

Julien Vaubourg

PhD in Computer Science

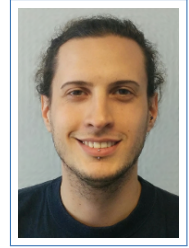
21, av. Paul Déroulède
54520 Laxou (France)

+336 71 555 141

✉ julien@vaubourg.com

🌐 ju.vg

👤 [jvaubourg](https://github.com/jvaubourg)



Research Topics

My PhD thesis is about integration of IP network models to DEVS multi-models, for cyber-physical system (CPS) co-simulations.

Modeling and simulating (M&S) a CPS can require to represent elements from three areas of expertise at the same time: physical systems, information systems and communication networks (IP). Because the universal simulator with all of the required skills does not exist, we have **to interconnect existing models provided by different communities**, with a multi-model. Challenges are therefore 1) integrating all of the heterogeneity of the multi-model (formalisms, representations, implementations), 2) integrating IP models in a way enabling them **to represent the network transportation of application data** produced by external models, and 3) integrating them in a way enabling them **to complete each other, to be able to represent together heterogeneous IP networks** used by CPS.

In order to meet these challenges, I contributed to M&S works around MECSYCO, a co-simulation platform based on the DEVS formalism and the concept of wrapping, to integrate different forms of heterogeneity. Thereby, I proposed the definition of a general framework enabling to **wrap IP simulators in DEVS**, with 1) adding of the port concept directly in IP models, to allow data exchanges with external models and 2) controlling IP simulator dynamics, to enable their synchronization with the other parts of the co-simulation. Proposed solutions do not require **to change the simulators code** (i.e. no specific versions to maintain). I was able to evaluate my approach thanks to the **integration of two popular IP simulators** (NS-3 and OMNeT++/INET), and the implementation of **industrial use cases** (smart grids related), in partnership with EDF R&D, the main French electric utility company.

Alongside my research work, I am interesting in issues related to privacy: I **co-founded a non-profit internet service provider** (Lorraine Data Network), I am very **involved in self-hosting popularization** (Internet Cube), and I regularly do public talks about these topics. I also did teaching as PhD candidate for two years, and I was **in charge of a popular science workshop** with kids during one year. I am currently a temporary teaching and research assistant (as a postdoc, corresponding to the French ATER position), finishing my thesis.

Education

2013–2017

Inria Grand Est, PhD Candidate & Postdoc.

PhD with Inria in collaboration with EDF R&D – Université de Lorraine

2010–2013

Master of Science in Engineering, TELECOM Nancy.

Telecoms, Networks and Services – Université de Lorraine

2010–2015

Lorraine Data Network, President.

French Non-Profit Internet Service Provider

2009–2010

BSc in IT Networking & Systems Administration, With high honors.

Professional degree ASRALL – Université de Lorraine

2007–2009

BTEC Higher National Diploma in IT, French DUT.

Université Lille 1, Université de Reims Champagne-Ardenne

Teaching

2016–2017

Programming and Algorithms (Python/C), L1.

Lectures/Tutorials/Practicals at Faculty of Sciences Nancy, 86h

2016–2017

Databases, L1.

Practicals at Faculty of Sciences Nancy, 15h

2016–2017

Project Management, L1.

Lectures/Tutorials at Faculty of Sciences Nancy, 21h

2016–2017

IT Certification, L1.

Lectures/Practicals at Faculty of Sciences Nancy, 24h

2015–2017

Systems and Networks, L3, M1, M2.

Lectures/Tutorials/Practicals at TELECOM Nancy and Faculty of Sciences Nancy, 82h

2014–2015

C Programming, L3.

Tutorials/Practicals at TELECOM Nancy, 32h

2014–2015

Creative Computing, 8-13 years (Popular Science).

Inria and MJC Centre Social Nomade, 134h

Popular Science (talks about Privacy/IPv6)

M2 TELECOM Nancy 2016, MathC2+ 2014 & 2015 (High School Students), ISN-EPI 2014 (High School Teachers), M1 MIAGE 2014, LP CISIIE 2013

Supervision of Students

2015–2016

Interdisciplinary Project, M1 TELECOM Nancy.

Plug-n-Play MECSYCO Demonstrations using a LiveUSB

Co-supervisor: V. Chevrier

2014–2015

Research Project, M1 TELECOM Nancy.

Exploitation of OMNeT++

Co-supervisor: V. Chevrier

2013–2014

Internship, L3 TELECOM Nancy.

Implementation of a C++ library for a convenient usage of the JSON format

Co-supervisor: V. Chevrier

2013–2014

Tutored Project, M1 Cognitive Sciences.

Coupling of a behavior model with a perception model

Co-supervisors: B. Camus, C. Bourjot et V. Chevrier

2013–2014

Tutored Project, Professional L3.

Monitoring and capping of the bandwidth used by internet subscribers

Co-supervisor: S. Jean

Research Publications

International conferences with proceedings

2016

J. Vaubourg, V. Chevrier, L. Ciarletta, B. Camus.

Co-Simulation of IP Network Models in the Cyber-Physical Systems Context, using a DEVS-based Platform

In proceedings of Communications and Networking Symposium (CNS'16).

2016

B. Camus, V. Galtier, M. Caujolle, V. Chevrier, **J. Vaubourg**, L. Ciarletta, C. Bourjot.

Hybrid Co-simulation of FMUs using DEV&DESS in MECSYCO

In proceedings of Symposium on Theory of Modeling and Simulation (TMS/DEVS'16).

2015

J. Vaubourg, Y. Presse, B. Camus, C. Bourjot, L. Ciarletta, V. Chevrier, J.-P. Tavella, H. Morais, B. Deneuille, O. Chillard.

Multi-agent Multi-Model Simulation of Smart Grids in the MS4SG Project

In proceedings of Practical Applications of Agents and Multi-Agent Systems (PAAMS'15).

2015

M. Dufлот, M. Quinson, F. Maseglia, D. Roy, **J. Vaubourg**, T. Viéville.
When sharing computer science with everyone also helps avoiding digital prejudices
In proceedings of International Scratch Conference (Scratch2015AMS).

National journals with reading committee

2015

F. Maseglia, M. Quinson, **J. Vaubourg**, V. Poirel, E. Taillant, S. Arias, L. Viennot.
Incitation à la découverte de la programmation
In Bulletin de la société informatique de France, HS1, février 2015.

Waiting submitted journals

2016

B. Camus, T. Paris, **J. Vaubourg**, Y. Presse, C. Bourjot, L. Ciarletta, V. Chevrier.
Co-simulation of Cyber-Physical Systems with the DEVS Wrapping Platform MECSYCO
In Simulation: Transactions of the Society for Modeling and Simulation International.

2016

B. Camus, **J. Vaubourg**, T. Paris, Y. Presse, C. Bourjot, L. Ciarletta, V. Chevrier.
Wrapping DEVS de modèles IP dans MECSYCO pour la co-simulation de systèmes cyber-physiques
In Technique et Science Informatiques (TSI), HS DEVS.

Demonstrations

2015

J. Vaubourg, Y. Presse, B. Camus, C. Bourjot, L. Ciarletta, V. Chevrier, J.-P. Tavella, H. Morais, B. Deneuille, O. Chillard.
Smart Grids Simulation with MECSYCO
In proceedings of Practical Applications of Agents and Multi-Agent Systems (PAAMS'15).

2015

J. Vaubourg, Y. Presse, B. Camus, L. Ciarletta, V. Chevrier, J.-P. Tavella, B. Deneuille, O. Chillard.
Simulation de smart grids avec MECSYCO
In proceedings of Journées Francophones sur les Systèmes Multi-Agents (JFSMA'15).

Research Lectures

2016

Paper Lecture, *United State, CA, Pasadena.*
Co-Simulation of IP Network Models in the Cyber-Physical Systems Context, using a DEVS-based Platform
Communications and Networking Symposium (CNS'16)

2016

Paper Lecture, *United State, CA, Pasadena.*
Hybrid Co-simulation of FMUs using DEV&DESS in MECSYCO
Symposium on Theory of Modeling and Simulation (TMS/DEVS'16)

2015

Paper Lecture, *Spain, Salamanca.*
Multi-Agent Multi-model Simulation of Smart Grids in the MS4SG Project
Practical Applications of Agents and Multi-Agent Systems (PAAMS'15)

2015

Demonstrations, *Spain, Salamanca.*
Smart Grids Simulation with MECSYCO
Practical Applications of Agents and Multi-Agent Systems (PAAMS'15)

2015

Demonstrations, *France, Rennes.*
Simulation de smart grids avec MECSYCO
Journées Francophones sur les Systèmes Multi-Agents (JFSMA'15)

2014

Demonstrations, *France, Chatou.*
Co-simulation distribuée
Journée Logiciels de Modélisation et de Calcul Scientifique (LMCS'14)

Research Software

Platform

Complete rewriting of the **MECSYCO co-simulation platform in C++**.

Simulators

Implementation of C++ libraries for the **integration of NS-3 and OMNeT++/INET** to MECSYCO.

Personal Experience

- Community** Founder and President for 5 years of a **Non-Profit Internet Service Provider** in France (community management, technical contributions, negotiation with providers, communication, public talks).
- Admin. sys./net.** Daily administration of personal and community **GNU/Linux servers**: emails, web, DNS, VPN, Git, Zimbra, Puppet, LDAP, KVM/Ganeti virtualization, LXC/Docker containers, etc. Writing of the **IPv6 Lothaire Yarding** Documentation.
- Open Source** Active developer of the **Internet Cube** project <internetcu.be>, and of **free software** available online on <ju.vg> and through the GitHub account *@jvaubourg*.