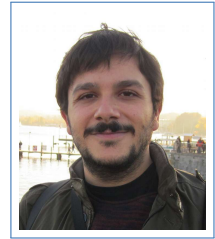# Nicola Roberto Zema

Short Curriculum Vitae

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Higlights

○ PhD in Information Engineering (Computer and Telecommunications Systems Engineering) from Università Mediterranea di Reggio Calabria, Italy.

○ M.Sc in Telecommunication Engineering from Università Mediterranea di Reggio Calabria, Italy.

○ 6 peer-reviewed journal articles and 12 peer-reviewed international conference articles. Google Scholar profile at: `https://scholar.google.it/citations?user=Q48sa6oAAAAJ`.

○ Interdisciplinary research background: Networking, Robotics and Control.

○ Taught 5 different courses in English and French.

○ Member of 9 journal editorial boards.

○ TPC in 12 Conferences.

○ Editor for a journal Special Issue; member of a organizing committee for an international workshop and session chair for two international conferences.

○ General Chair of a IEEE Workshop.

○ Qualified for French Associate Professor (Maître de conférences) Position

○ Mother Tongue: Italian. Known Languages: English, French.

Work Experience

May 2018 – Dec 2019
Postdoctoral Fellow, *LRI, U-Psud*, Paris Saclay, France.
My research at LRI involves Controlled Mobility in UAV networks. I am currentyl Researching Optimization Models, coupled with Machine Learning methods to guide fleets of mobile robots.

Oct 2017 – Apr 2018
Postdoctoral Fellow, *IFSTTAR*, Lille, France.
My research at IFSTTAR is focused on the creation of co-simulation tools that will integrate the research on railway traffic simulation with accurate networking insights

Grant
SMARTIES Project, `http://www.frttm.fr/elsat2020`

Mar 2017–Aug 2017
Research and Teaching Fellow, *Heudiasyc Laboratory*, Université de Technologie de Compiègne, France.
While continuing my previous research occupation, I am integrating my expertise with pedagogical activities

Oct 2015–Mar 2017
LABEX Postdoctoral Fellow, *Heudiasyc Laboratory*, Université de Technologie de Compiègne, France.
The research focus is on the study of a fleet of UAVs for which the main mission is to efficiently explore a totally or partially unknown area using vision sensors as the main perception modality and bio-inspired communications through distributed control

Grant	Divina Project, ANR-11-IDEX-0004-02, `https://www.labexms2t.fr/research/challenge-teams/divina.html`

Scope of Publications

- Mobile Sensor, Robot and UAV Networks;
- Multimedia Wireless Networks;
- Networked Control;
- Bio-Inspired approaches for networking and robotics.

Professional Qualifications

27/01/2017	**French Maitre de conférences (Associate Professor) Qualification**, *Number:* **17227303116**, CNU Section: 27 (Computer Science).

Education

Feb 2012 – Jun 2015	**Doctor of Philosopy (PhD) in Information Engineering**, *University "Mediterranea" of Reggio Calabria*, Italy.
Mar 2009 – Maj 2011	**Master Of Science (MSc) in Telecommunication Engineering**, *University "Mediterranea" of Reggio Calabria*, Italy. Cum Laude
Oct 2005 – Mar 2009	**Bachelor of Science (BsC) in Telecommunication Engineering**, *University "Mediterranea" of Reggio Calabria*, Italy.

Doctoral Thesis

Title	*Spontaneous Mobility and Autonomous (Re-)configuration techniques to support neXt Generation Networks*
Supervisors	Giuseppe Ruggeri, PhD
International Mobility	Universitè de Technologie de Compiègne, France, Jan–Jun 2013
International Mobility	Inria Lille, France, Feb–Jul 2014
Grant	Doctoral Mobility Grant by the French Ministry of Foreign Affairs, May 2014

Masters Thesis

Title	*An Epidemic model for node mutations in a Staminal Network*
Supervisors	Giuseppe Ruggeri, PhD

Bachelor Thesis

Title	*Firmware customization in a Linux-Based Mesh Node*
Supervisors	Giuseppe Ruggeri, PhD

Professional Services

Editorship

○ Guest Editor of the Special Issue of Digital Communications and Networks Journal on: "Theory and Applications of UAV Networks"

Organizing Committee Membership

○ General Chair of the 2018 IEEE PIMRC Workshop: Railway RoSe: Wireless Robots and Sensors Networks for Railway Systems
○ Publicity Chair of the International Workshop on Wireless Sensor, Actuator and Robot Networks (WISARN - IEEE ICNC) 2017
○ Publicity Chair of the International Workshop on Wireless Sensor, Actuator and Robot Networks (WiSARN - IEEE INFOCOM) 2018

Chairing

○ Session Chair at the 14th IEEE Consumer Communications and Networking Conference (IEEE CCNC) 2017
○ Session Chair of the International Workshop on Wireless Sensor, Actuator and Robot Networks (WISARN - IEEE ICNC) 2017

Technical Program Committee Membership	○ IEEE Wireless Communications and Networking Conference (IEEE WCNC 2018) ○ The 16th IEEE Consumer Communications and Networking Conference (IEEE CCNC) 2019 ○ IEEE Wireless Communications and Networking Conference (IEEE WCNC 2018) ○ The 5th International Workshop on Mobile Applications (MobiApps - IEEE FiCloud 2018) ○ The 15th IEEE Consumer Communications and Networking Conference (IEEE CCNC) 2018 ○ The 10th International Workshop on Wireless Sensor, Actuator and Robot Networks (WISARN - IEEE CCNC 2017) ○ The 11th International Workshop on Wireless Sensor, Actuator and Robot Networks (WISARN - IEEE INFOCOM 2018) ○ The 15th IEEE Consumer Communications and Networking Conference (IEEE CCNC) 2018 ○ The 14th IEEE Consumer Communications and Networking Conference (IEEE CCNC) 2017 ○ The 13th IEEE Consumer Communications and Networking Conference (IEEE CCNC) 2016 ○ The 9th International Workshop on Wireless Sensor, Actuator and Robot Networks (WISARN - IEEE 2016) ○ The CoWPER'16 workshio on the 13th annual IEEE International Conference on Sensing, Communication and Networking (SECON) 2016. ○ The 2nd International Conference on Computing for Sustainable Global Development, INDIACOM 2015. ○ The 2015 IEEE 82nd Vehicular Technology Conference (VTC2015-Fall)
Journal Editoral Boards	○ Elsevier Computers and Electrical Engineering, 2018 ○ Elsevier International Journal of Disaster Risk Reduction, 2018 ○ Wiley Transaction on Emerging Communication Technologies 2018 ○ IEEE Transaction on Mobile Computing 2017; ○ Elsevier Journal of Information Security and Applications 2017; ○ Elsevier Ad Hoc Networks 2017 2016, 2015; ○ Wiley Asian Journal of Control 2017 2016, 2015; ○ Elsevier Digital Communications and Networks 2016 2015; ○ Elsevier Computer Communications 2016;

Scope of research projects participated as a member

2017 – 2018 **SMARTIES**, *Smart, Fail-Safe Communication and Positioning Systems*, **Description:**In the framework of the Regional program ELSAT 2020 (co-financed by the European Union with the European Regional Development Fund, the French state and the Hauts de France Region Council), the SMARTIES (Smart, Fail-Safe Communication and Positioning Systems) project deals the question of smart, fail-safe communication and positioning functions for railway control and command (metros, conventional rail, high speed). The SMARTIES project is in line with the railway research strategy described in the Master Plan of the Shift2rail JTU in the Innovative program 2.

2016 – 2017 **DIVINA: DIstributed cooperative VIsual Navigation for multi-uAv systems**, *ANR-11-IDEX-0004-02*, **Description:** In this project, the focus is on the study of a fleet of UAVs for which the main mission is to efficiently explore a totally or partially unknown area using vision sensors as the main perception modality and bio-inspired communications through distributed control. The fleet is composed of autonomous UAVs that possess heterogeneous capabilities of control, communication and visual perception, as well as limited embedded resources, in terms of processing and energy. Indeed, each UAV can perform its localization, navigation and mapping in a non-supervised and non-coordinated manner while maintaining a consistent topology to realize the common objective of efficiently exploring the unknown environment.

2009 – 2011 **STEM-NET: "STEM" devices for self-organizing wireless Networks**, *Funded by Italian Ministry of Education and Research in July 2011 under the framework of National research project (PRIN)*, **Description:** In the project STEM-Net the network self-organization is managed at the level of a single wireless device, which is called "stem unit" because of its resemblance with its biological analogous. The "stemness" concept is analyzed and investigated through 4 main research directions: protocol reconfiguration, multi-homing, learning, cooperation/coordination. The actualization of a stem unit would include the implementation of a small set of functionalities, which can be extended by the knowledge of the task, the situation and the context where the node is operating, aside from the interactions with other units. This unit's reconfiguration results in an extreme flexibility of the whole network segment, and it turns the nodes heterogeneity from a limitation to a richness.

International Activities

During my PhD Studentship I had the possibility to visit two foreign research institution for a total period of 12 months. This was possible by the means of my peculiar ESF funding.

Jan – Jun 2013 (6 months) **Université de Technologie de Compiègne, France**, *Cooperation Agreement with Foreign University*, **Topics:** Controlled Mobility, Optimization, Modeling, **Description:** During this period, under the supervision of Enrico Natalizio, I started to work on controlled mobility topics that included mathematical modeling of network behaviors.

Feb – Jul 2014 (6 months)	**Inria, Lille, France**, *Cooperation Agreement with Foreign University*, **Topics:** Controlled Mobility, Wireless Sensor Networks, Localization, **Description:** During this period, under the supervision of Nathalie Mitton, I started a research line that concerned the problem of routing to a mobile sink from a mobile source. In respect to the classical literature approach, I envision the use of controlled mobility to ease the network operations.

Scientific Collaboration Network

During my research experience, I had the pleasure to collaborate with the following institutions:

France	LRI, University of Paris-Sud
France	Université de Technologie de Compiègne;
France	Inria Lille;
France	IFSTTAR Lille;
Spain	University of Valencia;
Italy	Università Mediterranea di Reggio Calabria;
Italy	Università della Calabria;
Italy	Università di Napoli "Federico II";
Italy	Università di Bologna;
Austria	Lakeside Labs;

Teaching

General Description

During my Postdoctoral experience, I had the possibility to give the following courses.

TOTAL	**239hrs Equivalent**.
Spring 2016	**LO21 - Programmation et conception orientées objet (Object Oriented Programming and Design), 73 Eq. hours.**, *A master's course at Université de Technologie de Compiègne, France*, Topics: initiation to the conception in object-oriented programming; Classes; Objects; Encapsulation; Generic Programming; UML; Design Patterns, Responsible: ANTOINE JOUGLET.
Autumn 2016	**Automatic processing of information 26 Eq. hours.**, *A engineer's course at Université de Technologie de Compiègne*, France, Topics: manipulate information; understand the potential of their automatic processing; concepts of applied mathematics; fundamentals of LaTeX and HTML, Responsible: JEAN-PAUL BOUFFLET.
Autumn 2016	**Algorithms and protocols for system interconnection, 10 Eq. hours**, *A master's and doctoral course at Université de Technologie de Compiègne, France.*, Topics: present the algorithms, the protocols and the communication technologies employed in the definition of "Systems of Systems"; advanced concepts in telecommunication networks that cover: advanced IP architectures, ad-hoc networks; robot and sensor networks, Responsible: ENRICO NATALIZIO.

Spring 2017	**SY02 - Statistical methods for engineers, France, 130 Eq. hours.**, *An engineer's course at Université de Technologie de Compiègne, France*, Topics: basic concepts and methods of statistics for use in the engineering sciences; estimation; confidence interval; hypothesis tests; linear regression; analysis of variance, Responsible: Benjamin QUOST.
Autumn 2016	**LC14 - Scientific and technical communication in English 2 Eq. hours.**, *A course at Université de Technologie de Compiègne, France, LC 14 aims to increase the level of English language in students by: (i) inciting them to communicate upon the technical and scientific actualities and (ii) by teaching them how to vulgarize their knowledge in order to transmit it to people not-specialized on their own domain and within an English-speaking environment.*, Responsible: Lynne FOREST.
Winter 2018	**Réseaux et Systèmes, 25 Eq. hours.**, *Université Paris Saclay*, Responsible: Steven Martin.
Winter 2018	**Programmation système et réseau, 24 Eq. hours.**, *Université Paris Saclay*, Responsible: Steven Martin.

Teaching References

Steven Martin	**Full Professor**, *LRI, Université Paris Sud, France*, `https://www.lri.fr/membre.php?mb=344`, Tel:+33(0)3 44 23 4691 . Mail: `mailto:steven.martin@lri.fr`
Jean-Paul BOUFFLET	**Associate Professor**, *Heudiasyc Laboratory, Université de Technologie de Compiègne, France*, `https://www.hds.utc.fr/~boufflet`, Tel: +33(0)3 44 23 4691. Mail: `mailto:boufflet@hds.utc.fr`
Antoine JOUGLET	**Associate Professor**, *Heudiasyc Laboratory, Université de Technologie de Compiègne, France*, `https://www.hds.utc.fr/~ajouglet`, Tel: +33(0)3 44 23 7939. Mail: `mailto:antoine.jouglet@hds.utc.fr`
Benjamin QUOST	**Associate Professor**, *Heudiasyc Laboratory, Université de Technologie de Compiègne, France*, `https://www.hds.utc.fr/~quostben`, Tel: +33(0)3 44 23 4968. Mail: `mailto:benjamin.quost@hds.utc.fr`
Enrico NATALIZIO	**Full Professor**, *Heudiasyc Laboratory, Université de Technologie de Compiègne, France*, `https://www.hds.utc.fr/~enataliz`, Tel: +33(0)3 44 23 4453. Mail: `mailto:enrico.natalizio@hds.utc.fr`

Students followed (6 to 9 months of work)

Doctoral

Angelo TROTTA	**Spring 2016**, *UTC Compiègne*, The student came to Heudiasyc Laboratory at UTC on behalf of a Cooperation Agreement between UTC and University of Bologna, Italy. In the six months of his doctoral mobility, he worked on simulation tools that integrated networked and control.

Oscar Patricio ALVEAR	**Spring 2016**, *UTC Compiègne*, The student came to Heudiasyc Laboratory at UTC on behalf of a Cooperation Agreement between UTC and University of Valencia, Spain. In the three months of his doctoral mobility, he worked on bio-inspired approaches to UAV mobility..

Master

Claudio PAS-CARIELLO	**Autumn 2016**, *UTC Compiègne*, The student was under my supervision during his Thesis Internship at Heudiasyc Laboratory, UTC on behalf of an Erasmus Mobility Grant. He was enrolled for the degree and her thesis was about the application of Consensus control algorithms for mobile wireless networks. Thesis Title: *Convergence and performance evaluation of a packet loss tolerant rendezvous algorithm for wireless networked robot systems*.

Bachelor

Silvana PIZZONIA	**Autumn 2012**, *Università "Mediterranea" di Reggio Calabria*, The student was under my supervision during her Bachelor Thesis Internship at the Università "Mediterranea" of Reggio Calabria. She was enrolled for the Telecommunications Engineering degree and her thesis was about recent deployments in Bio-Inspired approach for networking. Thesis Title: *A survey on "Bio-Inspired" approaches to the "Future Internet" Issues* .

Teaching Knowledge

During my studies and my years of teaching, I developed skills in the following areas:

Networking

- Traversal
  - Simulation tools for networking (NS2-3, wsnet);
  - Applied Mathematics (Information Theory, Coding, Etc);
  - Statistics;
- Level 2 ISO/OSI
  - MAC protocols for Wireless Networks (Access and Sensor Networks);
- Level 3 ISO/OSI
  - Routing protocols for Wireless Networks (Access and Sensor Networks);
  - Mesh Networks (802.11s);
  - 802.15.x;
  - Mobile Networks
- Upper Levels ISO/OSI
  - QoS Management;
  - Multimedia Services

Computer Science

- Operating Systems, Concurrent Programming, Scheduling, Distributed Systems;
- Matlab;
- Numpy/Scipy;
- Linux Kernel;
- R;
- Literate Programming and Reproducible Research;

- Agent-Oriented Programming (Java);
- Computer Architecture (x86);
- Data Bases and DBMSs, Relational Algebra, Data Mining;
- Programming: C, C++, Python, Java, Common Lisp, JSP;

References (research)

Steven Martin
Full Professor, *LRI, Université Paris Sud, France*, `https://www.lri.fr/membre.php?mb=344`, Tel:+33(0)3 44 23 4691 .
Mail: `mailto:steven.martin@lri.fr`

Giuseppe RUGGERI
University Researcher, *University "Mediterranea" of Reggio Calabria, Italy*, `https://www.unirc.it/scheda_persona.php?id=699`, +39 0965 875 339,
Mail: `giuseppe.ruggeri@unirc.it`.

Nathalie MITTON
Project leader of FUN Team, *Inria Lille, France,*, `http://researchers.lille.inria.fr/~mitton`, +33 (0)3 59 57 78 46, `Mail:nathalie.mitton@inria.fr`.

Enrico NATALIZIO
Full Professor, *Heudiasyc Laboratory, Université de Technologie de Compiègne, France*, `https://www.hds.utc.fr/~enataliz`, +33 (0)3 44 23 44 53, Mail: `enrico.natalizio@hds.utc.fr`.

Isabelle FANTONI
Research Director, *LS2N, Laboratoire des Sciences du numerique de Nantes, France*, `https://www.ls2n.fr/annuaire/Isabelle%20FANTONI/`, +33 (0)2 40 37 69 75, `Mail:isabelle.fantoni@ls2n.fr`.