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Top Skills

Risk Assessment
Industrial Safety
Reliability Analysis

Languages

Greek
English
French

Publications

Click here to see my publications at ORCID (https://orcid.org/0000-0003-1113-6635)

Effie Marcoulaki

Principal Researcher at NCSR "Demokritos"

Summary

I am Principal Researcher on Quantitative Risk Assessment at the System Reliability and Industrial Safety Lab, and Education Officer in my research Institute. I am also an appointed expert at CEN/TC 352 'Nanotechnology', and have collaborated with EC on the evaluation and monitoring of H2020 and FP7 projects.
My research areas include: quantitative assessment and management of reliability and risk, occupational safety including risks from nanomaterials, as well as uncertainty quantification, Bayesian statistics, Markov processes, stochastic optimization tools for process and material design, and machine / deep learning tools.

Experience

NCSR Demokritos

Principal Researcher & Institute Education Officer
June 2008 - Present (12 years 2 months)
Athens, Greece

Laboratory of System Reliability and Industrial Safety
Institute of Nuclear and Radiological Sciences and Technology, Energy and Safety
National Centre for Scientific Research "Demokritos"

Hellenic Open University

Tutor, Assistant Coordinator, Editor, Author
October 1999 - September 2009 (10 years)
Athens, Greece

Tutor, module on Quantitative Methods, undergraduate course on Business Administration (2002-2009)
Assistant Coordinator, module on Quantitative Methods (2002-2006)
Author of interactive teaching material for the module on Quantitative Methods (2004)
Editor of the teaching material for the modules on: Introduction to Business Administration, Quantitative Methods, and Financial Markets (1999-2001)

Piraeus University of Applied Sciences
Adjunct Professor
October 2000 - September 2008 (8 years)
Piraeus, Greece

Teaching Environmental Measurements Technology, Quality Assurance Systems and Thermodynamics at the undergraduate course on Mechanical Engineering. Coordinator of the Environmental Measurements Technology Laboratory. Supervising undergraduate research projects.

University of Piraeus
Adjunct Lecturer
September 1999 - August 2007 (8 years)
Piraeus, Greece

Teaching process engineering, computer science & programming, operations research, project management at:
- The undergraduate courses on Industrial Management, Banking and Financial Management, and
- The cross-departmental postgraduate courses on Energy Systems and Environmental Management (with NTUA), Management of Health Services (with University of Athens), Techno-economic Systems (with NTUA).
Supervision of undergraduate and postgraduate research projects

QuantiSci (later Enviros QuantiSci)
Process & Software Engineer
November 1998 - May 1999 (7 months)
Henley-on-Thames, United Kingdom

Software consultant for process synthesis / optimization / simulation
Object oriented programming in Visual C++, Visual Basic

University of Manchester - Institute of Science and Technology
Research Assistant
October 1994 - September 1998 (4 years)

Fellowships funded from the Engineering and Physical Sciences Research Council (EPSRC), UK, and the University of Manchester

Boutari Wineries S.A, Greece
Trainee in Quality Assurance
February 1993 - April 1993 (3 months)
Athens, Greece

Quality control manager assistant on ISO 9000 directives

Education

The University of Manchester

PhD, Process Integration · (1994 - 1998)

The University of Manchester

MSc, Process Integration · (1993 - 1994)

National Technical University of Athens

MEng, Chemical Engineering · (1988 - 1993)

The Moraitis School

High School · (1981 - 1987)

Research projects in NCSR “Demokritos”

- **[H2020/I4MS/CloudiFacturing] CLARION: Machine health assessment via energy monitoring**
  Feb 2020 – Feb 2021
  CLARION will apply existing non-intrusive energy monitoring tools and advanced ML models to analyse the patterns in electrical loads of machinery equipment, disaggregate component loads, and detect departures from normal operation in a traditional food processing plant. The analysis results will be fed to a DSS system integrated to the CloudiFacturing platform, to be fused with data from the plant’s PLC and SCADA systems and support energy efficiency and predictive maintenance. *Role: leader of NCSR-D participation*
  http://www.clarionproject.eu/

- **[H2020/I4MS/MIDIH] SUPREEMO: Smart Monitoring for Energy Efficiency and Predictive Maintenance – Application to Electric Motors Retrofitting**
  Dec 2019 – Aug 2020
  The SUPREEMO experiment aims to use advanced CPS / IOT technologies and edge/cloud data-analytics, to develop a data-driven approach for equipment fault detection. The proposed solution is particularly addressed to SMEs seeking cost effective industry 4.0-retrofitting-based solutions, to assist the transition to the Smart Factory era. *Role: project coordinator*
  http://www.ipta.demokritos.gr/supreemo/

- **[H2020] NanoInformaTIX "Development and Implementation of a Sustainable Modelling Platform for NanoInformatics"**
  Jan 2019 – Dec 2023
  NanoInformaTIX aims to create a comprehensive, sustainable, multi-scale modelling framework for exposure and (eco)-toxicity of Engineered Nanomaterials (ENM) to facilitate cost-effective risk assessment, less reliant on animal testing, and to support the design of safer materials and products. *Role: leader of NCSR-D participation*
  http://www.nanoinformatix.eu/

- **GR-NSP: Greek Nanosafety Platform**
  Nov 2017 – Present
  Sustainable production and use of nanotechnology is inextricably linked to the identification, understanding and adequate management of the risks related to engineered nanomaterials and nanoenabled products during their production, transfer, use and disposal. GR-NSP has been founded by teams from NCSR "Demokritos", NTUA and FORTH, and has close collaboration with the European Commission and the European Nanosafety Cluster. The platform aims to connect the laboratorial, with the commercial and legal framework / standardization of nanosafety in Greece, for statutory and coordinated response towards the impact of nanomaterials on safety during production, transfer, use and product

disposal to the environment, as well as on public health and environmental sustainability. *Role: leader of NCSR-D participation*
https://gr-nsp.gr/

- **[SNF] PREDIvis - Hardware accelerated energy disaggregation for energy efficiency and predictive maintenance applications**
  Oct 2017 – Sep 2021
  The project PREDIvis proposes novel technologies for energy efficiency and predictive maintenance using hardware accelerated energy disaggregation. They involve the use of custom designed smart sensors that measure the aggregated current and voltage waveforms, treat these data and transmit the treated data to the cloud for extraction of advanced information on individual device consumption patterns and health status. The project is funded under the Industrial Fellowships programme of the Stavros Niarchos Foundation. *Role: project coordinator*

- **[NSRF 2014-2020] NCSR-D – INRASTES research activities in the framework of the national RIS3**
  Sep 2017 – Dec 2020
  National project of the Institute of Nuclear and Radiological Sciences and Technology, Energy and Safety. *Role: development of suitable models and software tools for semi-quantitative occupational risk assessment of nanomaterial risks.*

- **[H2020] EC4SafeNano - European Centre for Risk Management and Safe Innovation**
  May 2015 – Oct 2019
  The overall objective of the EC4SafeNano project is to develop a distributed Centre of European organisations for Risk Management and Safe Innovation for Nanomaterials & Nanotechnologies, to support industry, safety service providers, regulators and public stakeholders. The overall resources and capabilities available within the Centre will make it possible to provide expert knowledge and technical solutions to enable the safe production and use of nanotechnologies. The project is funded under H2020/EC (NMBP-27-2016). *Role: leader of NCSR-D participation*
  http://ec4safenano.eu/

- **[ETHZ] Safety analysis and quantitative risk assessment of the ArDM detector in Canfranc, Spain**
  May 2013 – Jun 2014
  This work considered the safety analysis and quantitative risk assessment of the Argon Dark Matter Detector process system, located at the Canfranc Underground Laboratory on the Spanish Pyrenees. Financed by ETH Zürich Institut für Teilchenphysic (IPP).

- **[NSRF] IDEEA - Integrated design for environmental and energy applications**
  Jan 2013 – Dec 2015
  National project – *Role: elaborating and supervising research on the optimal design of novel phase change materials using molecular design tools, and the optimal design and routing of oil and gas pipeline networks.*

- **[FP7] SCAFFOLD: Innovative strategies, methods and tools for occupational risks management of manufactured nanomaterials (MNMs) in the construction industry**
  May 2012 – Apr 2015
  SCAFFOLD is an industrial oriented idea to provide practical, robust, easy-to-use and cost effective solution for the construction industry regarding current uncertainties about occupational exposure to MNMs. This will be achieved by introducing a new paradigm to improve workers' protection based on a novel holistic Risk Management approach particularly addressed to SMEs (EU FP7, GA no. 280535). *Role: Task leader*
  http://www.scaffold.eu-vri.eu/

- **[FP7] LAGUNA-LBNO: Design of a pan-European Infrastructure for Large Apparatus studying Grand Unification, Neutrino Astrophysics and Long Baseline Neutrino Oscillations**
  Sep 2011 – Aug 2014
  Study for the design of very large-scale neutrino detectors, located in tanks filled with high purity cryogenic, organic scintillator or water. The tanks are placed several hundred meters underground and their size is in the order of several ktons (EU FP7, GA no. 284518). *Role: contribution to Detector Lifetime Operation Strategy, Safety and Risks.*
  http://laguna.ethz.ch:8080/Plone

- **[FP6] KM3NeT: European deep-sea neutrino telescope**
  2006 – Jun 2010
  Study for the design of a cubic kilometre scale submarine Cherenkov telescope to study high-energy astrophysical neutrinos. As part of the «Risk assessment and quality assurance» work group, we performed the unavailability analysis and modelling of this complex, large scale system, based on component reliability characteristics and maintenance constraints (EU FP6, GA no. 011937). *Role: contribution to detector unavailability analysis and modelling*
  http://www.km3net.org/home.php