Hussein A. Houdrouge

BIRTH: Lebanon | 04 March 1995
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Website • GitHub • Google Scholar

Research Interest

I am interested in the intersections between Theoretical Computer Science, Geometry, and Topology

Research Experience

Sep. 2021 - Sep. 2025	**Ph.D. in Computer Science at Carleton University** Supervised by Prof. Pat Morin, and Prof. Vida Dujmovic. Research area: Extremal and Structural Graph Theory.
Jan. 2020 - Jan. 2021	**Research Assistant at The American University of Beirut.** **Department of Computer Science.** Supervised by Prof. Amer Mouawad. Worked on designing and analysing algorithms for Independent Set Reconfiguration (Token Sliding model).
Apr. 2019 - Aug. 2019	**Research Intern At the Sorbonne Laboratory** **of Computer Science** LIP6. Supervised by Prof. Vincent Cohen-Addad. Worked on designing, analysing, and implementing a Sub-quadratic High Dimensional Hierarchical Clustering Algorithms.
Apr. 2018 - Aug. 2018	**Research Intern At LORIA/INRIA Grand Est, Nancy - Alice Team** Supervised by Prof. Bruno Levy. Worked on Topological Optimisation algorithm based on Laguerre diagram. A report on this work can be found here.

Publications

Connected Dominating Sets in Triangulations
Joint work with Prosenjit Bose, Vida Dujmovic, Pat Morin, and Saeed Odak. Submitted to SoCG 2024 in December 2023 and rejected in February 2024. arxiv:2312.03399.

Linear versus Centred Chromatic Numbers
joint work with Prosenjit Bose, Vida Dujmovic, Mehrnoosh Javarsineh, and Pat Morin. Journal of Graph Theory. Accepted, pending minor revisions, in March 2024. arxiv:2205.15096

Subquadratic High-Dimensional Hierarchical Clustering
Joint work with Vincent Cohen-Addad and Amir Abboud. The proceedings of the conference on Neural Information Processing Systems (NeurIPS) 2019.

EDUCATION

Sep. 2017 - Sep. 2019	**Paris-Saclay University - L'Ecole Polytechnique de Paris (l'X).** Master M2: Parisian Master of Research in Computer Science (MPRI) Master M1: Algorithms and Foundations of Programming languages Awarded with Honour.
Sep. 2013 - Sep. 2017	**American University Of Beirut (AUB),** Bachelor of Science in COMPUTER SCIENCE Minor in Computational Science, Awarded with distinction.
May 23 - June 3 2022	Berlin Mathematical School - Summer School Attended two weeks courses on Topology and Geometry in Discrete Settings.

WORK EXPERIENCE

Jan. 2020 - Jan. 2021	**Teaching Assistant at the American University of Beirut,** Designed and graded assignments, gave problem solving sessions for the undergraduate's Advanced Algorithms and Data Structures Course. Graded assignments for the graduate Graph Algorithmic Theory Course.
Jun. 2017	**Instructor Assistant in the Future Developer Summer Camp - AUB.** Taught school students the basics of JAVA programming.
Jan. 2017	**Organiser of a Mini-Paralympics to Socially Integrate PWD.** Worked with in a team to design and implement a Mini-Paralympics across different areas in Lebanon.
Jul. 2016	**Intern at Fundación Promoción Social de la Cultura (FPSC), Lebanon** Planned a social media strategy for Soccer Social School. The project was organised between FPSC, Real Madrid Fondacion, and the Lebanese Ministry of Education

SCHOLARSHIPS, HONORS, AND AWARDS

2013 - 2017	Awarded full scholarship from The United State Agency for International Development USAID to study BSc. in Computer Science at the American University Of Beirut.
2014 - 2017	Placed Four times on the Dean's Honor List During my studies at the American University of Beirut.
2016	Won the first place (team 1729) in ACM - The 8th Lebanese Collegiate Programming Contest.
2013 - 2014	Awarded two certificates for participating in several volunteering activities from the Center of Civic Engagement and Community Service (CCECS) at the American University of Beirut.

Projects

Jan. 2019 - Mar. 2019	**Optimising Low Auto-correlation Binary Sequences.** Implemented and compared the performance of several discrete optimisation algorithms to find Low Auto-correlation Binary Sequences. It was a team project with Misha Volkhov for the Solving Optimization Problems with Search Heuristics course. Source code.
Sep. 2017 - Jan. 2018	**Scalable Nearest Neighbour Search Algorithms for High Dimensional Data** Implemented and studied the performance of several Data Structures that compute the approximate nearest Neighbour Search in High Dimensional Data Source code.
Nov. 2017 - Dec. 2017	**Computing Geodesic Distance Based on Heat Flow.** Implemented a technique based on heat flow to compute the geodesic distance over meshes.The implementation is based on this paper. The project for the course INF555. Source code.
Feb. 2017 - May. 2017	**Imgs** Implementing Android mobile image search application based on machine learning and deep learning techniques for final year project.

More projects can be found on **GitHub.**

Languages

English (Fluent), French (Fluent), and Arabic (Native).

Computer Skills

Basic Knowledge:	QGIS, Assembly (MIPS), MPI (open-MPI), Python, Haskell, JavaScript, Git, CMake, NTL, GMP, Hadoop, SFML, Vim, HTML, openGL, and Spark .
Intermediate Knowledge:	Java, C, C++, Linux, and LaTeX.

Interests and Activities

Hobbies:	Drawing , Playing Piano, Playing Guitar, and Reading.
Sport:	Alpinism, Boxing, Muay Thai, Swimming, and Competitive Programming.