Belzig, Wolfgang, Univ. Konstanz, Germany
Quantum Fluctuations of Squeezed Magnons in Ferro- and Antiferromagnets

12:35-13:00 **Invited talk:** Macucci, Massimo, Univ. of Pisa, Italy
Effect of control signal phase noise on the fidelity of superconducting qubits

13:00- 14:30 **Lunch (on site)**

Session: Noise and oscillations

Chair: Massimo Macucci

14:30-15:05 **Keynote talk:** Dykman, Mark, MSU, USA:

Fluctuations in weakly damped driven vibrational systems

15:05-15:40 **Keynote talk:** Goychuk, Igor, Univ. Erlangen-Nürnberg, Germany:

Nonlinear viscoelastic transport and diffusion: How can seemingly overdamped Brownian particles exhibit sustained oscillations?

15:40-16:05 **Invited talk:** Chan, Ho Bun, Hong Kong Univ. Sci.Tech, Hong Kong, China.

Controlled asymmetric Ising model implemented with parametric micromechanical oscillators

16:05-16:35 **Coffee break**

Session: Noise in society

Chair: Mark Dykman

16:35-17:10 **Keynote talk:** Weissman, Michael, UIUC, USA:

Bayesian analysis of the probable origins of Covid: Quantifying "friggin' likely"

17:10-17:30 Pethes, Róbert (Physiological Controls Research Center, Óbuda University, Hungary) and Levente Kovács (University Research, Innovation and Service Center, Óbuda University)

Constructing Socially-Inspired Networks Using the Static Edge Voting Model

== End of Tuesday sessions

June 5, Wednesday. Room F-09.

Session: Noise at the nano scale-1

Chair: Derek Abbott

9:00-9:35 **Keynote talk:** Balandin, Alexander, UCLA, USA:

Noise of charge density waves in low-dimensional quantum condensate materials

9:35-10:10 **Keynote talk:** McClintock, Peter, Univ. of Lancaster, UK:

Noise-driven permeation of ions through tiny channels and pores in biology and nanotechnology

10:10-10:35 **Invited talk:** Burov, Stas, Bar Ilan Univ., Israel

Universality of Exponential Tails for Transport in Disordered Media

10:35-11:00 Pralgauskaitė, Sandra (Vilnius University, Lithuania), Frydričas Mireckas (Vilnius University), Darya Meisak (Vilnius University), Jan Macutkevic (Vilnius University), Jonas Matukas (Vilnius University) and Juras Banys (Vilnius University)

Low Frequency Noise and Carrier Transport in Hybrid CNT/Metal/Polymer Composites

11:00-11:20 **Coffee break**

Session: Noise at the nano scale - 2

Chair: Sandra Pralgauskaite

11:20-11:40 Gonnella, Giuseppe (Department of Physics, Università degli Studi di Bari, Italy), Daniela Moretti (Department of Physics, Università degli Studi di Bari), Giovanni Battista Carollo (Department of Physics, Università degli Studi di Bari) and Antonio Suma (Department of Physics, Università degli Studi di Bari)

Mass fluctuations as a subordinating process in cluster dynamics

11:40-12:00 Rehman, Adil (CENTERA Laboratories, Institute of High Pressure Physics, Polish Academy of Sciences, Warsaw 01-142, Poland.)

Similarity of the 1/f Noise Properties in HgCdTe and Graphene

Session: Various noise processes - 1

Chair: Ferdinand Grueneis

12:00-12:25 **Invited talk:** Dubkov, Alexander, Lobachevsky State Univ., Russia

Probability characteristics of Gompertz model with different kinds of colored noise excitation

12:25-12:50 **Invited talk:** Abbott, Derek, Univ. of Adelaide, Australia

Two-envelope problem

13:00-14:30 **Lunch (on site)**

Session: Noise in devices

Chair: Alexander Balandin

14:30-15:05 **Keynote talk:** Deen, Jamal, Mohamed Elamien, McMaster Univ., Canada:

Low-frequency noise in downscaled silicon transistors - trends and unsolved issues

15:05-15:30 **Invited talk:** Scandurra, Graziella, Univ. of Messina, Italy

Reducing leakage effects and measurement time in Low Frequency Noise Measurements

15:30-15:50 Filatov, Dmitrii (Lobachevskii University of Nizhnii Novgorod, Russia), Daria Vrzhesch (Lobachevskii University of Nizhnii Novgorod) and Alexander Dubkov (Lobachevskii University of Nizhnii Novgorod)

Response of a memristor to an external noise signal

15:50-16:10 Grueneis, Ferdinand (Institute for Applied Stochastic, Germany)

Spectral Features and Counting Statistics of the Intermittent Poisson Process in the Presence of 1/f Fluctuations

16:10-16:30 **Coffee break**

Session: Noise in sensing

Chair: Graziella Scandurra

16:30-16:55 **Invited talk:** Smulko, Janusz, Tech. Univ. Gdansk, Poland

Perspectives of Fluctuation-Enhanced Gas Sensing by Two-dimensional Materials

16:55-17:20 **Invited talk:** Soskin, Stanislav, Nat. Acad, Sci, Ukraine

Using activation for accurate measurement of temperature greatly exceeding the barrier

17:20 -17:40 Sik, Ondrej (Brno University of Technology, Faculty of Electrical Engineering and Communications, Department of Physics, Czech Republic), Nikola Papez (Brno University of

Technology, Faculty of Electrical Engineering and Communications, Department of Physics), Robert Macku (Brno University of Technology, Faculty of Electrical Engineering and Communications, Department of Physics), Nadezda Bogatyreva (Brno University of Technology, Faculty of Electrical Engineering and Communications, Department of Physics) and Petr Sedlak (Brno University of Technology, Faculty of Electrical Engineering and Communications, Department of Physics)

Low-frequency noise of a graphene chemical resistor operating near the Dirac point

17:40-18:00 Hino, Kaito (The University of Electro-Communications, Japan), Tota Mizuno (The University of Electro-Communications), Ryusei Iwasaki (The University of Electro-Communications), Kazuyuki Mito (The University of Electro-Communications) and Naoaki Itakura (The University of Electro-Communications)

Investigation of Functional Design in Back-Input Interface Using Motion Sensor

18:00-18:20 Mizuno, Tota (The University of Electro-Communications, Japan), Shodai Yada (The University of Electro-Communications), Kazuyuki Mito (The University of Electro-Communications) and Naoaki Itakura (The University of Electro-Communications)

Proposal of a highly operable Eye Glance Input Interface Using MediaPipe

== End of Wednesday sessions

June 6, Thursday. Room F-05.

Session: Noise in biology and biomedicine - 2

Chair: Janusz Smulko

9:00-9:30 **Invited talk:** Holcman, David, ENS, France

Modeling and asymptotic of extreme events in stochastic processes and application in cell biology

9:30-10:00 **Invited talk:** Der, Andras, HUN-REN Biological Research Centre, Hungary

What can we really learn from heart rate variability?

10:00-10:30 **Invited talk:** Vadai, Gergely, Univ. of Szeged, Hungary

The noise of our daily motion – general spectral characteristics of human mobility and activity

10:30-10:50 Kuljić, Bojan (Subotica Tech, College of Applied Sciences, Subotica, Serbia) and Peter Odry (University of Dunaújváros, Hungary)

Extracting Biomedical Signals from High Noise Environments

10:50-11:15 **Coffee break**

Session: Noise in biology and biomedicine - 3

Chair: Andras Der

11:25-11:45 Uchida, Masafumi (The University of Electro-Communications, Japan) and Riku Akamine (The University of Electro-Communications)

Analysis of Temporal Fluctuations in Repetitive Pick-and-place Movement Using Detrended Fluctuation Analysis

11:45-12:10 Petrychuk, Mykhailo (Forschungszentrum Juelich, IBI-3, Germany), Denys Pustovyi (FZJ, IBI-3), Nazarii Boichuk (FZJ, IBI-3), Yongqiang Zhang (FZJ, IBI-3), Hanlin Long (FZJ, IBI-3) and Svetlana Vitusevich (Forschungszentrum Juelich, IBI-3)

Random Telegraph Signal Noise Spectroscopy: Challenges and Opportunities For Biosensing Applications

12:10-12:30 Pralgauskaite, Sandra (Vilnius University, Lithuania), Lukas Dundulis (Vilnius University), Justinas Glemza (Vilnius University), Aivaras Spokas (Center for Physical Sciences and Technology), Andrius Bičiūnas (Center for Physical Sciences and Technology), Mindaugas Kamarauskas (Center for Physical Sciences and Technology), Bronislovas Čechavičius (Center for Physical Sciences and Technology), Renata Butkutė (Center for Physical Sciences and Technology) and Jonas Matukas (Vilnius University)

Low Frequency Noise Spectroscopy of NIR A3B5-Bi MQW Lasers for Blood Oxygen Detection

12:30-12:50 Shimizu, Miku (The University of Electro-Communications, Japan), Naoaki Itakura (The University of Electro-Communications), Kazuyuki Mito (The University of Electro-Communications) and Tota Mizuno (The University of Electro-Communications)

Comparative Study of Quantitative Removal Methods for Effects of Light Intensity Using Multiple Weight Conditions

13:00-14:30 **Lunch (on site)**

Session: Noise in biology and biomedicine - 4

Chair: Gergely Vadai

14:30-14:50 Kish, Laszlo B. (Texas A&M University, USA) and Andrea Antal (University of Göttingen, Germany)

Non-invasive Deep-Brain Stimulations by Spatiotemporal Fourier Synthesis

Session: Various noise processes-2

Chair: Gergely Vadai

14:50-15:10 Semeraro, Massimiliano (Università degli Studi di Bari and INFN, Sezione di Bari, Italy), Antonio Suma (Università degli Studi di Bari and INFN, Sezione di Bari), Giuseppe Negro (Università degli Studi di Bari and INFN, Sezione di Bari) and Giuseppe Gonnella (Università degli Studi di Bari and INFN, Sezione di Bari)

Fluctuation Theorems for Heat exchanged between passive and active baths

15:10-15:30 Dubkov, Alexander (Lobachevsky University of Nizhni Novgorod, Russia), Alexey Kargovsky (Lomonosov Moscow State University) and Olga Chichigina (Lomonosov Moscow State University)

The correlation time of a super-Poisson renewal process characterized by waiting time distributions with the locally thickened tail

15:30-22:00 **Leisure-time and Banquet.**

Banquet Talk: Abbott, Derek, Univ. Adelaide, Australia
UPoN, and Randomness and science in everyday life

== End of Thursday program

June 7, Friday. Room F-05.

Session: Artificial intelligence and deep learning

Chair: Christiana Chamon

9:00-9:25 **Invited talk:** Kertesz, Gabor, Óbuda Univ., Hungary
Current challenges in the field of Deep Metric Learning

Session: Noise in security

Chair: Ferdinand Gruneis

9:25-9:40 Balint, Krisztian_ (Óbuda University, Hungary)
Creating a Private Access Blockchain to Securely Store the Noise Measurement Report

9:40-10:00 Chamon, Christiana (Texas A&M University, USA)
Can the KLJN Scheme Be Implemented in Reinforced Concrete?

10:00-10:20 Davis, Kate (Texas A&M University, USA), Laszlo B. Kish (Texas A&M University) and Chanan Singh (Texas A&M University)
Dynamically watermarked smart power grids: Are they secure?

10:20-10:40 Flanery, Sarah (Texas A&M University, USA) and Christiana Chamon (Texas A&M University). *Noise-Based Biometric Authentication: Is It Secure?*

10:40 **Closing words**