

# Yan Gobeil

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## Personal Profile and Research Interest

I am a PhD student at McGill University working on theoretical physics. I am doing research on the conformal field theory side of the AdS/CFT correspondence. I study various aspects of the conformal bootstrap and different ways of constraining CFTs, most of the time in two dimensions. I am also interested by quantum gravity, black holes and the role that quantum information has to play in both these subjects. My past research has lead me to study decay of topological defects and I still have some interest in that subject.

## Education

- 2016-pres** *Ph.D.* in theoretical physics - McGill University - Montreal  
Supervised by Alex Maloney
- 2014-2016** *M.Sc.* in theoretical physics - McGill University - Montreal  
Cosupervised by Alex Maloney and Robert Brandenberger  
Thesis entitled *Constraints on the spectrum of operators in two-dimensional Conformal Field Theories*  
GPA 4.0/4.0
- 2011-2014** *B.Sc.* in mathematics and physics - Universite de Montreal - Montreal  
GPA 4.21/4.30
- 2009-2011** *DEC* in natural sciences - CEGEP Regional de Lanaudiere a Terrebonne - Terrebonne  
R score 34.328

## Research Experience

- 2016-pres** Research assistant for my doctorate at McGill University  
Work on theoretical physics under the supervision of Alex Maloney.  
Funded with a B2 scholarship from FRQNT and a PGS D from NSERC.
- 2014-2016** Research assistant for my master's degree at McGill University  
Work on theoretical physics under the supervision of Alex Maloney and Robert Brandenberger.  
Funded with a CGS M from NSERC and a B1 from FRQNT.
- 2014** Summer internship at Universite de Montreal  
Work on decay of false kinks under the supervision of Manu Paranjape and Richard MacKenzie.  
Funded with a USRA from NSERC.
- 2013** Summer internship at Universite de Montreal  
Work on decay of false vortices under the supervision of Richard MacKenzie.  
Funded with a USRA from NSERC.

## Teaching Experience

- Lead 6 hours of revision session for first year physics courses at McGill, Fall 2017
- TA for *PHYS 350* (Electromagnetism) at McGill University, Fall 2017, marking & tutorials
- TA for *PHYS 142* (Electromagnetism and Optics) at McGill University, Winter 2017, demos
- TA for *PHYS 610* (Quantum Field Theory) at McGill University, Fall 2016, marking
- Make-up lecturer during 2 classes of *PHYS 554*, McGill University, March 2016
- TA for *PHYS 554* (General Relativity) at McGill University, Winter 2016, marking
- TA for *PHYS 551* (Quantum Theory) at McGill University, Fall 2015, marking
- TA for *PHYS 271* (Intro to Quantum Mechanics) at McGill University, Winter 2015, marking
- TA for *PHYS 131* (Intro to Mechanics and Waves) at McGill University, Fall 2014, marking
- TA for *PHY1902* (Electricity and Optics) at Université de Montréal, Fall 2013, tutorials & marking
- Tutor at *Maths Help Center* at CÉGEP Régional de Lanaudière à Terrebonne, Fall 2010 & Winter 2011

## Academic Publications

S. Collier, **Y. Gobeil**, H. Maxfield, E. Perlmutter, *Quantum Regge Trajectories and the Virasoro Analytic Bootstrap*, arXiv: 1811.05710

**Y. Gobeil**, A. Maloney, G.S. Ng, J.-q. Wu, *Thermal conformal blocks*, arXiv: 1802.10537

E. Dupuis, **Y. Gobeil**, B-H. Lee, W. Lee, R. MacKenzie, M. B. Paranjape, U. A. Yajnik, D-H. Yeom, *Tunneling decay of false vortices with gravitation*, JHEP, 1711 (2017) 028 (arXiv: 1709.03839)

E. Dupuis, **Y. Gobeil**, R. MacKenzie, L. Marleau, M. B. Paranjape and Y. Ung, *Tunneling decay of false kinks*, Phys. Rev. D, 92:025031, July 2015 (arXiv: 1506.05091)

## Miscellaneous Publications

Review of the book *Quantum Information, Computation and Communication*, Physics in Canada, Volume 73, No. 4 (2017), page 247

Review of the book *Group Theory in a Nutshell for Physicists*, Physics in Canada, Volume 73, No. 2 (2017), page 119

Review of the book *Everyday Calculus: Discovering the Hidden Math All around Us*, Physics in Canada, Volume 72, No. 4 (2016), pages 215-216

## Scholarships and Awards

- Bourse Robert Pearson, AMI tele, 2017
- *Walter C. Sumner* Memorial Fellowship, 2017
- Postgraduate Scholarship for Doctorate (*PGS D*), NSERC, 2017
- Doctoral Research Scholarship (*B2*), FRQNT, 2016
- *Bourse Hector-Cypihot*, Fondation Hector-Cypihot, 2015
- Master's Research Scholarship (*B1*), FRQNT, 2015
- Canada Graduate Scholarship for Master's (*CGS M*), NSERC, 2014
- *Lorne Trottier Science Accelerator Fellowship*, McGill University, 2014
- Undergraduate Student Research Awards (*USRA*), NSERC, 2013 and 2014
- Bourse d'excellence du service aux étudiants, Université de Montréal, 2013
- List of the Dean of Arts and Science, Université de Montréal, 2012, 2013 and 2014

- *Don Jeanne-Cypihot* , Fondation Cypihot-Ouellette, 2011, 2015
- *Canada Governor General's Academic Bronze Medal* for Secondary School, 2009

## Talks and Presentations

### External talks

- Contributed talk on *Thermal Conformal Blocks* at ICMP 2018
- Talk on *Constraining the spectrum of CFTs with  $W(2,4)$  symmetry* at It from Qubit school, PI, July 2016
- Talk on *Constraints on the spectrum of  $W$  algebras* at CAP congress, University of Ottawa, June 2016
- Conference on *Les trous noirs: de Einstein a Hawking* at CEGEP de Terrebonne, May 2016
- Club scientifique on *Les trous noirs: de Einstein a Hawking* at College Jean-de-Brebeuf, April 2016

### Journal clubs at McGill

- *The Virasoro fusion kernel and its applications*, Novembre 2018
- *Thermal 1-point function conformal blocks*, October 2017
- *Entanglement Entropy and Conformal Field Theory*, January 2017
- *Quantum error correction and toy models of holography*, September 2016
- *The weak gravity conjecture and its implications in AdS/CFT*, December 2015

### Grad seminars at McGill

- *Integral geometry and holography*, January 2018
- *Black holes as mirrors*, November 2017
- *Intro to the conformal bootstrap*, March 2017
- *Supersymmetric quantum mechanics*, October 2016
- *Some bounds on entropy*, February 2016
- *Introduction to supersymmetry*, September 2015
- *Shor's algorithm*, January 2015
- *Tunneling decay of false vortices*, November 2014

## Workshops and Conferences attended

- ICMP 2018, McGill, July 2018
- Simons Bootstrap School 2018, Caltech, July 2018
- Simons Non-perturbative Bootstrap School, ICTP-SAIFR, May 2017
- It from Qubit annual meeting, New York, December 2016
- It from Qubit summer school, Perimeter Institute, July 2016
- Canadian Association of Physicists congress, University of Ottawa, June 2016
- Theory Canada 11, Carleton University, June 2016
- Applications of AdS/CFT to QCD and condensed matter physics, CRM, October 2015
- AdS/CFT and quantum gravity, CRM, September 2015
- Hidden symmetries and integrability methods in SYM theories and their dual string theories, CRM, August 2015
- Black Holes, Holography and Strings, Harvard, July 2015
- AdS/CFT, self-adjoint extension and the resolution of cosmological singularities, CRM, July 2015

## Other Informations

- Member of the Physics Outreach Group, McGill University, Fall 2014 to present
- Mentor as part of the McGill physics mentorship program

- **Member of the TA committee at McGill since Fall 2017**
- **Organizer of the grad seminars at McGill during years 2015-16, 2016-17 and 2017-18**
- **Organizer of a reading course on Quantum Gravity (PHYS 741 in Winter 2016, PHYS 606 in Winter 2018)**
- **Organizer of the string theory group meetings at McGill during year 2015-2016**
- **Organizer of a reading group on Advanced QFT at McGill during Fall 2015**
- **Organizer of a reading group on String Theory at McGill during Summer 2015**
- **Organizer of the reading course PHYS 731 on AdS/CFT at McGill for Winter 2015**
  
- **Volunteer for the 2017 ACFAS congress at McGill**
- **Volunteer at the Silent Auction stand during the 2015, 2017 and 2018 Rogers Cup in Montreal**
- **Volunteer for the organization of the 2013 CAP congress at Université de Montréal**
  
- **5th in Quebec and 24th in Canada at the 2011 CAP High School/CEGEP Prize exam**
- **«Einstein d'or» prize for the best final project, CÉGEP Régional de Lanaudière à Terrebonne**

## **Computer skills**

- **LaTeX**
- **Maple/Mathematica**
- **C++**
- **Html**