Research Training Group π^3:
Parameter Identification – Analysis, Algorithms, Applications

π^3 is a collaborative project between mathematicians of the Center for Industrial Mathematics (ZeTeM); mathematicians in analysis, topology, and statistics; and applied scientists of the University of Bremen. We invite applications for a

<div align="center">

PhD position (75% of a full position)

</div>

in the area of mathematical data analysis in the framework of project R3-9: **Generative models in image analysis: theory and applications**.

In recent years, *generative models* which result from training a (or two) neural network(s) have shown great promise in a variety of applications. Such generative models create realistic data – for example, one might train a generative model to return a natural-looking image given a Gaussian iid vector of much smaller dimension as an input – and can be used as a prior or regularizer in a discriminative task or more general inverse problem. Although there is widespread effort to mathematically characterize when neural networks achieve certain goals, many questions are still open. The theoretical component of this project will concern proving performance guarantees of generative priors via networks with various structures. In parallel, the doctoral student will also develop new methods using generative priors to be achieve certain tasks, like tumor classification in MALDI data.

We are searching for an enthusiastic and committed researcher with interest in mathematical data analysis as well as in developing and applying new mathematical models and algorithms. Within the research training group, the PhD student will be part of the Industrial Mathematics group at the Center for Industrial Mathematics, working under the supervision of Prof. Peter Maass. In addition Prof. Emily King (Colorado State University from August 2019) will be part of the advisory committee.

Requirements:
- M.Sc. or equivalent degree with excellent grades in mathematical sciences or related fields.
- Experience in the fields image analysis and machine learning is advantageous.
- Ability to program in Matlab and/or Python is advantageous.
- Industry or research internships are advantageous.
- Fluency in English.
- Desire to work in an international and interdisciplinary team.
- Willingness to a research stay at Colorado State University (host Prof. Emily King)

The position is for a fixed term of 3 years. The earliest starting date for each position in the research training group is 1 October 2019. The salary is according to the German federal employee scale TV-L E13, 75% of a full position (i.e., approximately €1700-1900 monthly net income). This call is open until all positions are filled.

Applicants are invited to submit their letter of motivation including a reference to PhD project R3-9, an extended CV including copies of certificates, a publication list (as far as applicable), one recommendation letter from a math professor, and contact information of two more scientists as possible referees.

The recommendation letter should be sent by the math professor directly to us (pi3-application@math.uni-bremen.de), while the application file should only include her/his name and affiliation.

All relevant documents, quoting the official reference number A 297 / 18, should be submitted by May 15, 2019, – preferably electronically as a single PDF file to pi3-application@math.uni-bremen.de – to the π^3-coordination: Dr. Tobias Kluth, Zentrum für Technomathematik, Universität Bremen, Bibliothekstr. 5, 28359 Bremen.

The University of Bremen has received a number of awards for its gender and diversity policies and is particularly aiming to increase the number of female researchers. Gender equality will be given special emphasis within this research training group. Applications from female candidates, international applications and applications of academics with a migrant background are explicitly welcome.

Disabled persons with the same professional and personal qualifications will be given preference.

Further enquiries may be addressed to

Prof. Peter Maass
Center for Industrial Mathematics
pmaass@math.uni-bremen.de