

# Rawane ISSA

## Computer Scientist

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📍 Boston, MA 02215

I am a third year doctoral student at Boston University. I am interested in topics such as: (1) Secure Multi-Party Computation, (2) Privacy, (3) Formal Methods and Verification. I am very excited about coming up with privacy preserving algorithm for the public good and would like to get a better understanding of policies surrounding data sharing and computation on the cloud.

## PROGRAMMING SKILLS

**Programming Languages.** Java, MATLAB, JavaScript, Python, C, C++, x86 Assembly, HTML5, CSS  
**Misc.** ANTLR, BCEL, Jasmin, Z3, Latex, Labview, VHDL, Git, Eclipse, node.js, Linux, gimp

## LANGUAGES

French ●●●●●  
English ●●●●●  
Arabic ●●●●●

## EDUCATION

2016 Bachelors in Engineering with a Minor in Mathematics, American University of Beirut  
2018 Masters in Computer Sciences, Boston University  
2021 PhD in Computer Science, Boston Univeristy

## RESEARCH PROJECTS

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|--|---|
| May 2017-<br>Present<br><br>Boston, MA         | <b>Web Enabled Scalable MPC - JIFF   FUNDED BY HONDA RESEARCH INSTITUTE</b><br>I am working on building and maintaining a multipurpose MPC framework (JIFF) that unlike other frameworks in the same domain (1) relies on modern technologies that allow developers to easily integrate it into their web-based applications and (2) allows for large scale real-time deployment of multi-party computation (MPC) protocols.<br><span>MPC</span> <span>Privacy</span> <span>Distributed Systems</span> <span>Javascript</span>  |
| May 2017-<br>Present<br><br>Boston, MA         | <b>Privacy Preserving Route Recommendation Protocol   FUNDED BY HONDA RESEARCH INSTITUTE</b><br>I am currently working on finalizing a large-scale real-time route recommendation protocol that preserves the privacy of both user and server: i.e. this protocol ensures that (1) the user's <source, destination and query history> remain private, and does not any information that the server is not incentivized to share (i.e. map weights representing traffic etc.). This protocol works in an honest but curious model that can handle up to $n - 1$ malicious parties.<br><span>MPC</span> <span>Privacy</span> <span>Distributed Systems</span> <span>Graph Algorithms</span> <span>Differential Privacy</span> |
| Sept 2016 -<br>Feb 2017<br><br>Boston, MA      | <b>Fast MPC Network Distance by Symbolic Optimization of Unrolled Loops   GRADUATE RESEARCH</b><br>I worked on efficiently and securely performing iterative graph algorithms in Multi-Party Computation (MPC). This work includes computing the network distance metric in MPC. Input graphs are networks made from multiple private companies sub-networks. The protocol guarantees that no information about the private sub-networks gets leaked at any stage in our computation.<br><span>MPC</span> <span>Privacy</span> <span>Distributed Systems</span> <span>Graph Algorithms</span> <span>Programming Languages</span>  |
| Feb 2015 -<br>Dec 2016<br><br>Beirut, Lebanon  | <b>Modeling of the respiratory airways   UNDERGRADUATE RESEARCH</b><br>I worked with <b>Prof. Fadi Karam</b> and <b>Prof. Issam Lakkis</b> to model respiratory airways using an equivalent electric circuit. We used the neural system model in order to carry out our work. I was the lead developer for the computational model. Publication in progress.<br><span>Numerical Analysis</span> <span>Circuits</span> <span>Computational Biology</span> <span>Modelling of Biological Systems</span> <span>MATLAB</span> <span>C++</span>  |
| Sept 2015 -<br>May 2016<br><br>Beirut, Lebanon | <b>Arabic Temporal Entity Normalization   UNDERGRADUATE RESEARCH</b><br>I worked with <b>Prof. Fadi Zaraket</b> and my final year project team ( Ramzi Karam and Jad ElKik) to build a solution for temporal entity normalization in arabic and develop a practical tool for this purpose.<br><span>NLP</span> <span>Arabic</span> <span>HMM</span> <span>Python</span> <span>C++</span>  |

## PUBLICATIONS

(1) Kinan Bab, Rawane Issa, Andrei Lapets, Azer Bestavros, and Nikolaj Volgushev. **Scalable Secure Multi-Party Network Vulnerability Analysis via Symbolic Optimization.** In Proceedings of WTMC 2017: The IEEE Security and Privacy Workshop on Traffic Measurements for Cybersecurity, San Jose, CA, May 2017.

(2) Andrei Lapets, Frederick Jansen, Kinan Dak Albab, Rawane Issa, Lucy Qin, Mayank Varia, Azer Bestavros. **Accessible Privacy-Preserving Web-Based Data Analysis for Assessing and Addressing Economic Inequalities** In Proceedings of the 1st ACM SIGCAS Conference on Computing and Sustainable Societies, June 2016.

## INDUSTRY EXPERIENCE

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### UBILITY | SOFTWARE ENGINEERING INTERN

MAY 2015 – JUL 2015 | SAN DIEGO, CA

 <http://www.ubilite.com/>

During the Summer of 2015, I was asked by the company to modify a lightweight IP/TCP stack (lwIP) according to their microchip's specs and provide necessary documentation of my work.

lwIP

### SAIL | SOFTWARE ENGINEERING FELLOW

MAY 2017 – PRESENT | BOSTON, MA

 [github.com/hicsail](https://github.com/hicsail)  [github.com/multiparty](https://github.com/multiparty)  <https://sail.bu.edu>

During the Summer of 2017 and 2018, I interned at the Software and Application Innovation Lab at the Hariri Institute for Computing and worked on implementing an MPC multi-purpose web-based framework. I also partook in several other projects which developed & deployed cyber-security applications for the Boston's Women's Workforce Council, and which built a database interface in MATLAB for a computational biology oriented project..

Javascript   MATLAB

## TEACHING EXPERIENCE

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### CS235: ALGEBRAIC ALGORITHMS | TEACHING FELLOW

JAN 2017 – MAY 2017 | BOSTON MA

During the Spring 2017, I was a teaching fellow under Prof. Leonid Levin. My duties included grading, giving weekly discussion sessions, writing informative articles and holding office hours.

Algebra   Algorithms   Mathematical Proofs   Number Theory

## AWARDS AND HONORS

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- > Hariri Fellowship | 2016-2017
- > Dean's Award for Best Innovative Software Development Project – Offered by Murex for Excellence | 2016
- > Dean's Creative Achievement Award | 2016
- > Dean's Honor List for Fall | 2016

## NOTABLE COURSEWORK

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### BU | PHD STUDENT

- > Fundamentals of Cryptography 1 and 2
- > Secure Multi-party Computation at Scale
- > Privacy in Machine Learning and Statistical Inference
- > Formal Methods
- > Operating Systems
- > Complexity Theory
- > Probability in Computing
- > Programming Languages

### AUB | GRADUATE LEVEL COURSES

- > Advanced Topics in Algorithms
- > Sp. Topics. Computer Science Theory (Logic, Computability and Set Theory)
- > Coding Theory
- > Logic, Verification and Synthesis
- > Sp. Topics. Philosophy of Wittgenstein

## MISC.

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### INTERESTS

- > Privacy and Security
- > Open Source Community
- > World Politics
- > Art
- > Cinema
- > Philosophy of Language

### OTHER SKILLS

- > Photography
- > Design
- > Pianist and Musician