ΠΡΟΣΚΛΗΣΗ

ΚΥΠΡΙΑΚΗ ΔΗΜΟΚΡΑΤΙΑ

ΔΙΑΡΘΡΩΤΙΚΑ ΤΑΜΕΙΑ
της Ευρωπαϊκής Ένωσης στην Κύπρο
οι ιδέες μας, πράξη και ανάπτυξη

ΕΥΡΩΠΑΪΚΗ ΕΝΩΣΗ

Αρ. Πρωτοκόλλου Έργου:
ΤΕΧΝΟΛΟΓΙΑ/ΜΗΧΑΝ/0308(ΒΙΕ)/05

Τίτλος Έργου:
Development and Testing of a Robotic System for Minimally-Invasive Interventions with Real-Time MRI Guidance

ΔΕΣΜΗ 2008

Ίδρυμα
Προώθησης
Έρευνας

ΚΟΙΟΣ

**KIOS Research Center
for Intelligent Systems and Networks**
A University of Cyprus Research Center

Το Ερευνητικό Κέντρο «Κοίος» του Πανεπιστημίου Κύπρου σας προσκαλεί στο εργαστήρι "Workshop on New Approaches in MRI Guided Interventions", που θα διεξαχθεί την Παρασκευή 18/02/2011 στην αίθουσα B210 του κτηρίου ΧΩΔ02 στην Πανεπιστημιούπολη. Ως μέρος του εργαστηρίου θα παρουσιαστούν και τα αποτελέσματα του ερευνητικού έργου "Development and Testing of a Robotic System for Minimally-Invasive Interventions with Real-Time MRI Guidance" που χρηματοδοτήθηκε από το Ίδρυμα Προώθησης Έρευνας (ΤΕΧΝΟΛΟΓΙΑ/ΜΗΧΑΝ/0308 (ΒΙΕ)/05). Επισυνάπτεται το πρόγραμμα του εργαστηρίου. Οι ομιλίες θα γίνουν στην αγγλική γλώσσα.

ΠΡΟΓΡΑΜΜΑ ΕΡΓΑΣΤΗΡΙΟΥ

17:00 - 17:05 - Χαιρετισμός και έναρξη εργαστηρίου
Δρ. Ευτύχιος Χριστοφόρου, Συντονιστής Ερευνητικού Έργου
Ερευνητικό Κέντρο «Κοίος»
Πανεπιστήμιο Κύπρου

17:05 - 17:40 - "Technical challenges and clinical applications of human MRI at 7 Tesla and above"
Prof. Andrew Webb
Director, C.J.Gorter Centre for High Field MRI
Leiden University Medical Center

17:40 - 18:15 - "Robotics in Interventional MRI"
Δρ. Νικόλαος Τσέκος, Αναπλ. Καθηγητής
Department of Computer Science
University of Houston

18:15 - 18:50 - "A novel manipulation system for MRI-guided interventions"
Δρ. Ευτύχιος Χριστοφόρου, Συντονιστής Ερευνητικού Έργου
Ερευνητικό Κέντρο «Κοίος»
Πανεπιστήμιο Κύπρου

18:50 - 19:00 - Ολοκλήρωση και συζήτηση

<u>**Workshop on New Approaches in MRI Guided Interventions**</u>

Organized by: KIOS Research Center – University of Cyprus
When: Friday 18/02/2011, 17:00-19:00
Where: University Campus / Building ΧΩΔ02 / Room B210

The program will include the following three presentations (35 min each).

1. "Technical challenges and clinical applications of human MRI at 7 Tesla and above"
Andrew Webb, Professor,
Director, C.J.Gorter Centre for High Field MRI,
Leiden University Medical Center, Leiden, The Netherlands

Abstract:
The major aim of the high field MRI group at the LUMC is to develop new hardware and imaging sequences for successful clinical MRI at 7T. Examples which will be presented include: (i) the use of navigator echoes and phase imaging for high resolution MRI in Alzheimers patients, (ii) coil development for improved coronary artery imaging, (iii) developing methodologies for studying the human vertebral column in patients with ankylosing spondylitis, and (iv) the use of high dielectric materials to improve imaging and spectroscopy at high field.

Biography:
Andrew Webb graduated from the University of Bristol with a bachelors in Chemistry and obtained his PhD from the University of Cambridge in Medicinal Chemistry. After a postdoc in the Department of Radiology at the University of Florida, he joined the faculty of the Department of Electrical and Computer Engineering at the University of Illinois Urbana-Champaign. He was appointed full professor in 2000, and worked for three years in the Department of Physics at the University of Wurzburg on a Humboldt Fellowship. After three years directing the MRI lab at Penn State University, he was appointed to run the newly-formed C.J.Gorter Centre at Leiden University Medical Center. His main research areas are RF design for high field MRI, combined optical tomography and functional MRI, and spending time in Greece and now Cyprus.

2. "Robotics in Interventional MRI"
Nikolaos V. Tsekos, PhD,
Associate Professor,
Director, Medical Robotics Laboratory,
Department of Computer Science,
University of Houston, Houston

Abstract:
Robot assisting surgeries is an evolving field that, while promises a revolution toward minimally invasive procedures, it faces a myriad of challenges. Since its early stages, pre- and intra-operative image guidance has been evangelized as one of the tools-of-the-future that may improve current and allow new types of surgical practices. This presentation will discuss aspects of the technical merit and associated challenges of incorporating image guidance in robot-assisted procedures. Among other aspects, the focus will be on multi-modal and multi-contrast imaging, visuo-haptic interfacing, the co-registration of the robotic system with the imaging modality, 3D versus 2D visualization and integrating robotics in diagnosis.

Biography:
Nikolaos V. Tsekos received his BS degree in Physics from the National and Kapodistrian University of Athens in Greece, his M.Sc. degree in Physiology and Biophysics from the University of Illinois in Urbana Champaign and his PhD degree from the University of Minnesota in Minneapolis. His research is focused on the development of cardiovascular and interventional MRI methodology, and includes the areas of dynamic MRI and MR-compatible robotics for performing interventions with real-time MRI-guidance. His work is currently and has been previously funded by the national Science Foundation (NSF), National Institutes of Health (NIH), the Whitaker Foundation, the American Heart Association and the RSNA. He is an Associate Professor and director of the Medical Robotics Laboratory at the Department of Computer Science at the University of Houston.

3. "A novel manipulation system for MRI-guided interventions"
Eftychios Christoforou, PhD,
Project Coordinator,
KIOS Research Center,
University of Cyprus

Abstract:
The effective integration of robotics together with magnetic resonance imaging (MRI) technology is currently being considered in order to facilitate the real-time guidance of various diagnostic and therapeutic interventions. Specially-designed robotic manipulators are required for this purpose in order to provide the necessary access to the patient inside the scanner. The development of MR-compatible robotic systems is a challenging task given the strong magnetic fields and the space limitations that characterize the MRI scanning environment. A novel, manually-actuated, MR-compatible manipulation system will be presented, which was developed at the University of Cyprus as part of a project funded by the Cyprus Research Promotion Foundation. The system can provide access to the abdominal and thoracic areas and facilitate various minimally invasive interventions including biopsies, aspirations, drug deliveries, etc. The design of the system will be presented together with results from phantom studies on needle targeting inside a 1.5 as well as a 3 Tesla cylindrical MR scanner.

Biography:
Eftychios Christoforou received a diploma in Mechanical Eng. from the National Technical Univ. of Athens, Greece, a postgraduate diploma in Management from the Mediterranean Inst. of Management, Cyprus, and a Ph.D. in Mechanical Eng. from the Univ. of Canterbury, New Zealand. He has industrial experience in robotics, design of mechatronic systems, process dynamics and control, and engineering project management. He has worked for three years as adjunct professor with the Dept. of Electrical and Systems Eng. and also as a research associate with the Dept. of Radiology of Washington Univ. in St. Louis, Missouri. Since 2007 he works at the Univ. of Cyprus as visiting assistant professor / special scientist, currently with the Dept. of Electrical and Computer Engineering. His research interests are in the areas of robotics, dynamics and control of flexible structures, nonlinear and adaptive control, system identification, biomedical robotics, image-guided robotic interventions, and biomechanics.