

Curriculum Vitae

Last name: BOAYE BELLE

First name: Alvine

Title: Postdoctoral researcher and part-time professor at University of Ottawa, Research scientist at KDM Analytics

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Research and industrial expertise

- Software architecture
- Technical debt in software
- Software maintenance
- Program understanding (through feature identification)
- Architectural styles
- Software analysis
- Architecture recovery
- Design patterns
- Assurance case development
- Assurance argumentation
- Expert systems

Professional experience

Teaching experience

January 2018 – April 2018: Part-time professor

Mentor: Professor Timothy Lethbridge, University of Ottawa (uOttawa)

Location: University of Ottawa (uOttawa)

Description: This winter, I am teaching the **CSI5140E** course (technical debt in software development) described as follow: “Technical debt is a metaphor proposed by Ward Cunningham to convey the idea that doing things in a “quick and dirty” way when designing and constructing a software leads to a situation where one incurs more and more deferred future expenses. Similarly to financial debt, technical debt requires payment of interest in the form of the additional development effort that could have been avoided if the quick and dirty design choices have not been made.

Technical debt applies to all the aspects of software development, spanning from initial requirements analysis to deployment, and software evolution. The course examines technical debt as it relates to software architecture, software quality, software maintenance and code smells. Technical debt has recently become a popular topic in industry and the research community.”

September 2014 – December 2014, September 2013 – December 2013, and September 2012 – December 2012: Teaching assistant for an object-oriented design course

Location: University of Quebec (École de Technologie Supérieure)

Description: Supervise the practical sessions of undergraduate students enrolled in an object-oriented design course; correct the reports of these students

Research and academic experience

Since August 2017: Member of the ISEM (International Software Engineering Management R&D) research Network founded by Professor Alain Abran and regrouping researchers from 24 countries.

Location: University of Quebec (Ecole de Technologie Supérieure)

Link: <https://isemnetwork.org>

Description: Develop synergies between research collaborators in order to increase the visibility and impact of software engineering on society.

Since May 2016: Visiting researcher / Postdoctoral researcher

Location: University of Ottawa (uOttawa)

Supervisor: Professor Timothy Lethbridge

Description: Conduct research in the CRUISE laboratory (uOttawa) and KDM Analytics

- Investigate how to reverse-engineer models compliant with the DODAF framework;
- Help supervise PhD students;
- Preparing a graduate level course that I will be teaching in 2018 (Winter term).

January 2012 – August 2016: Research assistant at the Software engineering and IT (LASI) laboratory

Location: University of Quebec (École de Technologie Supérieure)

Description: Reconstruct the software architectures of legacy systems by: i) extracting the principles that characterize these architectures, ii) deriving metrics and constraints from these principles, iii) using the derived metrics and constraints to translate the software architecture recovery into an optimization problem, and iv) solving this problem using search-based techniques. Resulting ReALEITY software available here: https://sites.google.com/a/etsmtl.net/realeity_v1_0/home

December 2013 – April 2014: Member of the SARA project staff (sara.etsmtl.ca)

Location: University of Quebec (École de Technologie Supérieure)

Description: contribute to the development of the SARA (Paper Writing Help Service) website, popularize the SARA project to students, manage the mailbox of SARA and assign to evaluators the scientific papers submitted through the SARA website.

March 2013 – April 2013: Supervision of a College student for his graduation project

Location: University of Quebec (École de Technologie Supérieure)

Description: Monitor the progress of a college student during the development of a tool aiming at visualizing architectural layers.

June 2010- July 2011: Research trainee in a computer lab

Location: “ReDCAD” Research Unit on Development and Control of Distributed Applications (Tunisia)

Description: design and develop middleware for distributed real-time embedded systems

Industrial experience

Since May 2016: Research scientist at KDM Analytics as part of postdoctoral work (see above). KDM Analytics is a company focusing on the prioritization, measurement and quantification of CyberSecurity Risk.

February 2012 - June 2012: Research trainee in an enterprise

Location: Benchmark Consulting Canada (Montreal), which supports legacy systems modernization.

Description: adapt and propose clustering algorithms to reconstruct architectural views from KDM representations of systems developed in COBOL.

Education

January 2012 – August 2016: Ph.D., software engineering

At: University of Quebec (École de Technologie Supérieure)

2009 - 2011: Master's in software engineering

At: National Engineering School of Sfax (Tunisia)

2005 - 2009: Bachelor in computer science

At: Faculty of sciences of Gabès (Tunisia)

Languages

- French (fluent)
- English (advanced)

Publications

- Alvine Boaye Belle, Ghizlane El Boussaidi, Sègla Kpodjedo, Hafedh Mili and Timothy C. Lethbridge. (2018). **A catalogue of rules to guide the reconstruction of software systems architectures compliant with the layered style.** Submitted to *Journal of Systems and Software*.
- Opeyemi O. Adesina, Timothy C. Lethbridge, Stéphane S. Somé, Vahdat Abdelzad, Alvine Boaye Belle (2017). **Improving Formal Analysis of State Machines with Particular Emphasis on And-Cross Transitions.** *Computer Languages, Systems & Structures* (accepted in December 2017).
- Alvine Boaye Belle, Timothy C. Lethbridge, Miguel Garzón and Opeyemi O. Adesina (2018). **Design and implementation of distributed expert systems: on a control strategy to manage the execution flow of rule activation.** *Expert Systems with Applications*, 96, 129-148. <https://doi.org/10.1016/j.eswa.2017.11.033>

- Boaye Belle, A. (2016). **Recovering software layers from object oriented systems: a formalization as an optimization problem** (Doctoral dissertation, University of Quebec).
- Alvine Boaye Belle, Ghizlane El Boussaidi, Segla Kpodjedo. (2016). **Combining lexical and structural information to reconstruct software layers**, *Information and Software Technology*, doi: 10.1016/j.infsof.2016.01.008.
- Boaye Belle, A., Boussaidi, G. E., Desrosiers, C., Kpodjedo, S. and Mili, H. (2015). **The Layered Architecture Recovery as a Quadratic Assignment Problem**. In *European Conference on Software Architecture (ECSA)*.
- Boaye Belle, A., Boussaidi, G. E., & Mili, H. (2014). **Recovering software layers from object oriented systems**. In *Evaluation of Novel Approaches to Software Engineering (ENASE), 2014 International Conference on* (pp. 1-12). IEEE.
- Boaye Belle, A., El Boussaidi, G., Desrosiers, C., & Mili, H. (2013). **The layered architecture revisited: Is it an optimization problem**. In *Proc. 25th Int. Conf. Software Engineering and Knowledge Engineering* (pp. 344-349).
- Boussaidi, G. E., Boaye Belle, A., Vaucher, S., & Mili, H. (2012). **Reconstructing Architectural Views from Legacy Systems**. In *Reverse Engineering (WCRE), 2012 19th Working Conference on* (pp. 345-354). IEEE.

Awards, recognitions and other achievements

- **2016-18:** Two-year MITACS postdoctoral scholarship
- **2015:** Scientific production scholarship from University of Quebec (École de Technologie Supérieure)
- **2013:** Internal scholarship (rewarding the best master and Ph.D. students) from University of Quebec (École de Technologie Supérieure)
Scientific production scholarship from University of Quebec (École de Technologie Supérieure)
- **2012:** Four-year doctoral scholarship from my thesis supervisor
- **2009:** Two-year government grant to study in Tunisia for a master's Degree
Recruited for engineering studies by the Réseau Polytechnique France after an entrance examination
- **2005:** Four-year government grant to study in Tunisia for a bachelor's Degree

Volunteer Professional Activities

- Reviewer for a FedCSIS 2016 satellite event
- Volunteer at CompArch 2015, conference series federating WICSA, CBSE and QoSA
- Volunteer at the 22nd IEEE International Conference on Software Analysis, Evolution, and Reengineering (2015)
- Auxiliary reviewer for CSEDU (International Conference on Computer Supported Education) 2015 and 2016