ALEXANDRE VINCART-EMARD

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PhD Candidate in computational string theory with an aptitude for developing innovative solutions to abstract problems. Hardworking and detail-oriented autodidact motivated in applying his scientific expertise toward the technical and ethical aspects of data science. Also perfectly trilingual in English, French, and pure mathematics.

EDUCATION

PhD, Physics | University of British Columbia, Vancouver, BC   **2012-2017**

Thesis: *"Numerical Investigation of Spatial Inhomogeneities in Gravity and Quantum Field Theory"*
Supervisor: Dr. Moshe Rozali

My research focuses on the application of analytical and numerical methods to study classical gravitational systems. My goals are twofold: to investigate the physics of strongly correlated quantum systems using the celebrated AdS/CFT correspondence, and to improve our understanding of higher-dimensional black holes in asymptotically flat or AdS spacetimes. Technically my work involves finding numerical solutions to the Einstein equations in both static and time-dependent frameworks.

- Developed state of the art code for solving partial differential equations (Mathematica & MATLAB).
- Achieved 5x speed-up compared to already-existing software by implementing domain decomposition techniques, as well as 10x speed-up by removing memory-based bottlenecks from code.
- Used High Performance Computing resources to produce, process and analyze over 1 TB of data.

Relevant courses: CPSC 540 - Machine Learning
                        PHYS 410 - Computational Physics (teaching assistant for two years)

M.Sc., Physics | University of Waterloo & Perimeter Institute, Waterloo, ON   **2011-2012**

Thesis: *"Topological Order in the Toric Code"*
Supervisor: Dr. John Berlinski

- Ten-month-long Master's level course in theoretical physics at the Perimeter Institute.
- Undertook a variety of courses in string theory, high energy physics and numerical relativity.

B.Sc., Physics & Mathematics | Université de Montréal, Montréal, QC   **2008-2011**

- Graduated top of my class with a GPA of 4.27/4.3.
- Spent three summers as a research assistant in experimental optics and mathematical physics.

PUBLICATIONS

- Moshe Rozali & **Alexandre Vincart-Emard**, *"Comments on entanglement propagation"*, J. High Energ. Phys. (2017) 2017: 1
- Moshe Rozali & **Alexandre Vincart-Emard**, *"On brane instabilities in the large D limit"*, J. High Energ. Phys. (2016) 2016: 166
- Mukund Rangamani, Moshe Rozali & **Alexandre Vincart-Emard**, *"Dynamics of holographic entanglement entropy following a local quench"*, J. High Energ. Phys. (2016)
- Moshe Rozali & **Alexandre Vincart-Emard**, "*Chiral edge currents in a holographic Josephson junction"*, J. High Energ. Phys. (2014) 2014: 3

INTERNSHIPS

Université de Montréal, Montréal, QC   **2010-2011**

Project: *"The Commutant of the Temperley-Lieb Algebra"* (funded by NSERC USRA)
Supervisor: Dr. Yvan Saint-Aubin

I spent two summers investigating the properties of the Temperley-Lieb algebra in the context of Q-Potts models. The goal of my research was to use abstract algebra and representation theory to algebraically describe classes of two-dimensional lattice models in the hopes of characterizing their integrals of motion.

Université de Montréal, Montréal, QC   **2009**

Project: *"Growth and Characterization of Quantum Confinement in Sb-Based Heterostructures"* (funded by NSERC USRA)
Supervisor: Dr. Richard Leonelli

As a lab assistant I participated in the growth process of antimony-based quantum confinement heterostructures via molecular beam epitaxy and then measured the quality of the samples with various optical characterization methods, including Raman spectroscopy and photoluminescence.

TEACHING EXPERIENCE

University of British Columbia, Vancouver, BC

2015-2016:   PHYS 410 - Computational Physics
              Independently created 14 in-depth tutorials and 2 assignments for this course.
2013-2014:   PHYS 102 - Electricity, Light and Radiation
2012:   PHYS 101 - Energy and Waves

Université de Montréal, Montréal, QC

2010:   PHY 1651 - Classical Mechanics I
              PHY 1441 - Electromagnetism I
              Recipient of the Femto Nobel award for PHY 1441 (best undergraduate teaching assistant).

HONOURS AND AWARDS

2012:   NSERC CGS D3 Scholarship   (highly competitive nationally)
              Four Year Doctoral Fellowship (automatically eligible due to NSERC CGS D3 Scholarship)
2011:   NSERC CGS M Scholarship   (highly competitive nationally)
              PSI Full Scholarship   (highly competitive internationally)
              FQRNT Scholarship   (highly competitive provincially; declined)
2009-2011:   NSERC Undergraduate Student Research Awards
2008-2011:   Full-Tuition Scholarship, Université de Montréal

COMPETENCES & CERTIFICATIONS

- Highly proficient with MATLAB and Mathematica.
- Working proficiency with Python, including scikit-learn and Pandas libraries.
- Machine Learning Coursera Certificate - June 2016 (grade: 98%).
- UBC workshop training for effective class teaching strategies.
- Perfectly bilingual in English and French.

LEADERSHIP INITIATIVES & VOLUNTEER EXPERIENCE

- Vice-President Academic for the physics department (Université de Montréal, 2010-2011).
- Member of the physics department's Curriculum Committee (Université de Montréal, 2009-2011).
- Orchestrated the undergraduate interns' summer conferences (Université de Montréal, 2010).
- Planned and executed an industrial field trip to Hydro-Québec's Research Institute for 40 physics students to explore potential career opportunities (Paul-Lorrain award, 2009).
- Guest speaker for five radio broadcasts of scientific popularization, 103.3 FM, Longueuil, QC (2009).
- Created and directed three Talent Shows for Université de Montréal's physics department (2008-2011).

REFERENCES

Dr. Moshe Rozali — PhD Supervisor, UBC
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Additional references available upon request.