Curriculum Vitae

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Sidi Mohamed Beillahi
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❖ Summary

I am interested in algorithmic verification, formal verification, and programming languages. I develop new techniques to improve the reliability of software systems. I work in a variety of application areas: distributed systems, blockchain, smart contracts, and asynchronous programming.

❖ Education

Doctorate — Computer Science *Dec 2017 – Mar 2021*
Thesis Title: **Automated Verification of Programs Running on top of Distributed Systems** Université de Paris, France
Advisors: Ahmed Bouajjani and Constantin Enea

Master of Applied Science — Computer Engineering *Sep 2014 – Nov 2016*
Thesis Title: **Towards the Design Automation of Quantum Circuits** Concordia University, Canada
Advisor: Sofiène Tahar

Engineer's Degree — Polytechnicien *Sep 2011 – Jun 2014*
Thesis Title: **Formalization of Signal-Flow Graphs in HOL** Tunisia Polytechnic School, Tunisia
Advisor: Sofiène Tahar

DEUPC — Mathematics and Physics *Sep 2009 – Jun 2011*
Sfax Preparatory Engineering Institute
University of Sfax, Tunisia

❖ Experience

Postdoctoral Researcher, University of Toronto *Jun 2021 – present*
Advisors: Fan Long and Andreas Veneris Toronto, Canada

Research Assistant, Université de Paris *Dec 2017 – May 2021*
Advisors: Ahmed Bouajjani and Constantin Enea Paris, France

Teaching Assistant, Université de Paris *Sep 2018 – Jan 2021*

Research Intern, SRI International *Apr 2019 – Aug 2019*
Advisor: Michael Emmi New York City, USA

Software Programmer, TRU Simulation + Training *May 2017 – Dec 2017*
Montréal, Canada

Research Assistant, Concordia University *Mar 2014 – Nov 2016*
Advisor: Sofiène Tahar Montréal, Canada

Teaching Assistant, Concordia University *Sep 2015 – May 2016*

Research Engineer, Marinvent inc. *Mar 2016 – Nov 2016*
Advisor: Sofiène Tahar Montréal, Canada

Intern, STMicroelectronics *Jul 2013 – Aug 2013*
Advisor: Mohamed Ben Ahmed Tunis, Tunisia

Intern, Mauritel S.A *Aug 2012 – Aug 2012*
Advisor: Mohamed Moujtaba Nouakchott, Mauritania

❖ Awards and Recognitions

- Best Undergraduate Thesis, Tunisia Polytechnic School, 2014.
- Ranked 31st in the National Grandes Ecoles Exam, Tunisia, 2011.
- Olympian in the International Mathematical Olympiad, Germany, 2009.
- Ranked 3rd in the National Mathematical Olympiad, Mauritania, 2009.
- Ranked 1st in the National Bac Exam in Mathematics, Mauritania, 2009.

❖ Grants and Scholarships

- VMW Scholarship Award for CAV 2016, USD 650.
- Concordia Graduate Student Association Conference Funding for CAV 2016, CAD 100.
- Concordia University Conference and Exposition Award for NFM 2016, CAD 1,000.
- Graduate Student Support Program, Concordia University, 2014 – 2016, CAD 20,000.
- National Scholarship, Mauritania, 2009 – 2014, EUR 13,500.
- Scholarship Award to Participate in the International Mathematical Olympiad, Mauritania, 2009, EUR 1,000.

❖ Service

- Co-organizer, IRIF Verification Seminar, Mar 2020 – July 2020.
- Artificat Evaluation Committees: POPL 2021, CAV 2021, OOPSLA 2021, POPL 2022, OOPSLA 2022.
- Extended Review Committees: OOPSLA 2022.
- Sub-Reviewer: FTSCS 2016, VMCAI 2020, CAV 2020.
- Student Volunteer: CAV 2016.

❖ Journal Publications

J2 **Robustness Against Transactional Causal Consistency** *Feb 2021*
Sidi Mohamed Beillahi, Ahmed Bouajjani, Constantin Enea
Logical Methods in Computer Science, 17(1): 12:1 – 12:42
Invited special issue for selected papers from CONCUR 2019

J1 **A Modeling and Verification Framework for Optical Quantum Circuit** *Mar 2019*
Sidi Mohamed Beillahi, Mohamed Yousri Mahmoud, Sofiène Tahar
Formal Aspects of Computing, 31(3): 321 – 351

❖ Conference Publications

C9 **SigVM: Toward Fully Autonomous Smart Contracts** *2021*
Ryan Song, Zihan Zhao, Yuxi Cai, Sidi Mohamed Beillahi, Andreas Veneris, Fan Long
under submission, 2021

C8 **Automated Synthesis of Asynchronizations** *2021*
Sidi Mohamed Beillahi, Ahmed Bouajjani, Constantin Enea, Shuvendu Lahiri
under submission, 2021

C7 **Smart Contracts Refinement for Gas Optimization** *Sep 2021*
Keerthi Nelaturu, Sidi Mohamed Beillahi, Fan Long, Andreas Veneris
In Proc. 3rd Conference on Blockchain Research & Applications for Innovative Networks and Services (BRAINS), 2021

C6 **Checking Robustness Between Weak Transactional Consistency Models** *Mar 2021*
Sidi Mohamed Beillahi, Ahmed Bouajjani, Constantin Enea
In Proc. 30th European Symposium on Programming (ESOP), 2021

C5 **Behavioral Simulation for Smart Contracts** *Jun 2020*
Sidi Mohamed Beillahi, Gabriela Ciocarlie, Michael Emmi, Constantin Enea
In Proc. 41st annual ACM SIGPLAN conference on Programming Language Design and Implementation (PLDI), 2020

C4 **Robustness Against Transactional Causal Consistency** *Sep 2019*
Sidi Mohamed Beillahi, Ahmed Bouajjani, Constantin Enea
In Proc. 30th International Conference on Concurrency Theory (CONCUR), 2019

C3 **Checking Robustness Against Snapshot Isolation** *Jul 2019*
Sidi Mohamed Beillahi, Ahmed Bouajjani, Constantin Enea
In Proc. 31st International Conference on Computer Aided Verification (CAV), 2019

C2 **Hierarchical Verification of Quantum Circuits** *Jun 2016*
Sidi Mohamed Beillahi, Mohamed Yousri Mahmoud, Sofiène Tahar
In Proc. 8th International Symposium NASA Formal Methods (NFM), 2016

C1 **Formal Analysis of Power Electronic Systems** *Nov 2015*
Sidi Mohamed Beillahi, Umair Siddique, Sofiène Tahar
In Proc. 17th International Conference on Formal Engineering Methods (ICFEM), 2015

❖ Workshop Publications

W3 **Formal Analysis of Engineering Systems Based on Signal-Flow-Graph Theory** *Jul 2016*
Sidi Mohamed Beillahi, Umair Siddique, Sofiène Tahar
In Proc. 9th International Workshop Numerical Software Verification (NSV-CAV), 2016

W2 **On the Formal Analysis of Photonic Signal Processing Systems** *Jun 2015*
Umair Siddique, Sidi Mohamed Beillahi, Sofiène Tahar
In Proc. 20th International Workshop Formal Methods for Industrial Critical Systems (FMICS), 2015

W1 **A Tool for the Formal Verification of Quantum Optical Computing Systems** *Apr 2015*
Sidi Mohamed Beillahi, Mohamed Yousri Mahmoud, Sofiène Tahar
In Proc. Automated Reasoning Workshop (ARW), 2015

❖ Teaching

- Teaching Assistantships at Université de Paris
  - Automata and Lexical Analysis for 2nd Year Computer Science Students, Sep 2020 – Dec 2020.
  - Principles of Binary Machines for 1st Year Computer Science Students, Sep 2020 – Dec 2020.
  - Java Programming for 1st Year Computer Science Students, Sep 2019 – Dec 2019.
  - Principles of Object-Oriented Programming in Java for 2nd Year Computer Science Students, Sep 2019 – Dec 2019.
  - Python Programming for 1st Year Social Science Students, Sep 2018 – Dec 2018.
  - Relational Databases and SQL for 2nd Year Computer Science Students, Sep 2018 – Dec 2018.
- Teaching Assistantships at Concordia University
  - Hardward Functional Verification for Senior Undergraduate and Graduate Students, Jan 2016 – Apr 2016.
  - Computer Architecture and Design for Graduate Students, Jan 2016 – Apr 2016.
  - Digital Design for Undergraduate Students, Jan 2016 – Apr 2016.
  - Microprocessors and their Applications for Graduate Students, Sep 2015 – Dec 2015.

Mentoring

- Keerthi Nelaturu, PhD student, University of Toronto
- Zihan Zhao, MASc student, University of Toronto
- Zhiyang Chen, MASc student, University of Toronto
- Eric Keilty, MASc student, University of Toronto

Talks

Checking Robustness Between Weak Transactional Consistency Models
ANR Project AdeCoDS Meeting, LIP6, Sorbonne University (virtual) *Jun 2021*
IRIF Verification Seminar, Université de Paris (virtual) *May 2021*
ESOP 2021, Luxembourg, Luxembourg (virtual) *Mar 2021*

Behavioral Simulation for Smart Contracts
SEMINAR UM6P-CS, Morocco (virtual) *Jul 2020*
PLDI 2020, London, UK (virtual) *Jun 2020*

Robustness Against Transactional Causal Consistency
IRIF Verification Seminar, Université de Paris *Dec 2019*
CONCUR 2019, Amsterdam, Netherlands *Sep 2019*

Checking Robustness Against Snapshot Isolation
ANR Project AdeCoDS Kick-off Meeting, IRIF, Université de Paris *Nov 2019*
CAV 2019, New York City, USA *Jul 2019*

Formal Analysis of Engineering Systems Based on Signal-Flow-Graph Theory *Jul 2016*
NSV-CAV 2016 Toronto, Canada

Hierarchical Verification of Quantum Circuits *Jun 2016*
NFM 2016 Minneapolis, USA

Formal Analysis of Power Electronic Systems *Oct 2015*
Hardware Verification Group Meeting Concordia University

On the Formal Analysis of Photonic Signal Processing Systems *May 2015*
Hardware Verification Group Meeting Concordia University

List of Referees

Ahmed Bouajjani
Professor
University of Paris
abou@irif.fr

Constantin Enea
Professor
Ecole Polytechnique
cenea@irif.fr

Parosh Aziz Abdulla
Chaired Professor
Uppsala University
parosh@it.uu.se

Michael Emmi
Applied Scientist
Amazon Web Services
michael.emmi@gmail.com