Ανακοίνωση

Την Τρίτη 4 Απριλίου και ώρα 15.00 – 19.00, στο Αμφιθέατρο Ι της Σχολής Θετικών Επιστημών του Πανεπιστημίου Θεσσαλίας στη Λαμία, η Δρ. Juliette Leblond (Senior Researcher (DR2), INRIA, Γαλλία) και ο υποψήφιος διδάκτορας κ. Χρήστος Παπαγεωργάκης (INRIA, Γαλλία) θα μας δώσουν μια σειρά ομιλιών στις οποίες θα μας παρουσιάσουν τις ερευνητικές τους ομάδες στο INRIA, Γαλλία και κάποια πρόσφατα αποτελέσματα της έρευνάς τους.

Η Δρ. Juliette Leblond και ο κ. Χρήστος Παπαγεωργάκης επισκέπτονται το τμήμα Πληροφορικής με Εφαρμογές στη Βιοϊατρική τη Δευτέρα 3 Απριλίου και την Τρίτη 4 Απριλίου.

Θα είναι μια θαυμάσια ευκαιρία ιδιαίτερα για όσους δουλεύουν στην ίδια περιοχή με τους καλεσμένους μας (και ιδιαίτερα μεταπτυχιακούς φοιτητές και τελειόφοιτους), να συναντηθούν, να ανταλλάξουν ιδέες και να συζητήσουν πιθανές συνεργασίες μαζί τους.

Θα είναι επίσης μια εποικοδομητική εμπειρία για όλους τους προπτυχιακούς φοιτητές καθώς θα μπορούν να παρακολουθήσουν εύκολα το μεγαλύτερο μέρος των ομιλιών.

Ακολουθεί η ανακοίνωση στα αγγλικά μαζί με περισσότερες λεπτομέρειες σχετικά με τις ομιλίες καθώς και σύντομα βιογραφικά των ομιλητών.

Ευριπίδης Μάρκου

Announcement

On Tuesday 4-April, 15.00-19.00, Amphitheater I, School of Science, University of Thessaly, Lamia, Dr. Juliette Leblond (Senior Researcher (DR2), INRIA, France) and PhD student Mr. Christos Papageorgakis (INRIA, France) will give us a series of talks in which they will present their research teams at INRIA, France and discuss some of their recent research results.

Dr. Juliette Leblond and Mr. Christos Papageorgakis are visiting the department of Computer Science and Biomedical Informatics on Monday 3-April and Tuesday 4-April.

It will be an excellent opportunity for people working on the same area (especially for PhD and graduate students), to meet, exchange ideas and discuss potential collaborations with our visitors.

It will also be a fruitful experience for all undergraduate students since they will be able to follow most part of the talks.

Talks' details:

Title of the talk: Presentation of the research center INRIA and the APICS Team

Speaker: Dr. Juliette Leblond

Abstract: APICS is a project-team in constructive mathematics at the crossroads of function theory, harmonic analysis, circuit and system theory, and inverse problems. APICS's favorite topics include: Frequency domain optimization and complex approximation, transfer-function analysis and realization, inverse potential problems and boundary-value problems, extremal problems and spectral theory for analytic or pseudo-analytic functions, harmonic gradients and their operators.

Title of the talk: Presentation of Athena Team

Speaker: Mr. Christos Papageorgakis

Abstract: The objective of Athena team is to explore the Central Nervous System (CNS) through computational imaging, by putting emphasis on signal and image recording from Diffusion Magnetic Resonance Imaging (dMRI), Magneto-Encephalography (MEG) and Electro-Encephalography (EEG). Their strategy for measuring and processing the CNS (brain and spinal cord) functional and anatomical connectivities is based on the following road map: Develop rigorous mathematical and computational tools for the analysis and interpretation of Diffusion MRI and MEG and EEG data. Improve acquisition and processing techniques and push forward the state-of-the-art in Computational CNS imaging. Use our expertise and collaborations to address collaborators clinical and neuroscience questions.

Title of the talk: Dictionary Learning for M/EEG multidimensional data

Speaker: Mr. Christos Papageorgakis

Abstract: Signals obtained from magneto- or electroencephalography (M/EEG) are very noisy and inherently multi-dimensional, i.e. provide a vector of measurements at each single time instant. To cope with noise, researchers traditionally acquire measurements over multiple repetitions (trials) and average them to classify various patterns of activity. This is not optimal because of trial-to-trial variability (waveform variation, jitters). The jitter-adaptive dictionary learning method (JADL) has been developed to better handle for this variability (with a particular emphasis on jitters). JADL is a data-driven method that learns a dictionary (prototype pieces) from a set of signals, but is currently limited to a single channel, which restricts its capacity to work with very noisy data such as M/EEG. We propose an extension to the jitter-adaptive dictionary learning method, that is able to handle multidimensional measurements such as M/EEG.

Title of the talk: Software presentation: FindSource3D

Speaker: Dr. Juliette Leblond

Abstract: FindSources3D is a software program dedicated to the resolution of inverse source problems in electroencephalography (EEG). From pointwise measurements of the electric potential, numerically obtained or taken by electrodes on the scalp, FindSources3D estimates pointwise dipolar current sources within the brain.

Title of the talk: Influence of skull modelling on conductivity estimation for EEG source analysis

Speaker: Mr. Christos Papageorgakis

Abstract: The skull conductivity strongly influences the accuracy of EEG source localization methods. As the conductivity of the skull has strong inter-individual variability, conductivity estimation techniques are required. Typically, conductivity estimation is performed on data from a single event-related stimulation paradigm, which can be explained by one dipole source. A conductivity value for the skull can be estimated as the value for which the single dipole source provides the best goodness of fit to the data. This conductivity value is then used to analyse the actual data of interest. It is known that the optimal local skull conductivity when modelling the skull as one compartment depends on the amount of spongiosa present locally. The research question arising is: Is conductivity estimation based on data from a single paradigm meaningful without accounting for the internal skull structure?

Title of the talk: Inverse problem in geoscience and planetary science

Speaker: Dr. Juliette Leblond

Abstract: Dr. Juliette Leblond will talk about inverse source and conductivity recovery problems for partial differential equations and their applications to brain imaging and planetary sciences. She will start from the practical issues and go to more computational then mathematical considerations. Illustrations and numerical experiments will be discussed as well.

Title of the talk: Inverse skull conductivity estimation problems from EEG data

Speaker: Mr. Christos Papageorgakis

Abstract: Electroencephalography (EEG) is a non invasive imaging technique that measures the effect of the electric activity of active brain regions, called sources, through values of the electric potential furnished by a set of electrodes placed at the surface of the scalp. A fundamental problem there is the inverse problem of source localization which aims at locating the sources of the electric activity using the acquired EEG measurements. The quality of the source estimation depends on the accuracy of the conductivity model used to solve the problem. Among the head tissues, the skull conductivity is the one that influences most the accuracy of EEG source localization. We examine the inverse skull conductivity estimation problem, which aims at recovering the electrical conductivity properties of the skull from measurements given at the surface of the head by EEG measurements. Our goal is to show uniqueness and a constructive scheme for the inverse skull conductivity estimation problem using partial boundary EEG data from a single experiment, in the preliminary case of an homogeneous skull conductivity.

Short CVs:

Juliette Leblond, INRIA (French National Research Institute in Computer Sciences and Applied Mathematics), Sophia Antipolis (S. A.), France, team APICS (Analysis and Inverse Problems for Control and Signal theory).

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I am a senior research scientist in applied mathematics, specialized in analysis and constructive approximation in spaces of holomorphic functions and their applications to inverse problems for partial differential equations and electromagnetic waves (electroencephalography in medical imaging and neurosciences, paleomagnetism in planetary sciences). These activities are the topics of collaborations between my team APICS and: hospital La Timone (Marseille, France), INRIA team Athena (S. A.); MIT (Cambridge, USA), Vanderbilt University (Nashville, USA), associate INRIA team IMPINGE. I got my HdR in 1998 and published a number of articles. A recent one is joint work with Christos Papageorgakis and one of his co-advisors: M. Clerc, J. Leblond, J.-P. Marmorat, C. Papageorgakis,Uniqueness result for an inverse conductivity recovery problem with application to EEG, Rendiconti dell'Istituto di Matematica dell'Università di Trieste. An International Journal of Mathematics, special issue dedicated to Giovanni Alessandrini, 48, 2016 (http://hal.archives-ouvertes.fr/hal-01303640).

Christos Papageorgakis is PhD student at research center Inria Sophia Antipolis - Méditerranée, within APICS and Athena project-teams, co-supervised by BESA. Both passionate by neuroscience and computer science Christos aims at investigating the influence of the skull conductivities on measurements aquired by non invasive techniques such as the magneto- or electo-encephalography (M/EEG). In 2013, after graduating from the Department of Computer Science and Biomedical Informatics of the University of Central Greece, Christos joins the COATI* project team of the research center INRIA Sophia - Méditerranée where he focus on implementing algorithms derived from graph theory games. Looking forward to gain knowledge in the field of Computational Biology, he successfully follows the Master 2 program in Computational Biology and Biomedicine of the University of Nice Sophia Antipolis, being founded by the embassy of France at Greece and the program Vrika. Following his master's program, Christos stays in France between September 2013 and August 2014, and joins ATHENA project team for a six months internship working on Dictionary Learning techniques for mutli-dimensional data such as the Electroencephalography (EEG). In October 2014, he joins Athena and APICS project team to conduct his 3 years PhD contract.