NATIONAL PH.D. PROGRAM IN AUTONOMOUS SYSTEMS

Title of the research

Identification, modeling and optimization of a sustainable urban transportation network

Ph.D. candidate

NADIA NAZ

Cycle

XXXIX

Tutors

Prof. Marco Locatelli

Prof. Luca Consolini

1. Description of the research program

This research work involves one or more of the following activities:

1. Development of a multi-modal transportation model, that considers mobility demand and describes car, bike, public transportation, and pedestrian traffic.

2. Collection of data on the cycling mobility infrastructure, with the use of a fleet of sensored bikes.

3. Identification of model parameters, based on available data (traffic flow and mobility demand).

4. Optimization of the transportation network, aimed at converting motor traffic into bike traffic.

5. Identification of Patient models for the automatic control of intravenous anesthesia.

6. Optimization and Identification methods for cancer diagnosis and treatment.

2. Schedule of the research activities

First academic year

	Description	**Period**	**Activity abroad**
Collection of literature	Collection of data on the cycling mobility infrastructure	Nov 2023-April 2024	NO
Study of literature	Development of a multi-modal transportation model	May 2024-Oct 2024	NO

Second academic year

	Description	**Period**	**Activity abroad**
Experimentation	Identification of model parameters/Cancer Diagnostic Research, Magnetic Resonance Imaging Physics	Nov 2024-April 2025	YES
Analysis and preparation of proposed scheme/model	Optimization of the transportation network	May 2025-Oct 2025	YES

Third academic year

	Description	**Period**	**Activity abroad**
Result Formulation	Optimization of the transportation network	Nov 2025-April 2026	Yes (Partially)
Final write-up and Thesis Submission	Identification, modeling and optimization of a sustainable urban transportation network	May 2026-Oct 2026	NO

First academic year

	Description	Period	Final Exam	ECTS
A. Ph.D. courses	Intelligent Control systems	Jan 2024-Feb 2024	Yes	2
	Control for Optimization	06/11/2023-09/11/2023	Yes	3
	Optimization via extremum seeking	06/11/2023-09/11/2023	Yes	2
B. Master's degree courses	Advanced Medical Physics, Physics of Materials			8
	Research Methodology, Semiconductor Physics			
C. Soft skillcourses				1
D. Participation to seminars	Will be furnished			2
E. Participation to international congresses or workshops				
F. Presentation of research products at international congresses or workshops				
				4
	TOTAL OF ECTS FOR TRAINING ACTIVITIES			22
G. Individual research activity	Collection of data on the cycling mobility infrastructure, Development of a multi-modal transportation model. Cancer diagnostic research, Cancer Treatment research, Cancer screening and early detection research, Nuclear medical physics, Medical health physics, Magnetic resonance imaging physics			35
H. Supervision of students				
I. Integrative teaching activities				
J. Preparation of manuscripts for conferences or journals				13
	TOTAL OF ECTS FOR RESEARCH ACTIVITIES			48
	TOTAL OF ECTS			**60**

Second academic year

	Description	Period	Final Exam	ECTS
A. Ph.D. courses	Will be furnished	2024	Yes	5
B. Master's degree courses	Advanced Medical Imaging, Medical Applications of Lasers			
	Radiation Detection and Measurement, Treatment Planning in Radiation Oncology			
C. Soft skill courses				
D. Participation to seminars	Will be furnished			5
E. Participation to international congresses or				
				5

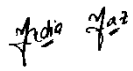
workshops				
F. Presentation of research products at international congresses or workshops				
	TOTAL OF ECTS FOR TRAINING ACTIVITIES			15
G. Individual research activity	Identification of model parameters/Cancer Diagnostic Research, Magnetic Resonance Imaging Physics, Optimization of the transportation network. Cancer diagnostic research, Cancer Treatment research, Cancer screening and early detection research, Nuclear medical physics, Medical health physics, Magnetic resonance imaging physics			25
H. Supervision of students				
I. Integrative teaching activities				
J. Preparation of manuscripts for conferences or journals				20
	TOTAL OF ECTS FOR RESEARCH ACTIVITIES			45
	TOTAL OF ECTS			**60**

Third academic year

	Description	**Period**	**Final Exam**	**ECTS**
A. Ph.D. courses				
B. Master's degree courses				
C. Soft skill courses				
D. Participation to seminars				
	Will be furnished			5
E. Participation to international congresses or workshops				4
F. Presentation of research products at international congresses or workshops				
				5
	TOTAL OF ECTS FOR TRAINING ACTIVITIES			14
G. Individual research activity	Optimization of the transportation network, Identification, modeling and optimization of a sustainable urban transportation network. Cancer diagnostic research, Cancer Treatment research, Cancer screening and early detection research, Nuclear medical physics, Medical health physics, Magnetic resonance imaging physics			30
H. Supervision of students				
I. Integrative teaching activities				
J. Preparation of manuscripts for				16

conferences or journals				
	TOTAL OF ECTS FOR RESEARCH ACTIVITIES			
	TOTAL OF ECTS			**60**

NADIA NAZ



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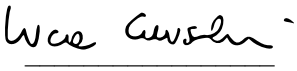

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