

# **Programmazione di attivita' di ricerca e didattiche presso l'Universita' di Messina**

Prof. Antonio Tricoli, PhD

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The visit of Prof. A. Tricoli will be focused on two main research and educational activities. With respect to the research, he will be participating in an existing joint project led by Professor Giovanni Neri which has been recently funded. This project aims to develop miniaturized chemical gas sensors for a spectrum of applications including measurement of volatile biomarkers present in sub-ppm concentrations in complex gas mixtures. The use of volatile biomarker analysis is becoming increasingly attractive due to the development of powerful analytical tools for lab-scale analysis of ultra-low concentrations of VOCs from body fluids, including breath. Nanomaterial-based sensors, have great potential to meet these clinical challenges and become powerful diagnostic tools owing to their inherently non-invasive nature. The large surface-to volume ratio of the nanomaterials provides high sensitivity and fast response and recovery times. The broad range of well-investigated nanomaterials can help to increase the selectivity and sensitivity to the target VOCs. Development of novel solid state sensors for selective detection of ultra-low concentrations of specific gas molecules is becoming increasingly more feasible due to the recent progress in nanofabrication approaches, which are capable of providing atomic-level control of the surface composition of high-surface-area detectors. The expertise of Prof. A. Tricoli on the nanofabrication of ultra-sensitive nanostructured semiconductor will be complimentary to the existing strengths of Prof. G. Neri's group on the engineering of gas sensing systems.

The educational activities will be centered on the advanced nanofabrication of ultra-porous nanomaterials and devices by flame spray pyrolysis. This is a scalable and flexible process that has been recently demonstrated as a CMOS-compatible tool for the engineering of complex device layout with application in ppb gas sensing, UV light detection and water splitting. Prof. A. Tricoli has an established background in the education of undergraduate and graduate students and currently leads a similar educational program at the Australian National University.

Seminars with students and faculty members of the University of Messina will be held for illustrating this project and on general themes regarding chemical sensors.

Yours sincerely



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