Alexandra Koulouri, PhD

PERSONAL

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RESEARCH AND WORK EXPERIENCE

Academy of Finland Post-doc researcher, Faculty of Information Technology and Communication Sciences, Tampere University, **brief description of my project** **Since Oct. 2018**

Researcher in the Ionospheric imaging group, EEE Dept., University of Bath, May 2018- Oct. 2018

Research fellow in the group of Bioelectromagentism, School of Physics, Aristotle University of Thessaloniki, Greece Nov. 2016 – Oct. 2017

Teacher in the MSc in Bioinformatics and Neuroinformatics, Ionian University, Dept. of Informatics Oct. 2016 - Feb. 2017
Course: Recording and Processing of Brain Signals
Responsibilities: design of the course, preparation of lecture material and organizing lab exercises in Octave and Matlab. The course includes mathematical models of neurons, methods of processing of electrical brain signals and reconstruction of neural activity using EEG data

Post-Doc. researcher, Institute for Comp. & Applied Maths University of Münster Oct. 2014 - Jul. 2016
Topics of research: super-resolution imaging strategies in Raman spectroscopy and microbiology, vector tomography, (Bayesian) inverse problems, convex optimizations and scientific computing, regression analysis, digital signal processing and segmentation techniques in medical imaging.

PhD researcher, Imperial College London 2010 - 2015
Dept. of Electrical & Electronic Engineering
Research area: Medical Imaging and Inverse Problems

EDUCATION

Research program, University College London (UCL) 2008 - 2009
Dept. of Bioengineering and Medical Physics
Program title: Medical Image Computing (Score: 72%)

MSc Degree, Imperial College London (IC) 2007 - 2008
Dept. of Electrical & Electronic Engineering
MSc course title: Communications & Signal Processing, Merit (71%)

Diploma of Electrical & Computer Engineer 2002 - 2007
Aristotle University of Thessaloniki, Greece (AUTH)

PEER REVIEW PUBLICATIONS

- A. Koulouri, P. Heins and M. Burger, Adaptive Superresolution in Deconvolution of Sparse Peaks, in IEEE Transactions on Signal Processing, vol. 69, pp. 165-178, 2021, doi: 10.1109/TSP.2020.3037373.
- V. Rimpilainen, T. Samaras, A. Koulouri, Electrical Impedance Tomography with Box Constraint for Skull Conductivity Estimation. EMBEC 2020. IFMBE Proceedings, vol 80. Springer, Cham. doi:10.1007/978 − 3 − 030 − 64610 − 3_54
- A. Koulouri, V. Rimpilainen, Simultaneous Skull Conductivity and Focal Source Imaging from EEG Recordings with the Help of Bayesian Uncertainty Modelling. EMBEC 2020. IFMBE Proceedings, vol 80. Springer, Cham. doi: 10.1007/978 − 3 − 030 − 64610 − 3_114, Finalist in the Young Investigator Competition

- A. Rezaei, A. Koulouri S. Pursiainen Randomized Multiresolution Scanning in Focal and Fast E/MEG Sensing of Brain Activity with a Variable Depth. Brain Topogr 33, 161–175 (2020). doi: $10.1007/s10548-020-00755-8$
- A. Koulouri, N. Smith, B. Vani, V. Rimpiläinen, A. Astin and B. Forte Methodology to estimate ionospheric scintillation risk maps and their contribution to position dilution of precision on the ground, J Geod 94, 22 (2020). doi: $10.1007/s00190-020-01344-0$
- A. Koulouri, V. Rimpiläinen and N. Smith, Position Dilution of Precision and Bayesian Model of the Observation Error (2020arXiv:2001.02198)
- V. Rimpiläinen, A. Koulouri, F. Lucka, J.P. Kaipio, C.H. Wolters, Improved EEG source localization with Bayesian uncertainty modelling of unknown skull conductivity, NeuroImage, 188, 252-256, 2019. doi: $10.1016/j.neuroimage.2018.11.058$
- A. Koulouri, V. Rimpiläinen, M. Brookes. J.P. Kaipio, Prior Variances and Depth Un-biased Estimators in EEG Focal source Imaging, EMBEC NBC 2017, International Federation for Medical and Biological Engineering (IFMBE) Proceedings, 65, 33-36, 2017
- V. Rimpiläinen, A. Koulouri, F. Lucka, J.P. Kaipio, C.H. Wolters, Bayesian Modelling of Skull Conductivity Uncertainties in EEG Source Imaging, EMBEC NBC 2017, International Federation for Medical and Biological Engineering (IFMBE) Proceedings, 65, 892-895, 2017
- A. Koulouri, M. Brookes and V. Rimpilainen. Vector tomography for reconstructing electric field with non-zero divergence in bounded domains, Journal of Computational Physic ,Vol. 329, 15 January 2017, Pages 73–90. doi: $10.1016/j.jcp.2016.10.037$
- A. Koulouri, V. Rimpilainen, M. Brookes and J. P. Kaipio. Compensation of domain modelling errors in the inverse source problem of the Poisson equation: application in electroencephalographic imaging, Applied Numerical Mathematics, Vol. 106, Aug. 2016, P. 24-36. doi: $10.1016/j.apnum.2016.01.005$
- A. Koulouri and M. Petrou: Vector Field Tomography: Reconstruction of an Irrotational Field in the Discrete Domain, Proceeding (778) Signal Processing, Pattern Recognition and Applications, 2012, doi: $10.2316/P.2012.778-021$
- Book: Automatic segmentation of the abdominal Aorta from CT images: an initial approach towards the aortic Aneurysm detection. Authors: Alexandra Koulouri, Prof. Maria Petrou. Publisher: LAP LAMBERT Academic Publishing (22 May 2011).

Theses

- PhD thesis (Imperial College London)
  Reconstruction of Bio-electric fields and Source Distributions in EEG Brain Imaging 2015
  Supervisor: Mike Brookes (mike.brookes@imperial.ac.uk) and Maria Petrou
- MSc thesis (University College London)
  Automatic Segmentation of the Thoracic Organs for Image Registration and Radiotherapy Treatment Planning 2009
  Supervisors: Prof. D. Hawkes (d.hawkes@ucl.ac.uk) and Dr. J. McClelland
- MSc thesis (Imperial College London)
  Automatic Segmentation & $3D$ Reconstruction of abdominal aorta from CT images 2008
  Supervisor: Prof. Maria Petrou
- Diploma thesis (Aristotle University of Thessaloniki, Greece)
  3D previewing of Aorta Aneurysm from CT Scans 2007
  Supervisor: L. J. Hadjileontiadis (leontios@auth.gr)

Skills and Training

- Signal and image processing, machine vision, partial differential equations, finite element methods, linear and non-linear optimization techniques, and regularization methods.
- Programming languages: C/C++ and Matlab
- Free open source libraries:
  Medical Image processing: ITK, VTK and FieldTrip
  Image processing: CImg (C++ Template Image Processing Toolkit)
- Development tools: MS Visual Studio 2019
- Languages: Greek (native), English (fluent) and French (basic).

- Training in ESADE Business School in Spain (Entrepreneurship October 2019)
- Currently: Pedagogical training from Tampere University, Jan. 2021 until June 2021 (10 ECTS)

Teaching Experience

- Teacher in the Master Programme of Bioinformatics and Neuroinformatics, Ionian University, Dept. of Informatics, 7 Pl. Tsirigoti, 49100, Greece Oct. 2016 – Jan. 2017
- Tutor in Mathematics, Imperial College London 2010-2012
  I was teaching small groups of undergraduate students on a weekly basis. Course included: Calculus, Differential Equations and Linear Algebra. Responsibilities included marking of exams and providing feedback of the progress of the students (Coordinator: Dr. S. Wright s.wright02@imperial.ac.uk)
- C/C++ Lab demonstrator and preparing course material on C/C++ 2010-2012

Scholarships and Projects

- Finnish Academy Post-doctoral project, 2018-2021
- ATTRACT consortium, EC Horizon 2014-2020, 2019 – 2020
- IKY Fellowship of excellence for postgraduate studies in Greece - Siemens program, 2016-2017
- Participation in HYPERMATH project (2014-2016) funded by German BMBF for the development super-resolution algorithms in microscopy and Raman spectroscopy in Muenster University
- PhD grant by John S. Latsis Public Benefit Foundation, 2010-2013 (3 years)
- Studentship EPSRC, UCL, 2008-2009
- Studentship by John S. Latsis Public Benefit Foundation, 2008-2009
- Co-authoring of a successfully funded project by the ARISTEIA call for the establishment of Cognitive Signal Processing Lab (http://cbp.iti.gr/) My role was to write the materials and methods related to Vector Tomography. The principle investigator was Prof. Maria Petrou

Research visits

University of Auckland, Dept. of Mathematics, New Zealand
Invited by Prof. J. Kaipio 2013-2014

University of Helsinki, Dept. of Mathematics, Finland
DAAD program May 2015

Web-page

ResearchGate
TUNI webpage
Personal web-page