



Technische Universität München



Fakultät für Mathematik
Lehrstuhl für Angewandte
Numerische Analysis

One Doctoral position at the Department of Mathematics of the Technical University of Munich (supervisor Prof. Massimo Fornasier)

Dear Colleague,

we are advertising **1 Doctoral** position under the supervision of Professor Massimo Fornasier for a term of up to 3 years at the Department of Mathematics of the Technical University of Munich within the project ***Quantization and Noise Robustness in Distributed Compressed Sensing***, a joint project with Professor Gerhard Kramer, Chair for Communications Engineering of the Technical University of Munich.

Prof. Dr.
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The scope of the project

Compressive sensing is a challenging and very exciting mathematical theory that addresses the efficient recovery of sparse vectors representing analog signals. Efficient usually refers to the minimal amount of nonadaptive linear measurements, e.g., measurements obtained by applying a random matrix. The matrix represents an acquisition system that possesses certain spectral properties with high probability. One further requires optimal recovery via convex optimization algorithms, e.g., l_1 -norm minimization, or via greedy algorithms.

The project ***Quantization and Noise Robustness in Distributed Compressed Sensing*** will explore information theory limits and efficient recovery algorithms after signal encoding by Distributed Compressed Sensing in the following scenarios:

- quantization of the signal prior to measurements and/or quantization of the measurements after source signal encoding;
- noise on the source prior to measurements and/or on the measurements after source signal encoding.

The two situations described above are closely related as quantization error can be interpreted as a type of noise affecting either the source signal or the encoded signal. The project will be conducted under the supervision of Professor Massimo Fornasier at the Department of Mathematics of the Technical University of Munich, in closed collaboration with the research group of Professor Gerhard Kramer at Chair for Communications Engineering of the Technical University of Munich.

The project is associated with the national initiative "Compressed Sensing in Information Processing" (<https://www.ti.rwth-aachen.de/SPP1798/cfp.html>) and it is connected to the most lively research activity on compressed sensing currently done in Germany.

Environment

Our unit in **Applied Numerical Analysis** is a very active research group with a strong international profile (<http://www-m15.ma.tum.de/>). The Department of Mathematics of the Technical University of Munich is a young, stimulating, and dynamic environment, offering excellent working conditions. It is composed of 17 research units representing all the relevant fields of applied and numerical mathematics (<http://www.ma.tum.de/Mathematik/WebHomeEn>), qualifying itself as one of the strongest centers of applied mathematics in Germany.

The Technical University of Munich has been recently confirmed as a *University of Excellence* in Germany, and in the next years will be subjected to further relevant developments, in particular with a very new and competitive *tenure track career system* (<http://www.exzellenz.tum.de/1/homepage/>).

Munich is simply a great, welcoming, and safe place where to live, with enormous possibilities for cultural entertainment, sports, and contact with the nature. It is located in an optimal geographical position to connect to Austria, Italy, France, and Switzerland very fast by train, and it is served by one of the most efficient international airports in Europe with daily flights to anywhere in Europe, and many direct flights to Asia and the US.

We offer

To the successful candidate will be offered a doctoral position up to 3 years with an employment contract (no scholarship, with an income of ca 1.700 EUR/month after taxes (this indicated amount is not legally binding and it may vary from case to case depending on marital status and individual contributions to religious entities) and it includes standard social security (pension contributions and health care). The work is additionally endowed with an individual research funding of c.a. 2.000,00 EUR/year. No teaching duties are requested. The activity will be developed in English. We ensure individual supervision and independent career promotion. The starting date is at the earliest convenience (negotiable), but indicatively not later than Dec. 31 2015. **Application deadline: October 31, 2015**, or until filled. This advertisement will keep online until the position is filled.

We search

We consider interested candidates who concluded their Master studies in Mathematics also from pure subjects, with best marks, and a provably strong education in

mathematical analysis, functional analysis, probability, and familiarity with programming in Matlab or Mathematica.

Candidates are invited to apply, by electronically submitting a motivation letter, curriculum vitae et studiorum, including a copy of the Master thesis and 2 letters of recommendation in pdf format (one of the Master thesis supervisor).

Enquiries regarding the position and the applications should be directed to Massimo Fornasier (massimo.fornasier@ma.tum.de).

Sincerely yours



Massimo Fornasier