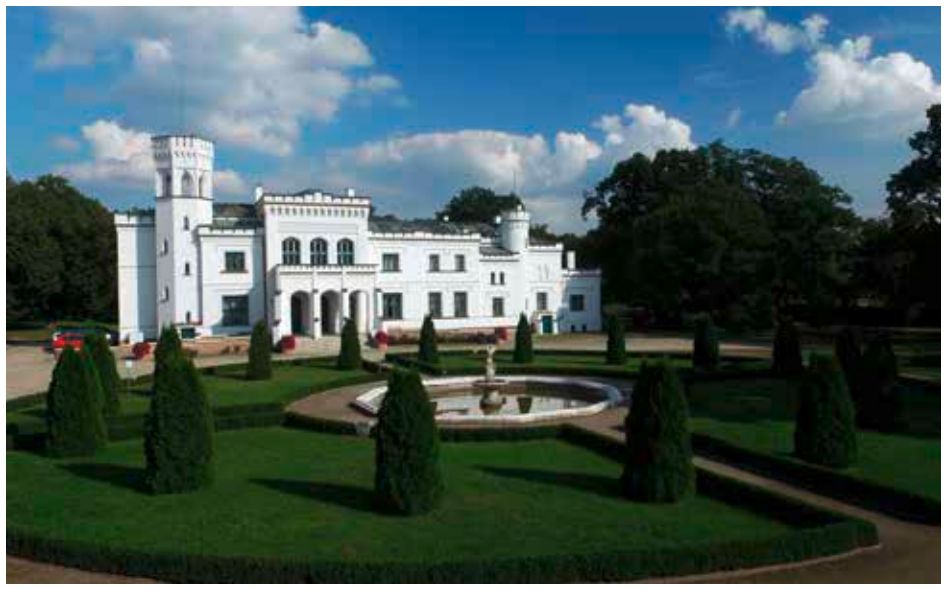
Mathematisches Forschungsinstitut Oberwolfach

Member of Leibniz Association

Banach Center
INSTITUTE OF MATHEMATICS PAS

Mathematics of Deep Learning

Banach Center – Oberwolfach Graduate Seminar



Organizers: Gitta Kutyniok, Berlin
Philipp Grohs, Wien
Date: 17 - 23 November 2019
Deadline: 15 August 2019

Motivation: Despite the outstanding success of deep learning in real-world applications, most of the related research is empirically driven and a mathematical foundation is almost completely missing. At the same time, those methods have already shown their impressive potential in mathematical research areas such as imaging sciences, inverse problems, or numerical analysis of partial differential equations. Recently, theoretical research aiming to derive a fundamental understanding of different aspects of deep learning such as expressibility, generalization, identifiability, and learning as well as improving current methodologies has been intensified. Summarizing, deep learning is a rich research area, touching various areas of mathematics and posing an exciting challenge to mathematicians. This seminar is intended to provide an introduction to the current state-of-the-art in the mathematical analysis of deep learning algorithms.

Goal: The goal is to provide an introduction into this exciting research area. We will discuss current main theoretical results, and also include practical sessions. The seminar will also include problem sessions which are intended to initiate collaborations on particular projects, as well as preparing the participants to conduct their own research in this area.

The seminar takes place at the Mathematical Research and Conference Center of the Institute of Mathematics of the Polish Academy of Sciences in Będlewo. Please see the website of the center where you can find basic information (location, travel etc.): **www.impan.pl/en/activities/bedlewo-conference-center/about-center**. In general travel expenses can not be reimbursed. The number of participants is restricted to about 50 persons.

Applications including

- full name and address, incl. e-mail address
- short CV and publication list
- present position, university
- name of supervisor of Ph.D. thesis
- a short summary of previous work and interest
- title, ID and date of the intended seminar

should be sent preferably by e-mail (with attachments in pdf format) via **seminars@mfo.de** until 15 August 2019 to:

Prof. Dr. Dietmar Kröner
Mathematisches Forschungsinstitut Oberwolfach
Schwarzwaldstr. 9 – 11
77709 Oberwolfach
Germany

Practical questions (visa etc.) of approved applicants can be checked with the Banach Center via **office@impan.pl**.