



UNIVERSITÀ DEGLI STUDI
DI PERUGIA



DOTTORATO DI RICERCA
SCIENZA E TECNOLOGIA PER LA FISICA E LA GEOLOGIA
A. A. 2013-2014 (Ciclo XXIX)

AVVISO DI SEMINARIO

Martedì 8 Luglio 2014, ore 15
aula C - 2° piano sede di Via A. Pascoli snc

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***“Recent progresses on microelectronic devices and micro-
/nano-technologies for large-scale electrophysiological
measures at the microscale within neural circuits”***

Abstract: A stringent need in neuroscience is to drastically upscale the number of simultaneously measured neurons within large neural circuits. This seminar will present an approach based on active microelectrode arrays realized in CMOS technology to record electrophysiological signals from several thousands of densely integrated microelectrodes. Microelectrode arrays (MEAs) represent an increasingly used methodology for investigating the ongoing or evoked networkwide neurodynamics, either in-vivo or in-vitro. In order to realize MEAs integrating arrays with a higher electrode density an emerging methodology is based on the implementation of active electrode arrays that integrate adapted microelectronic circuits. Based on an original technological approach derived from light imaging sensors, we have realized a high-density MEA platform that manages arrays of 4096 microelectrodes with electrode separations of 21 μm and enables a sampling rate of 7.7 kHz/electrode when recording from the full active area of 2.6 x 2.6 mm² (recently up-scaled to 5x5 mm²). This technology required also the development of adapted computational methods to represent and analyze neuronal activity recorded from such a large number of electrodes. During the seminar, we will focus on the system development but also on recent experimental results obtained within EC-funded projects, thus highlighting the unprecedented capabilities offered by this platform for electrophysiological studies on spontaneously active hippocampal neuronal networks, for investigating epileptogenic signalling and plasticity in cortico-hi

IL COORDINATORE DEL DOTTORATO

Paola Comodi

IL DIRETTORE DI SEZIONE INFN-PG

Pasquale Lubrano

Oltre che ai dottorandi l'invito a partecipare è esteso a tutti gli interessati.

N.B.: Si fa presente agli studenti iscritti al primo anno del Dottorato che la frequenza del seminario in oggetto è **obbligatoria**.

Per ulteriori informazioni sull' attuale Ciclo di seminari e lezioni per il Dottorato, è possibile contattare il Dr. Livio Fanò (via Alessandro Pascoli) e/o il Prof. Francesco Frondini (Palazzo delle Scienze, piazza Università).