



Isabela Bîrs

Work permit: Romanian | **Date of birth:** 08/05/1992 | **Place of birth:** Sibiu, Romania |

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WORK EXPERIENCE

GHENT UNIVERSITY, BELGIUM

POSTDOCTORAL RESEARCHER – 2024 – CURRENT

- research in the field of fractional order control systems

TECHNICAL UNIVERSITY OF CLUJ-NAPOCA, ROMANIA

LECTURER – 2023 – CURRENT

teaching Control Engineering and Advanced Control Strategies for Industry 5.0

TECHNICAL UNIVERSITY OF CLUJ-NAPOCA, ROMANIA

TEACHING AND RESEARCH ASSISTANT – 2015 – 2023

Continuous Process Control, System Theory and Control Engineering

EDUCATION AND TRAINING

2018 – 2022

DOCTOR OF ENGINEERING, FWO-SB DOCTORAL FELLOW, GRANT NO. 1S04719N Ghent University, Belgium

Thesis Fractional order models enable control strategies based on material properties

2017 – 2021

DOCTOR OF SCIENCE Technical University of Cluj- Napoca, Romania

Final grade Summa cum Laude | **Thesis** Advanced fractional order control strategies for poorly damped processes

2015 – 2017

MASTER'S DEGREE IN ADVANCED PROCESS CONTROL Technical University of Cluj- Napoca, Romania

2011 – 2015

BACHELOR OF SCIENCE IN SYSTEM ENGINEERING Technical University of Cluj- Napoca, Romania

LANGUAGE SKILLS

Mother tongue(s): **ROMANIAN**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C2	C2	C2	C2	C2
FRENCH	B1	B1	A2	B1	B1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

● PUBLICATIONS

[132 publications with 1066 citations](#)

● HONOURS AND AWARDS

2019

EU-COST Action no. 15225 mobility funding program winner

supporting a mobility of two weeks in the period September 2-16, 2019 to the research group of Prof. Riccardo Caponnetto, University of Catania, Sicily, Italy.

2019

Finalist (Second place) of the Young Author Award 2019, Philadelphia, USA – International Federation of Automatic Control

for the paper: **Isabela R. Birs**, Mihaela Ghita, Maria Ghita, Dana Copot, Cristina I. Muresan, Clara M. Ionescu "An Interdisciplinary, Low-Cost Methodological Framework for Analyzing Dynamical Material Properties for Control- Related Applications", IFAC PAPERSONLINE, vol. 52, no. 9, ELSEVIER, 2019, pp. 159–64, awarded in Philadelphia, USA, 2019.

● PROJECTS

2025 – 2026

TE-2023-0831, Principal Investigator, "Digitalization of event-based surgical protocols for system identification and robust control in general anesthesia", won through national competition and financed by UEFISCDI Romania

2022 – 2024

PD-2021-0204, Principal Investigator, "Development of event-based fractional order control strategies in general anesthesia", won through national competition and financed by UEFISCDI Romania

2020 – 2022

TE-2019-0745, Research Assistant, "Autotuning strategies of poorly damped processes"

2018 – 2020

TE-2016-1396, Research Assistant, "Robust fractional order control strategies based on events for optimized reallocation of resources in cyber-physic system"

2017 – 2018

TE-2016-1396, Research Assistant, "Scalable nanorobot prototype for non- Newtonian fluids using fractional order modelling and control"

2016 – 2017

TE-2014-4-0598, Research Assistant, "Novel fractional order control strategies for vibration suppression in aeroplane wings"

● SCHOLARSHIPS

09/2018 – 12/2018

Doctoral scholarship from Special University Funds at Ghent University to prepare FWO proposal and kickoff doctoral training (sept – dec 2018) –BOF STG020-18 "MIMOPREC": Multivariable Multiloop Optimization of predictive Control.

2019 – 2022

FWO SB doctoral fellow, (project MOCONEF, 1S04719N)

2024 – 2026

FWO Postdoctoral Junior Researcher, Ghent University, Belgium (project (1203224N)

● TOP 5 SCIENTIFIC ACHIEVEMENTS

Fractional order event based control

The development of a novel control strategy, fractional order event-based control, which generalized classical integer order event based control paradigms to any arbitrary order. The main theoretical findings, practical implementations and validations for Vertical Take-Off and Landing platforms are published in Birs, I., Nascu, I., Ionescu, C., Muresan, C., Event based fractional order PID control, Journal of Advanced Research, vol. 25, pp.191- 203, 2020.

Non-Newtonian fluid interactions experimental framework

The design and construction of an experimental framework (circulatory system and transiting vehicle) for modeling and control related to non-Newtonian fluid interactions (such as blood). Development and validation of fractional order controllers, proving the superiority of fractional order control for blood-like fluids in I. Birs, C. Muresan, O. Prodan, S. Folea, C. Ionescu, An Experimental Approach towards Motion Modeling and Control of a Vehicle Transiting a Non-Newtonian Environment, Fractal and Fractional, Vol. 5(3), pp. 104, 2021.

Time delay systems

An in depth study of fractional order control strategies for time delay systems (as is the case of general anesthesia) published in Birs, I., Muresan, C.I., Nascu, I., Ionescu, C. A Survey of Recent Advances in Fractional Order Control for Time Delay Systems, IEEE Access, vol. 7, no. 1, pp. 30951-30965, 2019.

Non-Newtonian fluid interactions model in liquid steel manufacturing

Development of a mathematical framework starting from Navier-Stokes non-Newtonian fluid flow leading to a fractional order general model for complex non-Newtonian dynamics. The study features real-life applicability in liquid steel manufacturing (partnership with Arcelor-Mittal), pharma tablet manufacturing and targeted drug delivery. Main findings are published in Birs, I., Copot, D., Muresan, C.I., Nascu, I., Ionescu, C. Identification For Control of Suspended Objects In Non-Newtonian Fluids, Fractional Calculus and Applied Analysis, vol. 22, no.5, pp. 1378– 1394, 2019.

Vibration suppression

Development and testing of various control methodologies in the presence/absence of a process model applied to vibration suppression in airplane wings and vertical take off and landing stabilization.