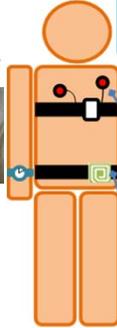## MSc FINAL PROJECTS BY **PROF Bruno Andò**

TOPICS

- Multi-sensor platforms for **Assistive Technology** and **Life Quality**
- Rapid prototyping of **(Bio)sensors**
  by Milling and InkJet Printing Tehcnology
- The use of **magnetic fluids** in smart sensors
- Advanced solutions for **Energy Harvesting**

SmartPhone/Smartwatch
- Body monitoring
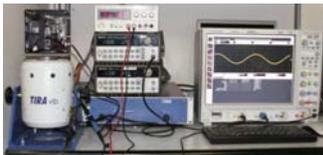- Light control
- User/Caregiver interaction

Body SENSORS
ECG, Activity, Posture,
Fall detection

RFID
Habits monitoring

DIEEI

METHODOLOGY

- Sensors design, realization and characterization
- Customized (µController based) **electronics** for sensors
- **Signal processing** and **firmware** development (Matlab, Labview)

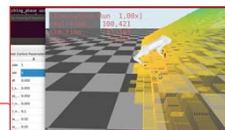**CONTACT: bruno.ando@unict.it**

1

MSc FINAL PROJECTS BY **PROF PAOLO ARENA**

TOPICS BIO-ROBOTICS

- New bio inspired neuron models for locomotion control
- Bioinspired learning algorithms for biorobot perception
  and decision making
- Implementation via Dynamic simulation environment &
  3D printing
- Hexapodal / Quadrupedal /hybrid Robots

METHODOLOGY

- Traditional control algorithms
- NN-based control algorithms

(bio-inspired reservoir computing)

DIEEI
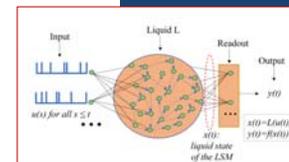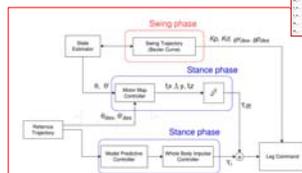
PLEASE CONTACT BY EMAIL (paolo.arena@unict.it)

2

MSc FINAL PROJECTS BY **PROF Maide Bucolo**

TOPIC 1 - Biological and Chemical Processes in Micro-channels

- Detection and control strategy based on Advanced Image and Signals Processing Methodologies

- Design and Realization of Embedded Micro-Opto-fluidic Systems

TOPIC 2- Brain-Computer Interface

- Advanced methods for brain signals Analysis and Control of external device

METHODOLOGY

- Software**:** Matlab, LabView, CAD in SolidWork, DPIV, Ray-Tracing,

- Technology: 3D-Printing, Soft-Lithography

- Microfluidics and Optics Laboratory

PLEASE CONTACT BY EMAIL maide.bucolo@unict.it

3

MSc FINAL PROJECTS BY **Prof. Arturo Buscarino**

TOPIC 1 – Nuclear Fusion Plasma modeling and control

- Modelling and Control of plasma instabilities (with ENEA and ENI)

- Fast control of nuclear fusion machines (with ENEA and ENI)

- Modeling and Control with Advanced Architectures (with F4E)

TOPIC 2 – Identification and control of nonlinear systems

- Control of energy distribution over networks using chaos

- Modeling and Control of nonlinear Electromechanical Systems

METHODOLOGY

- Matlab, Labview, DSpace systems, Laboratory experiments.

PLEASE CONTACT BY EMAIL arturo.buscarino@unict.it

4

MSc FINAL PROJECTS BY **PROF Riccardo Caponetto**

TOPICS

- Tuning and autotuning of fractional order controller
- Constant phase element realization and characterization
- Fuel cell modelling
- Road pavement defect detection
- Modelling and forecasting of power consumption
- Integrity operating Windows real time analysis and variance management
- µC applications

- Home&building automation
- Test engineering
- Industrial automation
- Functional Safety e FMEDA in automotive applications

PLEASE CONTACT BY EMAIL riccardo.caponetto@unict.it

METHODOLOGY

- Matlab, Labview , Laboratory experiments, DSpace systems, Microcontroller programming, C, C++ Programming languages

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MSc FINAL PROJECTS BY   **Prof. Luigi Fortuna**
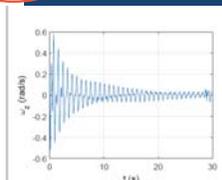
TOPIC 1 – Identification and Control

- Imperfect and nonlinear circuits and systems

- Model order reduction in distributed systems

TOPIC 2 – Modeling and control of time-delay and imperfect systems

- Synchronization and 3D displacement control of linear actuators with and without delay

- Displacement control of 3D- actuators arrays

- Modeling and Control of linear Electromechanical Systems

METHODOLOGY

- Matlab, Labview, DSpace systems, Laboratory experiments.

PLEASE CONTACT BY EMAIL luigi.fortuna@unict.it

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MSc FINAL PROJECTS BY **PROF Mattia Frasca**

TOPICS - COMPLEX ADAPTIVE SYSTEMS

- Analysis and control of synchronization and its failure in complex networks (with applications in power grids)

- Identification of complex networks

- Multi-agent systems: algorithms for consensus & multi-consensus, coordination, cooperation

- Epidemic models (agent-based and mean-field)

- Mechanisms of chaos generation in nonlinear oscillators (w. Dr. L. Minati)

METHODOLOGY

- Matlab, numerical methods

PLEASE CONTACT BY EMAIL mattia.frasca@unict.it

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MSc FINAL PROJECTS BY **PROF Lucia Lo Bello**

TOPIC 1- Industry 4.0 communications and Industrial IoT

- Wireless systems for Improved Safety in workplaces
- Innovative algorithms and performance evaluation of LoRaWAN networks for Industrial Internet of Things (IIoT)
- Bluetooth Low Energy real-time networks for industrial applications (e.g., industrial robotics)

TOPIC 2- Automotive communications

- Modeling and simulation of Time-Sensitive Networking standards for automotive communications
- Software architecture for Predictable HEterogeneous REal-time systems

METHODOLOGY

- Microcontroller programming, MATLAB, OMNeT++ Simulation framework
- C, C++ Programming languages

PLEASE CONTACT BY EMAIL lobello@unict.it

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MSc FINAL PROJECTS BY
PROFF Giovanni Muscato and Dario Guastella

TOPICS - Service Robotics

- Control and navigation of field robots for waste

    harvesting in beaches

- Mobile manipulation planning and control for environment sanitation

- Cooperative UAV control for monitoring and coverage path planning

- UAV for agricultural applications (in cooperation with D3A)

- UAV for gas sampling (in cooperation with INGV)

METHODOLOGY

- Matlab, ROS, Laboratory prototype development

PLEASE CONTACT BY EMAIL giovanni.muscato@unict.it
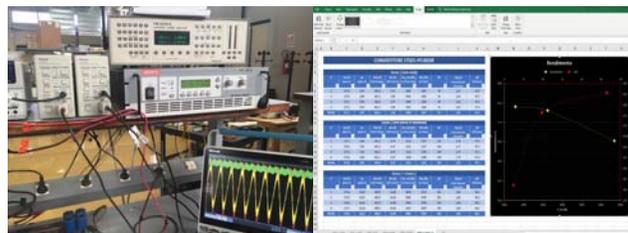**dario.guastella@unict.it**

DIEEI

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MSc FINAL PROJECTS **PROF Giuseppe Scarcella**

TOPICS

- Power Electronics for Automotive

- Energy efficiency

- HIL - HARDWARE IN THE LOOP Systems

METHODOLOGY

- Matlab

- Labview

- Dspace

DIEEI

PLEASE CONTACT BY EMAIL giuseppe.scarcella@unict.it

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MSc FINAL PROJECTS BY **PROF Rosario Sinatra**

TOPICS

- Kinematics and dynamics of mechanical systems, like parallel manipulators

- Dynamics identification of linear systems

- Dynamic performance optimization of mechanical systems

- Study of underwater robot

- Tensegrity structures

METHODOLOGY

- Matlab, Labview

PLEASE CONTACT BY EMAIL rosario.sinatra@unict.it

DIEEI

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