

# J. FELICIEN IHIRWE

PhD Student, Software engineer & Low-code engineering

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## BIO

I'm a Ph.D. student in the Department of Information Engineering, Computer Science, and Mathematics (DISIM) at the University of L'Aquila. I work for Intecs Solutions S.p.A's Innovation Technology Service research lab in Pisa-Italy. I graduated from Carnegie Mellon University with a Master's degree in Electrical and Computer Engineering. My research interest lies in Low-code Engineering (LCE), Software Engineering, and the Internet of Things (IoT) at the Edge/Fog/Cloud. Low-code Engineering aims to upgrade the current Low-code Development Platforms trend into a new paradigm by integrating the theoretical and technical framework established by recent research in Model-Driven Engineering, Cloud Computing, and Machine Learning. My current Ph.D. topic focuses on developing a robust domain-specific language for the design and analysis of IoT complex systems by employing Low-code Engineering concepts.

## EDUCATION

### Ph.D in Information Science and Engineering

Nov 2019 – Ongoing

University of L'Aquila

*Interest: Low-code engineering & Domain-specific languages & IoT*

### M.Sc. in Electrical and Computer Engineering

July 2017 – June 2019

Carnegie Mellon University

*Interest: Software engineering & Machine Learning*

### B.Sc. in Electronics and Telecommunication Engineering

Oct 2012 – June 2016

College of Science and Technology-University of Rwanda

*Interest: Embedded Systems*

## PROFESSIONAL EXPERIENCE

### Research Assistant

#### Intecs Solutions S.p.A

December 2019-Current

Pisa, Italy

- Computer Science applications in LowCode Engineering with Model-Driven Software Engineering practices for Industrial IoT systems.
- Working on CHESSIoT modeling and analysis environment
- Model-based system's failure logic analysis and real-time schedulability analysis for IIoT systems
- Platform-specific code generation. **Technologies:** Java, UML/SysML/MARTE, Acceleo, Qvto, Xtext, ETL.

### Technical Consultant

#### BIRGER.

June 2019-November 2019

Kigali, Rwanda

- BIRGER. is one of the leading professional IT services firm in the Indian Ocean Region, covering 9 countries.
- I was in charge of Consulting services in the area of Technology, Security and Resiliency for Rwanda and towards the East Africa region.

### Software Engineer

#### WYS ltd

Jan 2019 - June 2019

Kigali, Rwanda

- Contributed to the software development lifecycle by adopting agile principles until effective deployment.
- Software development using Java-based SpringBoot tech, Thymleaf Jquery, Bootstrap
- Worked on an integration framework with different multipurpose consumer services.

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## Co-Founder-Developer

### TaagMind Ltd

📅 September 2018 - October 2020

📍 Kigali, Rwanda

- TaagMind aim is to offer Augmented & Virtual reality (AR&VR) experience to client.
  - Technologies used: Unity3D, Node.js, React Frameworks, SparkAR Studio.
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## Data Scientist (Internship)

### Rwanda Revenue Authority

📅 May 2018 – September 2018

📍 Kigali, Rwanda

- Worked on Electronic Billing Machine (EBM) data to improve the VAT tax payment compliance and service quality.
  - Developed a Machine Learning model to predict non-reporting EBM machine.
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## Administrative Support Officer

### Carnegie Mellon University - Africa

📅 Jan 2018 – May 2018

📍 Kigali, Rwanda

- General office support for various administrative functions of the organization.
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## Electronics & Repair Engineer

### BBOXX Capital

📅 May 2016 – August 2017

📍 Kigali, Rwanda

- Efficiently provided a great working commitment to the company product refurbishment processes, unshipping, product quality check and deployment to the market.
  - Close collaboration with the ongoing product design team to improved client's satisfactions.
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## IT & Automation officer (Internship)

### BRALIRWA - Part of Heineken

📅 May 2015 – August 2015

📍 Kigali, Rwanda

- Contributed to the design and implementation of new system wiring optimization of brewery expansion.
  - Effectively identified and fixed faults which arose in company electrical and automotive network.
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## RESEARCH EXPERIENCE

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### PUBLICATIONS

📅 2021

- "Cloud-based modeling in IoT domain: a survey, open challenges and opportunities". Felicien Ihirwe , Arsene Indamutsa, Davide Di Ruscio, Silvia Mazzini, and Alfonso Pierantonio. *In the Proceedings of 2021 ACM/IEEE International Conference on Model Driven Engineering Languages and Systems Companion (MODELS 2021)*. October 2021 [DOI: 10.1109/MODELS-C53483.2021.00018](https://doi.org/10.1109/MODELS-C53483.2021.00018).
- "A domain specific modeling and analysis environment for complex IoT applications". Felicien Ihirwe , Davide Di Ruscio, Silvia Mazzini, and Alfonso Pierantonio. *In the 7th Italian Conference on ICT for Smart Cities And Communities (I-CiTies'21)*. September 2021. [\[Online\]](#)
- "Towards an MQTT5 geo-location extension for location-aware applications". Felicien Ihirwe , Giovanni Iovino, and Davide Di Ruscio. *In the 44th IEEE International Conference on Telecommunications and Signal Processing (TSP'21)*. [DOI: 10.1109/TSP52935.2021.9522590](https://doi.org/10.1109/TSP52935.2021.9522590). July 2021 [\[Online\]](#)
- "Towards a modeling and analysis environment for industrial IoT systems". Felicien Ihirwe , Davide Di Ruscio, Silvia Mazzini, and Alfonso Pierantonio. *In the International workshop on MDE for Smart IoT Systems co-located with Software Technologies: Applications and Foundations (MESS@STAF21) conferences*. June 2021. [\[Online - DOI\]](#)
- "Model-based Analysis Support for Dependable Complex Systems in CHESS". Alberto Debiassi, Felicien Ihirwe , Pierluigi Pierini, Silvia Mazzini, and Stefano Tonetta. *In Proceedings of the 9th International Conference on Model-Driven Engineering and Software Development - MODELSWARD'21*. ISBN 978-989-758-487-9; ISSN 2184-4348, pages 262-269. [DOI: 10.5220/0010269702620269](https://doi.org/10.5220/0010269702620269). February 2021 [\[Online\]](#)

📅 2020

- "Low-code Engineering for Internet of things: A state of research". Felicien Ihirwe , Davide Di Ruscio, Silvia Mazzini, Pierluigi Pierini, and Alfonso Pierantonio. *In Proceedings of the 23rd ACM/IEEE International Conference on Model Driven Engineering Languages and Systems: Companion Proceedings (MODELS'20)*. Article No.: 74 Pages 1–8 [DOI:10.1145/3417990.3420208](https://doi.org/10.1145/3417990.3420208). October 2020 [\[Online\]](#)

## TEACHING

### Carnegie Mellon University-Africa

📅 Fall 2018

📍 Kigali-Rwanda

- **Graduate Teaching Assistant:** 04-330 Foundations of Software Engineering and Problem Solving.

📅 July-Aug 2018, 2019 and 2021

📍 Kigali-Rwanda

- **Graduate Teaching Assistant:** Introduction to Linux-Java programming orientation course.
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### The African Centre of Excellence in Data Science (ACEDS)

📅 Fall 2019 and 2020

📍 Remote

- **Graduate Teaching Assistant:** DSC6231 Computer Systems and Data Analytics.
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### High school teaching (ACEC)

📅 February 2012 - June 2015

📍 Nyabihu-Rwanda (Part-time)

- **Teacher:** Mathematics and Physics for Advanced level studies.

## VOLUNTEER

- **Student Volunteer:** The 49th ACM SIGPLAN Symposium on Principles of Programming Languages ([POPL 2022](#)). 📅 Sun 16 - Sat 22 January 2022
- **Student Volunteer:** The 36th IEEE/ACM Int. Conf. on Automated Software Engineering ([ASE 2021](#)). 📅 Sun 14 - Sat 20 November 2021
- **Shadow Program Committee member:** 2021 Mining Software Repositories conference ([MSR'21](#)). 📅 May 17-19, 2021
- **Student Volunteer:** ACM / IEEE 24rd Int. Conf. on Model Driven Engineering Languages and Systems ([MODELS'21](#)) 📅 10-15 October 2021
- **Student Volunteer:** 25th ACM International Systems and Software Product Line Conference ([SPLC 2021](#)) 📅 Sept 6-11, 2021
- **Vice-president:** Energy and embedded system community - Carnegie Mellon university-Africa 📅 Dec 2018-Feb 2019

## SPEAKER AT CONFERENCES

- ACM/IEEE 24rd Intl. Conf. on Model Driven Engineering Languages and Systems ([MODELS'21](#)) (**Speaker**) 📅 October 10 - 15, 2021
- 7th Italian Conference on ICT for Smart Cities and Communities ([I-CITIES 2021](#)) (**Speaker**) 📅 22-24 September, 2021
- The 44th IEEE International Conference on Telecommunications and Signal Processing ([TSP'21](#)) (**Speaker**) 📅 July 26-28, 2021.
- Software Technologies: Applications and Foundations conferences ([MESS@STAF21'21](#)) (**Speaker**) 📅 21-25 June 2021.
- ACM/IEEE 23rd Intl. Conf. on Model Driven Engineering Languages and Systems ([MODELS'20](#)) (**Speaker**) 📅 Oct 16-23, 2020

## PROJECTS

### Lowcomote (EU H2020-ITN n. 813884)

📅 November 2019-Current

📍 Pisa, Italy

Lowcomote aims to train a generation of professionals in the design, development and operation of new LCDPs, that overcome the limitations above, by being scalable (i.e., supporting the development of large-scale applications, and using artefacts coming from a large number of users), open (i.e., based on interoperable and exchangeable programming models and standards), and heterogeneous (i.e., able to integrate with models coming from different engineering disciplines). These scientists will drive the upgrade of the current landscape of Low-Code Development Platforms to Low-Code Engineering Platforms (LCEPs).

## TECHNICAL SKILLS[\*:FAMILIAR]

### Programming Language

Java (SpringMVC, SpringBoot), Python (Flask),UML/SysML, Xtext,Acceleo, JavaScript\*, Node.js\* PL/SQL, C++\*/C\*, Assembly Languages\*,MATLAB, Xtend\*/Qvto\*

### Database

MySQL, Postgres, MongoDB\*

### Web Technology

HTML, CSS, JQuery, Bootstrap

Source Control

Git, SVN

OS

MacOS, Linux (Ubuntu, Kali), Windows

Linux

Linux/Bash Scripting

Deployment

Docker(DockerFile, Docker Compose)

Data Science

Python Libraries, Data Visualization, Machine Learning, Deep learning

Editor

VS Code, Sublime, Vi

Tools in Design

Papyrus, EMF, Simulink\*

Languages

English, French, Italian\*, Kinyarwanda, Kiswahili\*

Driving Licence

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## INTEREST

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Research

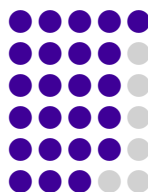
Teaching

IT Team Leading

Software Development

Software Architecture

Machine learning



## ACADEMIC REFERENCES

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Department of Engineering and Information Sciences and Mathematics  
University of L'Aquila

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🔗 <http://people.disim.univaq.it/diruscio/>

Alfonso Pierantonio

Full Professor

Department of Engineering and Information Sciences and Mathematics  
University of L'Aquila

Email: [alfonso.pierantonio@univaq.it](mailto:alfonso.pierantonio@univaq.it)

🔗 [Google Scholar](#)

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🔗 [DBLP](#)