Timothy Budd

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Education & Employment

2016–pres.	Postdoctoral researcher at the Institut de Physique Théorique, CEA-Saclay, France. Funded by a scholarship for research in Math & Physics of the Labex Mathématiques Hadamard.
2012–2016	Postdoctoral researcher and later Assistant Professor at the Theoretical Particle Physics and Cosmology group of the Niels Bohr Institute, University of Copenhagen, Denmark.
2008–2012	PhD student at the Institute for Theoretical Physics, Utrecht University, The Netherlands. Thesis: *Non-perturbative quantum gravity: a conformal perspective* (Advisor: Prof. R. Loll.)
2005–2007	Master's degree in Theoretical Physics (cum laude), Utrecht University.
2002–2005	Bachelor's degree in Physics and Astronomy (cum laude), Utrecht University.
2002–2005	Bachelor's degree in Mathematics (cum laude), Utrecht University.

Research interests

My research centers around aspects of random geometry in physics and mathematics. Topics include: models of quantum gravity in two, three, and four space-time dimensions; causal dynamical triangulations and Monte Carlo simulations; general relativity; Liouville gravity and conformal field theory; combinatorics and probability of random planar maps; random walks and stochastic processes; statistical physics on the lattice.

Publications and preprints

Coauthors:	Jan Ambjørn, Jerome Barkley, Jean Bertoin, Nicolas Curien, Igor Kortchemski, Tim Koslowski, Renate Loll, Yuri Makeenko, Cyril Marzouk, Yoshiyuki Watabiki.
2017	T. Budd, N. Curien and C. Marzouk, *Infinite random planar maps related to Cauchy processes*, preprint, arXiv:1704.05297.
2016	J. Bertoin, T. Budd, N. Curien and I. Kortchemski, *Martingales in self-similar growth-fragmentations and their connections with random planar maps*, preprint, arXiv:1605.00581.
2016	J. Ambjørn, T. Budd and Y. Makeenko, *Generalized multicritical one-matrix models*, *Nucl. Phys. B* 913 357–380, arXiv:1602.01328.
2016	T. Budd and N. Curien, *Geometry of infinite planar maps with high degrees*, Electron. J. Probab. 22, no. 35, arXiv:1602.01328.
2015	T. Budd, *The peeling process of infinite Boltzmann planar maps*, *Elec. J. Combin.* 23(1) #P1.28, arXiv:1506.01590.
2014	J. Ambjørn and T. Budd, *Multi-point functions of weighted cubic maps*, *Ann. Inst. H. Poincaré D* 3 1–44, arXiv:1408.3040.
2014	J. Ambjørn, T. Budd and Y. Watabiki, *Scale-dependent Hausdorff dimensions in 2d gravity*, *Phys. Lett.* B 736 339-343, arXiv:1406.6251.
2014	J. Ambjørn and T. Budd, *Geodesic distances in quantum Liouville gravity*, *Nucl. Phys.* B 889 676-691, arXiv:1405.3424.
2013	J. Ambjørn and T. Budd, *Two-dimensional Quantum Geometry*, *Acta Physica Polonica* B 44 2537, arXiv:1310.8552.
2013	T. Budd and R. Loll, *Exploring Torus Universes in Causal Dynamical Triangulations*, *Phys. Rev.* D 88 024015, arXiv:1305.4702.
2013	J. Ambjørn and T. Budd, *The toroidal Hausdorff dimension of 2d Euclidean quantum gravity*, *Phys. Lett.* B 724 328-332, arXiv:1305.3674.

2013 J. Ambjørn and T. Budd, *Trees and spatial topology change in CDT*, *J. Phys. A: Math. Theor.* 46 315201, arXiv:1302.1763.

2012 J. Ambjørn and T. Budd, *Semi-classical dynamical triangulations*, *Phys. Lett.* B 718 200-204, arXiv:1209.6031.

2011 T. Budd, *The effective kinetic term in CDT*, *J. Phys.: Conf. Ser.* 360 012038, arXiv:1110.5158.

2011 J. Ambjørn, J. Barkley, and T. Budd, *Roaming moduli space using dynamical triangulations*, *Nucl. Phys.* B, arXiv:1110.4649.

2011 J. Ambjørn, J. Barkley, T. Budd, and R. Loll, *Baby Universes Revisited*, *Phys. Lett.* B 706 86-89, arXiv:1110.3998.

2011 T. Budd and T. Koslowski, *Shape Dynamics in 2+1 Dimensions*, *Gen. Rel. Grav.* 44 1615-1636, arXiv:1107.1287.

2009 T. Budd and R. Loll, *In search of fundamental discreteness in (2+1)-dimensional quantum gravity*, *Class. Quant. Grav.* 26 185011, arXiv:0906.3547.

Teaching

2017 Mini-course on *Peeling of random planar maps*, 4.5 hours, Mini-school on Random Maps and the Gaussian Free Field, May 15-19, Lyon, France.

2017 Master course on *Analytic combinatorics and applications*, 4 ECTS, Feb. 2 - Mar. 30, Département de Mathématiques d'Orsay, Université de Paris-Sud, France.

2013 Bachelor thesis student: Andreas Søgaard (co-supervised), Niels Bohr Institute, University of Copenhagen.

2005–2011 Teaching assistant for several Master's courses at Utrecht University, including *Topics in theoretical physics* (Group Theory), *Introduction to black holes*, *General relativity*, *Classical and quantum integrable systems*. I also assisted several Bachelor's calculus courses and training sessions for the National Physics Olympiad.

Recent invited conference talks (full list and slides available at www.nbi.dk/∼budd/)

2017 *Escaping universality in two-dimensional quantum gravity*, at Quantum Gravity in Paris, Mar. 21, IHP, Paris.

2017 *Winding of walks on the square lattice*, at Journées de combinatoire de Bordeaux, Jan. 25, LaBRI, Bordeaux.

2017 *On a connection between planar map combinatorics and lattice walks*, at Workshop on Large Random Structures in Two Dimensions, Jan. 17, IHP, Paris.

2016 *Geometry of random planar maps with high degrees*, at Random Trees and Maps: Probabilistic and Combinatorial Aspects, Jun. 7, CIRM, Marseille.

2015 *The peeling process on random planar maps with loops*, at Séminaire Philippe Flajolet, Dec. 3, IHP, Paris.

2015 *Peeling of infinite Boltzmann planar maps*, at 20th Itzykson conference, Jun. 12, IPhT, Saclay, France.

2015 *Scaling constants and the lazy peeling of infinite Boltzmann planar maps*, at Random Planar Structures and Statistical Mechanics, Cambridge, Apr. 20, INI, Cambridge, UK.

2014 *First-passage percolation on random planar maps*, at Probability on Trees and Planar Graphs, Sept. 15, Banff International Research Station, Banff, Canada.

2014	*Fractal dimensions of 2d quantum gravity*, at Approaches to Quantum Gravity, Meeting of GDR, Université Blaise Pascal, Clermont-Ferrand.
2013	*From planar maps to spatial topology change in 2d gravity*, at Journées Cartes, Jun. 20, l'Institut de Physique Théorique, CEA Saclay, France.
2013	*Generalized CDT as a scaling limit of planar maps*, at Quantum gravity in Paris, Mar. 20, Orsay, France.
2012	*CDT and Trees*, at CDT and Friends conference, Dec. 14, Radboud University Nijmegen, The Netherlands.

Other professional experience

2012–pres.	Referee for journals including: Ann. Inst. H. Poincaré B, Ann. Inst. H. Poincaré D, Comb.Probab. Comp., Gen. Rel. Grav., J. Stat. Mech., J. Comb. Theor. A.
2016	Organizer of the journal club seminar at the High Energy Theory group at the Niels Bohr Institute.
2013–2016	Webmaster for the High Energy Theory group at the Niels Bohr Institute, Copenhagen.
2009–2012	Organizer of the PhD lunch seminar (*Planet*) at the Institute for Theoretical Physics, Utrecht.
2006	Chair of the organizing committee of the Dutch national physics competition *PION*.
2005–2007	Webmaster for the Freudenthal institute for mathematics and science education, Utrecht.

Undergraduate achievements

2006	Second place at the Dutch mathematics competition *LIMO* for teams of university students.
2004, 2005	Two first places at the Dutch physics competition *PION* for teams of university students.
2003	*Fysica encouragement award* for first-year study results in physics.
2002	Bronze medal at the 33^{rd} International Physics Olympiad, Indonesia.

Skills

Languages	Dutch: native, English: fluent, Danish, French: intermediate.
Computing	Experience with Monte Carlo simulations, numerical linear algebra and various other computing techniques. Programming languages: C++, python, Java, JavaScript, PHP. Relevant software experience: Mathematica, Matlab, LaTeX, git.