

# ALEXANDRE VINCART-EMARD

## CONTACT



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## HIGHLIGHTS OF QUALIFICATIONS

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- Worked with very large (> 1 TB) and complex datasets requiring advanced mathematical analysis.
- Developed state of the art code for solving partial differential equations with high numerical precision.
- Demonstrated creativity by defining novel and innovative metrics (e.g. brane tension as an order parameter, entanglement velocity) playing a central role in 4 research projects.
- Created effective data visualizations (with MATLAB and Mathematica) to present highly abstract concepts such as event horizon evolution, magnet thermalization and quantum anharmonic oscillators.
- Built an SVM classifier for spam filtering, an image compressor using K-means, a rudimentary movie recommender system, and a CNN correctly classifying dogs and cats with 97.9% accuracy.
- Excellent communication skills (guest speaker for 5 radio broadcasts; 9+ years experience as an effective teaching assistant; author of 4 peer-reviewed publications; bilingual in French and English).
- Highly adaptable worker with strong problem solving skills and a very positive attitude.

## TECHNICAL SKILLS

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- Programming: Python (Numpy, Scipy, Pandas, scikit-learn, TensorFlow, Keras, etc.), MATLAB, SQL, C, JavaScript.
- 7+ years of expertise in scientific computing: optimization, numerical analysis, Monte Carlo methods, differential equations, Fourier analysis.
- Machine learning fundamentals: linear/logistic regression, SVM, clustering, PCA, anomaly detection, collaborative filtering, neural networks, reinforcement learning.
- 2 years of experience using High-Performance Computing resources (WestGrid).
- Proficiency in website scraping with BeautifulSoup.

## EDUCATION

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### PhD, Physics | University of British Columbia, Vancouver, BC

2017

Thesis: *"Numerical Investigation of Spatial Inhomogeneities in Gravity and Quantum Field Theory"*

Application of analytical and numerical methods to study black hole dynamics. Topics covered include holographic superconductors, entanglement propagation, and black hole instabilities.

### Deep Learning Specialization | Coursera

2017

- Neural Networks and Deep Learning
- Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization
- Structuring Machine Learning Projects (error diagnostic, mismatched training/test sets, transfer learning)

### Machine Learning Certificate | Coursera

2016



avincartemard



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avincartemard.github.io

## LEADERSHIP & COMMUNICATION

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### Scientific Communication

- Author of 4 peer-reviewed publications in the Journal of High Energy Physics (see below).
- Award-winning teaching assistant for over 9 years with a track record of near-perfect student evaluations.
- Independently designed and led tutorial sessions in Computational Physics, for which I devised 14 in-depth tutorials and 2 assignments with minimal supervision.
- Guest speaker for five radio broadcasts of scientific popularization, 103.3 FM, Longueuil, QC (2009). Topics included "The Ozone Layer", "Microwaves", "GMOs", "Televisions", and "Glass".
- Presented research work at major undergraduate mathematics conferences (CUMC 2010 Waterloo and CUMC 2011 Quebec City).
- Orchestrated and participated in the undergraduate interns' summer conferences (2010).

### Professional Development (Université de Montréal)

- Represented the physics undergraduate student body interests as VP Academic (2009-2011).
- Researched issues and initiated structural changes to the Physics & Mathematics academic program.
- Planned and executed an industrial field trip to Hydro-Québec's Research Institute for 40 physics students to explore potential career opportunities (resulted in obtention of Paul-Lorrain award, 2009).
- Created and directed three successful Talent Shows for the physics department (2008-2011).

## HONOURS AND AWARDS

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- 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

## PUBLICATIONS

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- 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