

# Antoine BOURGET

## PERSONAL DATA

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PLACE AND DATE OF BIRTH: Colombes, France | 3 January 1989  
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 2012	FASTLITE, Orsay, France
OCT 2011	<i>Research Engineer</i>
<i>Current</i>	MINISTRY OF ECONOMIC AFFAIRS, Paris, France
SEP 2011	<i>Ingénieur du Corps des Mines (actuellement en détachement).</i>

## EDUCATION

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Jul 2016	PhD, 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: J. Troost
	Examiners: O. Aharony, C. Bachas, A. Hanany, M. Petrini, S.P. Kumar, H. Samtleben
2011-2012	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 several students over the last few years:

- 2022: Rodrigue Orageux (M1, ENS Paris, *Formalisme ADM de la Relativité Générale*).
- 2021: Théodore Bertrand (M1, ENS Paris, *Quivers in String Theory: an Introduction*)
- 2021: Diogo Santos (M3R, Imperial College London, *An Introduction to Quivers in 3d  $N = 4$  Superconformal Field Theories*)
- 2020: Min Lin (Undergraduate Research Opportunities Programme, Imperial College London, *Theories of class S*)
- 2020: Hai Châu Nguyễn (L3, ENS Lyon, *Classification des algèbres de Lie complexes, motivations physiques et carquois*)

## OUTREACH AND ACTIVITIES

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- Channel Scientia Egregia 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).  
<http://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>.

- A. Bourget, J. F. Grimminger, A. Hanany, and Z. Zhong, *The Hasse Diagram of the Moduli Space of Instantons*.  
[arXiv:2202.01218]
- A. Bourget, A. Dancer, J. F. Grimminger, A. Hanany, and Z. Zhong, *Partial Implosions and Quivers*.  
[arXiv:2112.10825]
- A. Bourget, J. F. Grimminger, A. Hanany, Rudolph Kalveks and Z. Zhong, *Higgs Branches of  $U/SU$  Quivers via Brane Locking*.  
[arXiv:2111.04745]
- A. Bourget, J. F. Grimminger, M. Martone and G. Zafrir, *Magnetic quivers for rank 2 theories*.  
[arXiv:2110.11365]
- A. Bourget and A. 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]
- A. Bourget, J. F. Grimminger, A. Hanany, Rudolph Kalveks, M. Sperling and Z. Zhong, *Folding Orthosymplectic Quivers*. JHEP 12 (2021) 070.  
[arXiv:2107.00754]
- G. Arias-Tamargo, A. Bourget and A. Pini, *Discrete gauging and Hasse diagrams*, SciPost Phys. 11 (2021) 2, 026.  
[arXiv:2105.08755]
- A. Bourget, A. Dancer, J. F. Grimminger, A. Hanany, F. Kirwan and Z. Zhong, *Orthosymplectic Implosions*, JHEP 08 (2021) 012.  
[arXiv:2103.05458]
- A. Bourget, J. F. Grimminger, A. Hanany, M. Sperling and Z. Zhong, *Branes, Quivers, and the Affine Grassmannian*.  
[arXiv:2102.06190]
- M. van Beest, A. Bourget, J. Eckhard and S. Schafer-Nameki, *(5d RG-flow) Trees in the Tropical Rain Forest*, JHEP 03 (2021) 241.  
[arXiv:2011.07033]
- A. Bourget, Simone Giacomelli, J. F. Grimminger, A. Hanany, M. Sperling and Z. Zhong, *S-fold magnetic quivers*, JHEP 02 (2021) 054.  
[arXiv:2010.05889]
- M. van Beest, A. Bourget, J. Eckhard and S. Schafer-Nameki, *Symplectic Leaves and 5d Higgs Branches in the Polygonsian Tropical Rain Forest*, JHEP 11 (2020) 124.  
[arXiv:2008.05577]
- A. Bourget, J. F. Grimminger, A. Hanany, Rudolph Kalveks, M. Sperling and Z. Zhong, *Magnetic Lattices for Orthosymplectic Quivers*, JHEP 12 (2020) 092.  
[arXiv:2007.04667]
- A. Bourget, J. F. Grimminger, A. Hanany, M. Sperling, G. Zafrir and Z. Zhong, *Magnetic quivers for rank 1 theories*, JHEP 09 (2020) 189.  
[arXiv:2006.16994]

- A. Bourget, A. Hanany, and D. Miketa, *Quiver origami: discrete gauging and folding*.  
[arXiv:2005.05273]
- A. Bourget, J. F. Grimminger, A. Hanany, M. Sperling and Z. Zhong, *Magnetic Quivers from Brane Webs with O5 Planes*, JHEP 07 (2020) 204.  
[arXiv:2004.04082]
- P. Argyres, A. Bourget and M. Martone, *On the moduli spaces of 4d  $N=3$  SCFTs I: triple special Kähler structure*, arXiv:1912.04926.  
[arXiv:1912.04926]
- A. Bourget, S. Cabrera, J. F. Grimminger, A. Hanany and Z. Zhong, *Brane Webs and Magnetic Quivers for SQCD*, JHEP 03 (2020) 176.  
[arXiv:1909.00667]
- A. Bourget, S. Cabrera, J. F. Grimminger, A. Hanany, M. Sperling, A. Zajac and Z. Zhong, *The Higgs Mechanism - Hasse Diagrams for Symplectic Singularities*, JHEP 01 (2020) 157.  
[arXiv:1908.04245]
- P. Argyres, A. Bourget and M. Martone, *Classification of all  $\mathcal{N} \geq 3$  moduli space orbifold geometries at rank 2*, SciPost Phys. 9 (2020) 083.  
[arXiv:1904.10969]
- Guillermo Arias-Tamargo, A. Bourget, A. Pini and D. Rodríguez-Gómez, *Discrete gauge theories of charge conjugation*, Nucl.Phys. B946 (2019) 114721.  
[arXiv:1903.06662]
- A. Bourget, D. Rodríguez-Gómez and J. Russo, *Universality of Toda equation in  $N=2$  superconformal field theories*, JHEP 1902 (2019) 011.  
[arXiv:1810.00840]
- A. Bourget, A. Pini and D. Rodríguez-Gómez, *Gauge theories from principally extended disconnected gauge groups*, Nucl.Phys. B940 (2019) 351-376.  
[arXiv:1804.01108]
- A. Bourget, D. Rodríguez-Gómez and J. Russo, *A limit for large  $R$ -charge correlators in  $N=2$  theories*, JHEP 1805 (2018) 074.  
[arXiv:1803.00580]
- A. Bourget and J. Troost, *The Conformal Characters*, JHEP 1804 (2018) 055.  
[arXiv:1712.05415]
- A. Bourget, A. Pini, D. Rodríguez-Gómez, *Towards the deconstruction of the type D  $(2,0)$  theory*, JHEP 1712 (2017).  
[arXiv:1710.10247]
- A. Bourget and J. Troost, *Permutations of Massive Vacua*, JHEP 1705 (2017) 042.  
[arXiv:1702.02102]
- A. Bourget and A. Pini, *Non-Connected Gauge Groups and the Plethystic Program*, JHEP 1710 (2017) 033.  
[arXiv:1706.03781]
- A. Bourget and J. Troost, *The Arithmetic of Supersymmetric Vacua*, JHEP 07 (2016) 036.  
[arXiv:1606.01022]
- A. Bourget, *Modularity and Vacua in  $\mathcal{N} = 1^*$  Supersymmetric Gauge Theory*, July 2016, PhD thesis.  
[PDF on tel.archives-ouvertes.fr]

- A. Bourget and J. Troost, *The Covariant Chiral Ring*, JHEP **03** (2016) 163.  
[arXiv:1512.03649]
- A. Bourget and J. Troost, *On the  $\mathcal{N} = 1^*$  Gauge Theory on a Circle and Elliptic Integrable Systems*, JHEP **01** (2016) 097.  
[arXiv:1511.03116]
- A. Bourget and J. Troost, *Counting the massive vacua of  $\mathcal{N} = 1^*$  super Yang-Mills theory*, JHEP **1508** (2015) 106.  
[arXiv:1506.03222]
- A. Bourget and J. Troost, *Duality and modularity in elliptic integrable systems and vacua of  $\mathcal{N} = 1^*$  gauge theories*, JHEP **1504** (2015) 128.  
[arXiv:1501.05074]

## INVITED SPEAKER AT INTERNATIONAL CONFERENCES

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- 11/02/2022, [Geometrization of \(S\)QFT in  \$D \leq 6\$](#) , Winter Conference at Aspen, USA. "On the Moduli Space of Instantons".
- 10/01/2022, [Connections between String Theory and Special Holonomy Workshop](#), Oxford, UK. "Magnetic quivers for singular hyperKähler spaces".
- 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, [Workshop on Strings, Branes and Gauge Theories](#), APCTP Pohang, South Korea. "Non simply laced quivers and Moduli spaces of 4d SCFTs".
- 04/12/2020, [Recent Advances in QFT and Geometry](#) "Moduli space of 5d SCFTs, a walk in the tropical rainforest". [\[video link\]](#)
- 01/06/2020 [Simons Collaboration: Moduli of special holonomy metrics and their periods](#) Lectures on Hasse diagrams for Symplectic Singularities via Magnetic Quivers [\[video link\]](#)
- 09/12/2019 [Joburg Workshop on String Theory, Calabi–Yaus, Machine Learning, and Aspects of 6D QFT](#), South Africa. "Symplectic Singularities".
- 18/07/2018 [Supersymmetric theories, dualities and deformations](#), Albert Einstein Center, Bern, Switzerland. "The importance of being disconnected".

## OTHER TALKS AND SEMINARS

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- 24/11/2021, Institut de Mathématiques de Bourgogne, Dijon. "What is a Magnetic Quiver?".
- 15/11/2021, IPHT Saclay, Mathematical Physics group, "Quiver subtraction and Hasse diagrams".
- 06/10/2021, Institut de Physique théorique, CEA Saclay, "A very short introduction to quivers".

- 05/10/2021, ENS Paris, Postdoc presentation, "What is a Magnetic Quiver?"
- 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".  
[\[video link\]](#)
- 19/12/2019 Rencontres théoriciennes, Institut Henri Poincaré, Paris, France. "Hasse diagrams and Higgs branches".
- 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  $\mathcal{N}=2$  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".
- 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  $\mathcal{N}=1^*$  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".