

# Antoine BOURGET

## PERSONAL DATA

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PLACE AND DATE OF BIRTH: Colombes, France | 3 January 1989  
PHONE: +33 6 32 05 57 74  
EMAIL: [antoine.bourget@polytechnique.org](mailto:antoine.bourget@polytechnique.org)  
WEBSITE: [antoinebourget.org](http://antoinebourget.org)  
LANGUAGES: French, English, Spanish (fluent) – Chinese (intermediate).

## WORK EXPERIENCE

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<i>Current</i>	CEA, Institut de Physique théorique, Saclay, France
OCT 2021	and ÉCOLE NORMALE SUPÉRIEURE, Paris, France
	<i>Junior Research Chair</i>
SEP 2021	IMPERIAL COLLEGE, London, UK
OCT 2018	<i>Postdoctoral researcher in High Energy Physics</i>
SEP 2018	UNIVERSITY OF OVIEDO, Spain
SEP 2016	<i>Postdoctoral researcher in High Energy Physics</i>
AUG 2016	ÉCOLE NORMALE SUPÉRIEURE, Paris, France
SEPT 2013	<i>PhD in High Energy Physics</i>
AUG 2016	MINISTRY OF ECONOMIC AFFAIRS, Paris, France
SEP 2011	<i>Ingénieur du Corps des Mines (en détachement).</i>
AUG 2012	FASTLITE, Orsay, France
OCT 2011	<i>Research Engineer</i>

## EDUCATION

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Jul 2016	PhD in theoretical physics, ÉCOLE NORMALE SUPÉRIEURE, Paris, France
	<i>Mention très bien avec les félicitations du jury</i>
	Thesis: Modularity and Vacua in $\mathcal{N} = 1^*$ Supersymmetric Gauge Theories
	Advisor: Jan Troost
	Examiners: O. Aharony, C. Bachas, A. Hanany, M. Petrini, S.P. Kumar, H. Samtleben
Jun 2013	ÉCOLE NORMALE SUPÉRIEURE, Paris, France
	Master ICFP, theoretical physics.
Sept 2011	ÉCOLE NATIONALE SUPÉRIEURE DES MINES, Paris, France
	Admission to the <i>Corps des Mines</i> (rank 3).
2008-2011	ÉCOLE POLYTECHNIQUE, Palaiseau, France
	Major in Mathematics and Theoretical Physics. GPA: 4.0
	Admission from the MP* Classe Préparatoire (rank 2).

## TEACHING

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January 2021	50th British Universities Summer School in Theoretical Elementary Particle Physics (BUSSTEP), Queen Mary University, London.
2020-2021	Lectures on Algebraic singularities in Physics MSc in Quantum Fields and Fundamental Forces Imperial College London.
2014-2016	TA in QUANTUM MECHANICS Undergrad level, ENS Paris.
2015-2016	TA in GENERAL RELATIVITY MSc level, ENS Paris.

I have supervised many students over the last few years (UROP students from Imperial College, Master students from ENS Lyon and ENS Paris).

## OUTREACH AND ACTIVITIES

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- Channel Scientia Egria on Youtube, filling the gap between undergrad and research level in math and theoretical physics ( $> 100,000$  hours total views).  
<https://www.youtube.com/user/antoinebrgt>
- Organizer of the workshop at the Simons Center, *5d  $N=1$  SCFTs and Gauge Theories on Brane Webs* (2020, postponed in 2021).  
<https://scgp.stonybrook.edu/archives/33275>
- Organizer of the String Theory seminars, London Triangle and Polygon seminars (2020-2021).
- Organizer of the Imperial College Theory Group Seminar series (2018-2020).
- Organizer of the SCGSC 2016 ([website](#)).
- Outreach organizations: *I'm a Scientist* (connecting scientists with highschool in the UK), Imperial College Science Forum, TALENS association (maths and physics classes in disadvantaged highschools), Physics for Everyone (lectures at ENS).

## PUBLICATIONS

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All my publications are available at <https://inspirehep.net/authors/1394491>.

- AB and Amihay Hanany, *Hasse diagrams and Higgs branches*, in *The Pollica perspective on the (super)-conformal world*. J.Phys.A 54 (2021) 30, 303001.  
[\[CERN Document Server\]](#)
- AB, Julius F. Grimminger, Amihay Hanany, Rudolph Kalveks, Marcus Sperling and Zhenghao Zhong, *Folding Orthosymplectic Quivers*.  
[\[arXiv:2107.00754\]](#)
- Guillermo Arias-Tamargo, AB and Alessandro Pini, *Discrete gauging and Hasse diagrams*.  
[\[arXiv:2105.08755\]](#)
- AB, Andrew Dancer, Julius F. Grimminger, Amihay Hanany, Frances Kirwan and Zhenghao Zhong, *Orthosymplectic Implosions*.  
[\[arXiv:2103.05458\]](#)

- AB, Julius F. Grimminger, Amihay Hanany, Marcus Sperling and Zhenghao Zhong, *Branes, Quivers, and the Affine Grassmannian*.  
[arXiv:2102.06190]
- Marieke van Beest, AB, Julius Eckhard and Sakura Schafer-Nameki, *(5d RG-flow) Trees in the Tropical Rain Forest*, JHEP 03 (2021) 241.  
[arXiv:2011.07033]
- AB, Simone Giacomelli, Julius F. Grimminger, Amihay Hanany, Marcus Sperling and Zhenghao Zhong, *S-fold magnetic quivers*, JHEP 02 (2021) 054.  
[arXiv:2010.05889]
- Marieke van Beest, AB, Julius Eckhard and Sakura Schafer-Nameki, *Symplectic Leaves and 5d Higgs Branches in the Polygonesian Tropical Rain Forest*, JHEP 11 (2020) 124.  
[arXiv:2008.05577]
- AB, Julius F. Grimminger, Amihay Hanany, Rudolph Kalveks, Marcus Sperling and Zhenghao Zhong, *Magnetic Lattices for Orthosymplectic Quivers*, JHEP 12 (2020) 092.  
[arXiv:2007.04667]
- AB, Julius F. Grimminger, Amihay Hanany, Marcus Sperling, Gabi Zafrir and Zhenghao Zhong, *Magnetic quivers for rank 1 theories*, JHEP 09 (2020) 189.  
[arXiv:2006.16994]
- AB, Amihay Hanany, and Dominik Miketa, *Quiver origami: discrete gauging and folding*.  
[arXiv:2005.05273]
- AB, Julius F. Grimminger, Amihay Hanany, Marcus Sperling and Zhenghao Zhong, *Magnetic Quivers from Brane Webs with O5 Planes*, JHEP 07 (2020) 204.  
[arXiv:2004.04082]
- Philip Argyres, AB and Mario Martone, *On the moduli spaces of 4d  $N=3$  SCFTs I: triple special Kähler structure*, arXiv:1912.04926.  
[arXiv:1912.04926]
- AB, Santiago Cabrera, Julius F. Grimminger, Amihay Hanany and Zhenghao Zhong, *Brane Webs and Magnetic Quivers for SQCD*, JHEP 03 (2020) 176.  
[arXiv:1909.00667]
- AB, Santiago Cabrera, Julius F. Grimminger, Amihay Hanany, Marcus Sperling, Anton Zajac and Zhenghao Zhong, *The Higgs Mechanism - Hasse Diagrams for Symplectic Singularities*, JHEP 01 (2020) 157.  
[arXiv:1908.04245]
- Philip Argyres, AB and Mario Martone, *Classification of all  $N \geq 3$  moduli space orbifold geometries at rank 2*, SciPost Phys. 9 (2020) 083.  
[arXiv:1904.10969]
- Guillermo Arias-Tamargo, AB, Alessandro Pini and Diego Rodríguez-Gómez, *Discrete gauge theories of charge conjugation*, Nucl.Phys. B946 (2019) 114721.  
[arXiv:1903.06662]
- AB, Diego Rodríguez-Gómez and Jorge Russo, *Universality of Toda equation in  $N=2$  superconformal field theories*, JHEP 1902 (2019) 011.  
[arXiv:1810.00840]
- AB, Alessandro Pini and Diego Rodríguez-Gómez, *Gauge theories from principally extended disconnected gauge groups*, Nucl.Phys. B940 (2019) 351-376.  
[arXiv:1804.01108]

- AB, Diego Rodríguez-Gómez and Jorge Russo, *A limit for large R-charge correlators in  $N=2$  theories*, JHEP 1805 (2018) 074.  
[arXiv:1803.00580]
- AB and Jan Troost, *The Conformal Characters*, JHEP 1804 (2018) 055.  
[arXiv:1712.05415]
- AB, Alessandro Pini, Diego Rodríguez-Gómez, *Towards the deconstruction of the type D  $(2,0)$  theory*, JHEP **1712** (2017).  
[arXiv:1710.10247]
- AB and Jan Troost, *Permutations of Massive Vacua*, JHEP **1705** (2017) 042.  
[arXiv:1702.02102]
- AB and Alessandro Pini, *Non-Connected Gauge Groups and the Plethystic Program*, JHEP **1710** (2017) 033.  
[arXiv:1706.03781]
- AB and Jan Troost, *The Arithmetic of Supersymmetric Vacua*, JHEP **07** (2016) 036.  
[arXiv:1606.01022]
- AB, *Modularity and Vacua in  $\mathcal{N} = 1^*$  Supersymmetric Gauge Theory*, July 2016, PhD thesis.  
[PDF on tel.archives-ouvertes.fr]
- AB and Jan Troost, *The Covariant Chiral Ring*, JHEP **03** (2016) 163.  
[arXiv:1512.03649]
- AB and Jan Troost, *On the  $\mathcal{N} = 1^*$  Gauge Theory on a Circle and Elliptic Integrable Systems*, JHEP **01** (2016) 097.  
[arXiv:1511.03116]
- AB and Jan Troost, *Counting the massive vacua of  $\mathcal{N} = 1^*$  super Yang-Mills theory*, JHEP **1508** (2015) 106.  
[arXiv:1506.03222]
- AB and Jan Troost, *Duality and modularity in elliptic integrable systems and vacua of  $\mathcal{N} = 1^*$  gauge theories*, JHEP **1504** (2015) 128.  
[arXiv:1501.05074]

## TALKS AND PRESENTATIONS

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- 23/09/2021, Geometry of (S)QFT, Simons Center for Geometry and Physics, Stony Brook, USA. "Higgs branches after lockdown". [video link]
- 03/08/2021, Nankai Symposium on Mathematical Dialogues, Chern Institute of Mathematics, Nankai University, Tianjin, China. "Branes, Quivers and Affine Grassmannians". [video link]
- 20/07/2021, APCTP Pohang, South Korea, Workshop on Strings, Branes and Gauge Theories. "Non simply laced quivers and Moduli spaces of 4d SCFTs".
- 04/12/2020, QFT and Geometry Seminars, "Moduli space of 5d SCFTs, a walk in the tropical rainforest".  
[video link]
- 04/12/2020, Imperial College, "The Higgs branch of 5d SCFTs: updates and challenges".  
<https://www.imperial.ac.uk/theoretical-physics/seminars/quiver-meetings/>
- 17/09/2020 SISSA, Workshop on Geometric Correspondences of Gauge Theories X, "Magnetic quivers for rank-1 4d  $\mathcal{N} = 4$  theories".

- 17/07/2020 Quiver Meeting, Imperial College, "The Affine Grassmannian and Quivers".  
[\[video link\]](#)
- 01/06/2020 Lectures for the Simons Collaboration on Special Holonomy in Geometry, Analysis, and Physics.  
[\[video link\]](#)
- 19/12/2019 Rencontres théoriciennes, Institut Henri Poincaré, Paris, France. "Hasse diagrams and Higgs branches".
- 09/12/2019 Joburg Meeting on String theory, "Symplectic Singularities".
- 06/12/2019 Utrecht University, "Hasse diagrams and Higgs branches".
- 25/10/2019 Durham University, "Hasse diagrams and Higgs branches".
- 21/10/2019 University of Oxford, "Hasse diagrams and Higgs branches".
- 09/10/2019 Joint seminar, Institute for Theoretical Physics, Leuven, "Hasse diagrams and Higgs branches".
- 30/09/2019 CEICO, Prague, "Hasse diagrams and Higgs branches".
- 21/05/2019 Oviedo University, "Magnetic quivers and Brane Webs for 4d  $N=2$  SQCD".
- 03/04/2019 DESY, Hamburg, "Brane webs and the SQCD Higgs Branch".
- 30/11/2018 Quiver Meeting, Imperial College, "Computing Hilbert series from free resolutions".
- 09/10/2018 Imperial College London, "Extremal correlators in 4d  $\mathcal{N} = 2$  SCFTs and Toda equations".
- 18/07/2018 Albert Einstein Center at the University of Bern, "The importance of being disconnected".
- 02/07/2018 Institut de Physique Nucléaire de Lyon, "Moduli spaces of theories with disconnected gauge groups".
- 05/06/2018 University of Torino, "The importance of being disconnected: principal extension gauge theories".
- 12/02/2018 Oviedo University, "Nilpotent orbits and quiver theories".
- 24/01/2018 Uppsala University, "Towards deconstruction of type D (2,0) theory".
- 22/01/2018 Nordita, "Towards deconstruction of type D (2,0) theory".
- 07/10/2017 Universitat de Barcelona, "Towards deconstruction of type D (2,0) theory".
- 04/12/2017 CPHT, Ecole Polytechnique, "Quivers, Hilbert series and Deconstruction"
- 30/11/2017 LPMT, Tours, "Théories de carquois et Séries de Hilbert"
- 31/10/2017 Università Milano-Bicocca, "Towards deconstruction of type D (2,0) theory"
- 27/09/2017 Imperial College London, "Higgs branch Hilbert series and non-connected gauge groups"
- 04/10/2016 Universidad de Oviedo, "A dance with supersymmetric vacua"
- 01/07/2016 LPTENS (Soutenance de thèse), "Modularity and Vacua in  $N=1^*$  supersymmetric gauge theories"

- 10/11/2015 CNAM Paris (RJP), "Do we live in a hologram ?".
- 19/02/2015 LPTHE Jussieu, "Duality and Modularity in Elliptic Integrable Systems".
- 23/05/2014 ENS Paris, "Beyond the Standard Model, an overview".
- 29/01/2014 Student seminar, ENS Paris, "Introduction to string theory".