

# 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

Thesis Title: [Automated Verification of Programs Running on top of Distributed Systems](#)  
Advisors: Ahmed Bouajjani and Constantin Enea  
Dec 2017 – Mar 2021  
University of Paris, France

### Master of Applied Science — Computer Engineering

Thesis Title: [Towards the Design Automation of Quantum Circuits](#)  
Advisor: Sofiène Tahar  
Sep 2014 – Nov 2016  
Concordia University, Canada

### Engineer's Degree — Polytechnicien

Thesis Title: [Formalization of Signal-Flow Graphs in HOL](#)  
Advisor: Sofiène Tahar  
Sep 2011 – Jun 2014  
Tunisia Polytechnic School, Tunisia

### DEUPC — Mathematics and Physics

Sep 2009 – Jun 2011  
Sfax Preparatory Engineering Institute  
University of Sfax, Tunisia

## ❖ Experience

### Postdoctoral Researcher, University of Toronto

Advisors: Fan Long and Andreas Veneris  
Jun 2021 – present  
Toronto, Canada

### Research Assistant, University of Paris

Advisors: Ahmed Bouajjani and Constantin Enea  
Dec 2017 – May 2021  
Paris, France

### Teaching Assistant, University of Paris

Sep 2018 – Jan 2021

### Research Intern, SRI International

Advisor: Michael Emmi  
Apr 2019 – Aug 2019  
New York City, USA

### Software Programmer, TRU Simulation + Training

May 2017 – Dec 2017  
Montréal, Canada

### Research Assistant, Concordia University

Advisor: Sofiène Tahar  
Mar 2014 – Nov 2016  
Montréal, Canada

### Teaching Assistant, Concordia University

Sep 2015 – May 2016

### Research Engineer, Marinvent inc.

Advisor: Sofiène Tahar  
Mar 2016 – Nov 2016  
Montréal, Canada

### Intern, STMicroelectronics

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

### Intern, Mauritel S.A

Advisor: Mohamed Moujtaba  
Aug 2012 – Aug 2012  
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, Blockchain 2021, ICBC 2022, ICDCS 2022.
- 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

- C11 **SigVM: Toward Fully Autonomous Smart Contracts** 2021  
Zihan Zhao, Sidi Mohamed Beillahi, Ryan Song, Yuxi Cai, Andreas Veneris, Fan Long  
*under submission*, 2021
- C10 **Automated Synthesis of Asynchronizations** 2021  
Sidi Mohamed Beillahi, Ahmed Bouajjani, Constantin Enea, Shuvendu Lahiri  
*under submission*, 2021
- C9 **Automated Auditing of Ponzi Scheme Smart Contract TOD Vulnerabilities** May 2022  
Sidi Mohamed Beillahi, Eric Keilty, Keerthi Nelaturu, Andreas Veneris, Fan Long  
*In Proc. IEEE International Conference on Blockchain and Cryptocurrency (ICBC)*, 2022
- C8 **LMPTs: Eliminating Storage Bottlenecks for Processing Blockchain Transactions** May 2022  
Jemin Andrew Choi, Sidi Mohamed Beillahi, Peilun Li, Andreas Veneris, Fan Long  
*In Proc. IEEE International Conference on Blockchain and Cryptocurrency (ICBC)*, 2022

C7	<b>Smart Contracts Refinement for Gas Optimization</b> Keerthi Nelaturu, Sidi Mohamed Beillahi, Fan Long, Andreas Veneris <i>In Proc. 3rd Conference on Blockchain Research &amp; Applications for Innovative Networks and Services (BRAINS), 2021</i>	Sep 2021
C6	<b>Checking Robustness Between Weak Transactional Consistency Models</b> Sidi Mohamed Beillahi, Ahmed Bouajjani, Constantin Enea <i>In Proc. 30th European Symposium on Programming (ESOP), 2021</i>	Mar 2021
C5	<b>Behavioral Simulation for Smart Contracts</b> Sidi Mohamed Beillahi, Gabriela Ciocarlie, Michael Emmi, Constantin Enea <i>In Proc. 41st annual ACM SIGPLAN conference on Programming Language Design and Implementation (PLDI), 2020</i>	Jun 2020
C4	<b>Robustness Against Transactional Causal Consistency</b> Sidi Mohamed Beillahi, Ahmed Bouajjani, Constantin Enea <i>In Proc. 30th International Conference on Concurrency Theory (CONCUR), 2019</i>	Sep 2019
C3	<b>Checking Robustness Against Snapshot Isolation</b> Sidi Mohamed Beillahi, Ahmed Bouajjani, Constantin Enea <i>In Proc. 31st International Conference on Computer Aided Verification (CAV), 2019</i>	Jul 2019
C2	<b>Hierarchical Verification of Quantum Circuits</b> Sidi Mohamed Beillahi, Mohamed Yousri Mahmoud, Sofiène Tahar <i>In Proc. 8th International Symposium NASA Formal Methods (NFM), 2016</i>	Jun 2016
C1	<b>Formal Analysis of Power Electronic Systems</b> Sidi Mohamed Beillahi, Umair Siddique, Sofiène Tahar <i>In Proc. 17th International Conference on Formal Engineering Methods (ICFEM), 2015</i>	Nov 2015

## ❖ Workshop Publications

W3	<b>Formal Analysis of Engineering Systems Based on Signal-Flow-Graph Theory</b> Sidi Mohamed Beillahi, Umair Siddique, Sofiène Tahar <i>In Proc. 9th International Workshop Numerical Software Verification (NSV-CAV), 2016</i>	Jul 2016
W2	<b>On the Formal Analysis of Photonic Signal Processing Systems</b> Umair Siddique, Sidi Mohamed Beillahi, Sofiène Tahar <i>In Proc. 20th International Workshop Formal Methods for Industrial Critical Systems (FMICS), 2015</i>	Jun 2015
W1	<b>A Tool for the Formal Verification of Quantum Optical Computing Systems</b> Sidi Mohamed Beillahi, Mohamed Yousri Mahmoud, Sofiène Tahar <i>In Proc. Automated Reasoning Workshop (ARW), 2015</i>	Apr 2015

## ❖ Teaching

- Teaching Assistantships at University of 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
  - Hardware 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)  
 IRIF Verification Seminar, University of Paris (virtual)  
 ESOP 2021, Luxembourg, Luxembourg (virtual)

*Jun 2021*  
*May 2021*  
*Mar 2021*

### Behavioral Simulation for Smart Contracts

GROUP SEMINAR, University of Toronto (virtual)  
 SEMINAR UM6P-CS, Morocco (virtual)  
 PLDI 2020, London, UK (virtual)

*Dec 2021*  
*Jul 2020*  
*Jun 2020*

### Robustness Against Transactional Causal Consistency

IRIF Verification Seminar, University of Paris  
 CONCUR 2019, Amsterdam, Netherlands

*Dec 2019*  
*Sep 2019*

### Checking Robustness Against Snapshot Isolation

ANR Project AdeCoDS Kick-off Meeting, IRIF, University of Paris  
 CAV 2019, New York City, USA

*Nov 2019*  
*Jul 2019*

### Formal Analysis of Engineering Systems Based on Signal-Flow-Graph Theory

NSV-CAV 2016

*Jul 2016*  
 Toronto, Canada

### Hierarchical Verification of Quantum Circuits

NFM 2016

*Jun 2016*  
 Minneapolis, USA

### Formal Analysis of Power Electronic Systems

Hardware Verification Group Meeting

*Oct 2015*  
 Concordia University

### On the Formal Analysis of Photonic Signal Processing Systems

Hardware Verification Group Meeting

*May 2015*  
 Concordia University