

# PhD Position on Visual Quality Assessment for Holographic Data

## Prerequisites & other requirements

You have a master degree in electrical engineering, mathematics or physics and you are attracted by the challenges in the domain of digital holography and associated multidimensional signal processing. You have good programming skills (C/C++) and/or profound MATLAB experience. You have a thorough background in mathematics and digital signal processing and preferably a basic knowledge of photonics. You have good oral and written communication skills. Fluency in English is a must, given the international character of the department.

Website: [www.etro.vub.ac.be](http://www.etro.vub.ac.be)

Contact: Prof. P. Schelkens

([www.etro.vub.ac.be/ETRO\\_Team/Personal\\_Page.asp?PM\\_ID=12](http://www.etro.vub.ac.be/ETRO_Team/Personal_Page.asp?PM_ID=12))

Reference number: ETRO-2014-PhD-2

# PhD Position on Sparse Signal Representations for Holographic Data

## Prerequisites & other requirements

You have a master degree in electrical engineering, mathematics or physics and you are attracted by the challenges in the domain of digital holography and associated multidimensional signal processing. You have good programming skills (C/C++) and/or profound MATLAB experience. You have a thorough background in mathematics and digital signal processing and preferably a basic knowledge of photonics. You have good oral and written communication skills. Fluency in English is a must, given the international character of the department.

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Reference number: ETRO-2014-PhD-1

# Postdoc Position on Sparse Signal Representations and Source Coding Architectures for Holographic Data

## Prerequisites & other requirements

You have a master degree in electrical engineering, mathematics or physics and a PhD degree in research fields associated to this position. You are attracted by the challenges in the domain of digital holography and associated multidimensional signal processing. You have already realised and excellent publication track record with publications in renown journals and you have the ambition to pursue a scientific career.

You have excellent programming skills (C/C++) and/or profound MATLAB experience. You have a thorough background in mathematics and digital signal processing and preferably a basic knowledge of photonics. You are a team player. You

have excellent oral and written communication skills. Fluency in English is a must, given the international character of the department.

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Reference number: ETRO-2014-PD-1

### **Work environment**

The **Electronics and Informatics department (ETRO)** belongs to the Faculty of Engineering Sciences at the *Vrije Universiteit Brussel (VUB)* and is embedded in the Future Media & Imaging Department of the *iMinds* Research Institute.

ETRO performs research on the representation, transmission, analysis, quality assessment and visualization of multidimensional signals. ETRO has built a large international collaboration network with a wide variety of industrial partners, academic institutions and R&D centres, and participates in a numerous fundamental, strategic and applied research projects in these domains.

In (multi-dimensional) data compression, ETRO has been active for more than 15 years in various research areas, including predictive and transform-based coding of images, video and meshes, near-lossless compression, multiple description coding, joint source and channel coding, error concealment, distributed video coding, visual quality assessment, and optimized media transmission over networks.

### **Research topic**

Since the invention of holography in 1948, researchers are attempting to realize realistic 3D projections. Recent developments in photonics, microelectronics and computer engineering offer the prospect that this will soon be feasible. Holographic television with acceptable visual quality will be achievable within the next decade. But to generate and process these 3D images we require massive supercomputers given current technologies. Moreover, distributing the associated huge data volumes over a network is not an evident problem to solve.

In order to alleviate these bottlenecks, the ERC CoG project ‘Sparse Signal Coding for Interference-based Imaging Modalities (INTERFERE)’ will pursue suitable sparse data representations for holographic signals. Moreover, holographic coding architectures will be designed that will address the bandwidth issues in this project. Additionally, improved models of the human visual system will be developed which will allow to minimize the impact of reconstruction errors during the visualization of the holographic content.

Research in the context of this PhD position will be particularly targeted towards the realisation of a digital holographic test bed that will provide holographic data and support the design of psychovisual and subjective testing experiments, the modelling of the response of human visual system with respect to holographic signals and the design of associated quality metrics.

This project will not only have a significant impact on the further developments in holographic television, but also seeding new applications in fields such as of medical imaging, biophotonics, life sciences and telecommunications.

Besides the scientific challenge, the position provides a great opportunity to work closely together with experienced researchers in the field of multidimensional signal processing and photonics.