

Daniel Butter

Curriculum Vitae

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Personal Information

Place of Birth: Pittsburgh, PA, USA

Citizenship: United States

Family status: Married, one daughter (age 7)

Languages: English (native), Spanish (intermediate), German (elementary), Dutch (elementary)

Academic Positions

Jan. 2017 - Sep. 2022	Research associate	Mitchell Institute, Texas A&M
Oct. 2016 - Dec. 2016	Visiting scholar	Mitchell Institute, Texas A&M
Oct. 2012 - Sep. 2016	Postdoctoral researcher	Nikhef Theory Group, Amsterdam
	Marie Curie Fellow	Mar. 2014 - Mar. 2016
Sep. 2010 - Aug. 2012	Research associate	School of Physics, University of Western Australia

Education

May 2010 Ph.D. Physics, UC Berkeley

Advisor: Mary K. Gaillard

Thesis: "On conformal superspace and the one-loop effective action in supergravity"

June 2002 A.B. Chemistry and Physics (*summa cum laude*), Harvard University

Honors, Awards, & Fellowships

2014 - 2016 Marie Curie Fellowship (FP7-MC-IIF), €183,000, grant no. 627976

The last piece of the puzzle: Off-shell hypermultiplets in string theory and complex geometry

2011 Research Development Award, University of Western Australia, \$11,900

Extended supergravity in particle physics and string theory

2010 Friedman Prize in Applied Mathematics, UC Berkeley

2004 Outstanding Graduate Student Instructor Award, UC Berkeley

2002 Phi Beta Kappa, Harvard University

Teaching experience

Utrecht University and University of Amsterdam

Co-lecturer *Field Theory in Particle Physics* Spring 2014
with B. de Wit and E. Laenen

Teaching assistant *Field Theory in Particle Physics* Spring 2013

University of California, Berkeley

Teaching assistant	Honors Intro. Mechanics	Fall 2009
	Honors Intro. Electrodynamics	Spring 2009
	Intro. Electrodynamics	S 2007, F 2006, S 2004, S 2003, F 2003
	Quantum Mechanics (II)	Spring 2006
	Quantum Mechanics (I)	Fall 2005, Fall 2004
	Electromagnetism & Optics	Spring 2005
	Intro. Mechanics	Fall 2002

Graduate mentoring

- 2021 - 2022 Haoyu Zhang Ph.D student, Texas A&M University, Advisor: Chris Pope
Work in progress with C. Pope and F. Hassler.
- 2020 - 2022 Artem Bolshov Ph.D student, Texas A&M University, Advisor: Katrin Becker
Guidance on research.
- 2020 - 2022 Anindya Sengupta Ph.D student, Texas A&M University, Advisor: Katrin Becker
Guidance on research. Co-authored one paper, another in progress.
- 2017 Sunny Guha Ph.D student, Texas A&M University, Advisor: Katrin and Melanie Becker
Co-authored one publication. Now working at MathWorks.
- 2012 - 2016 Franz Ciceri Ph.D, Utrecht University, Mar. 2017, Advisor: Bernard de Wit
Provided guidance. Co-authored two publications.
Currently postdoc at Max Planck Institute, Potsdam
- 2012 - 2016 Valentin Reys Ph.D, Utrecht University, Mar. 2016, Advisors: B. de Wit and S. Murthy
Provided guidance.
Postdoc at Milano-Bicocca. Current postdoc at KU Leuven.
- 2012 - 2014 Ivano Lodato Ph.D, Utrecht University, Sept. 2014, Advisor: Bernard de Wit
Worked extensively together. Co-authored four publications (two as student)
Postdoc at Fudan University, Shanghai. Now working for Nysus.
- 2011 - 2012 Joseph Novak Ph.D, University of Western Australia, Jan 2013, Advisor: Sergei Kuzenko
Worked extensively together. Co-authored 8 publications (two as student).
Postdoc at Max Planck Institute, Humboldt Fellowship.
Now working for Western Australian Treasury Corporation.

Conference and Workshops attended (talks in bold)

- Geometry and Duality, Potsdam, December 2-6, 2019
- Strings 2019, Brussels, July 9-13, 2019
- Pre-Strings, Leuven, July 2-5, 2019
- Simons Center's Workshop: Geometrical Aspects of Supersymmetry, Stony Brook, Oct. 22-26, 2018
- 23rd European String Workshop, "Strings, Geometry and Black Holes", King's College London, April 9-13, 2018
- Simons Collaboration on Special Holonomy in Geometry, Analysis and Physics First Annual Meeting, New York, Sept. 14-15, 2017
- Workshop on Special Holonomy, Simons Center, NY, Sept. 11, 2017
Eleven-Dimensional Supergravity in 4D, N=1 Superspace, Invited talk.
- "Supergravity: what next?", GGI, Florence, Sept. 2016
Conformal supergravity actions in four and six dimensions
- Amsterdam String Workshop, Amsterdam, July 2015.
- The String Theory Universe, KU Leuven, Sept. 2015
All rigid $N = 2$ supersymmetric backgrounds
- SUSY 2015, Lake Tahoe, Aug. 2015
All rigid $N = 2$ supersymmetric backgrounds

- Simons Summer Workshop, Stony Brook, August 2015.
- Eurostrings 2015, Cambridge UK, March 2015.
- Black Objects Beyond Supersymmetry, Utrecht, Sept 2014.
- SUSY 2014, Manchester, July 2014
Covariant techniques in projective and harmonic superspace
- Simons Summer Workshop, Stony Brook, July-August 2014.
- String Phenomenology 2014, ICTP Trieste, July 2014.
- Strings 2014, Princeton, June 2014.
- Physics@FOM, Veldhoven, Jan 2014.
- 19th European Workshop on String Theory, Bern, Sept. 2013
The N=2 Gauss-Bonnet and other higher derivative terms from conformal supergravity
- Integrability in Gauge and String Theory, Utrecht, August 2013.
- SQS 2013 (Dubna), Jul 2013
The N=2 Gauss-Bonnet invariant from conformal supergravity
- Topics in Holography, Supersymmetry and Higher Derivatives, Mitchell Institute, Texas, April 2013.
- Strings 2012, Munich, July 2012.
- XVII European Workshop on String Theory, Padua, September 2011
On higher derivative couplings in 4D N=2 supergravity
- Strings 2011, Uppsala, July 2011.

Seminars

- “ E_7 ExFT in superspace” Exceptional Geometry Seminar Series, July 24, 2020. (Zoom)
- “M-theory in $N = \frac{1}{8}$ superspace”, BTPC, Brown University, April 17, 2020. (Zoom)
- “Aspects of maximal supergravity”, SUNY Oneonta, Feb. 10, 2020.
- “11D supergravity in 4D superspace”, String Seminar, Albert Einstein Institute, Potsdam, Apr. 16, 2018.
- “Eleven-Dimensional Supergravity in 4D, N=1 Superspace”, String Duality Seminar, Harvard University, Nov. 16, 2017.
- “All rigid $N = 2$ supersymmetric backgrounds and actions”, Theory Seminar, Perimeter Institute, Waterloo, Sept. 2015.
- “All rigid $N = 2$ supersymmetric backgrounds”, Theory Seminar, Mitchell Institute, Texas A&M, Sept. 2015.
- “All rigid $N = 2$ supersymmetric backgrounds”, String Seminar, UC Berkeley, Sept. 2015.
- “Off-shell hypermultiplets in conformal supergravity”, String Seminar, Albert Einstein Institute, Potsdam, Feb. 2015.
- “Hypermultiplets and conformal supergravity in projective/harmonic superspace”, String Seminar, Groningen, Nov. 2014.
- “Complex geometry and conformal supergravity in projective/harmonic superspace”, String Seminar, ITF Utrecht, Sept. 2014.
- “The N=2 Gauss-Bonnet invariant in and out of superspace,” Mitchell Institute, Texas A&M, April 2013.
- “Supersymmetry, complex geometry and Hamiltonian mechanics,” Nikhef, January 2013.

- “Geometric aspects of N=2 nonlinear sigma models in AdS4”, Johns Hopkins, November 2011.
- “Conformal techniques in superspace” String Seminar, ITF Utrecht, July 2011.
- “Conformal $N = 1$ superspace in four dimensions,” UWA Seminar, Perth, Sept 2010
- “Superspace Pauli-Villars regularization of super Yang-Mills” 4D Seminar, LBNL, March 2008.
- “Classically conformal N=1, D=4 superspace” String Theory Seminar, UC Berkeley, Apr 2007.

Professional activities

- Organizer TAMU HET seminars (2016-2019)
- Referee for JHEP, Physics Letters B
- Thesis committees: Ivano Lodato, Utrecht University, Sept. 2014
Stefanos Katmadas, Utrecht University, July 2011
- Participated in Nikhef Open Day, Oct. 2014
- Organized Nikhef journal club (2012-2013)

Professional References

- Prof Bernard de Wit Nikhef Theory Group
Science Park 105, 1098 XG Amsterdam, The Netherlands,
and Institute for Theoretical Physics, Utrecht University
Leuvenlaan 4, 3584 CE Utrecht, The Netherlands
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- Prof Sergei Kuzenko School of Physics M013, The University of Western Australia
35 Stirling Highway, Crawley WA 6009, Australia
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- Prof Eric Laenen Nikhef Theory Group
Science Park 105, 1098 XG Amsterdam, The Netherlands
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- Prof Martin Roček C.N. Yang Institute for Theoretical Physics, Stony Brook University
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- Prof S. James Gates, Jr. Brown Theoretical Physics Center Director
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Publications

Author lists in high energy physics publications are typically given strictly alphabetically, without singling out a primary author. For each publication below, the number of citations is recorded in blue, as reported by the INSPIRE website on 11/11/22. Total citations: 992. *h*-index: 19.

Journal publications

- [J41] (0) K. Becker, D. Butter and A. Sengupta, “Linearized Off-shell 4+7 Supergeometry of 11D Supergravity,” [arXiv:2207.14327]. To appear in JHEP.
- [J40] (4) D. Butter, *Exploring the geometry of supersymmetric double field theory*, JHEP **01** (2022) 152 [2101.10328].
- [J39] (3) K. Becker, D. Butter, W. D. Linch, A. Sengupta, *Components of eleven-dimensional supergravity with four off-shell supersymmetries*, JHEP **07** (2021) 032 [2101.11671].
- [J38] (5) K. Becker and D. Butter, *4D $N = 1$ Kaluza-Klein superspace*, JHEP **09** (2020) 091 [2003.01790].
- [J37] (1) K. Becker, M. Becker, D. Butter, W. D. Linch and S. Randall, *Five-dimensional Supergravity in $N = 1/2$ Superspace*, JHEP **03** (2020) 098 [1909.09208].
- [J36] (12) D. Butter, F. Ciceri and B. Sahoo, *$N=4$ conformal supergravity: the complete actions*, JHEP **01** (2020) 029 [1910.11874].
- [J35] (10) D. Butter, H. Samtleben and E. Sezgin, *$E_{7(7)}$ Exceptional Field Theory in Superspace*, JHEP **01** (2019) 087 [1811.00038].
- [J34] (17) D. Butter, J. Novak, M. Ozkan, Y. Pang and G. Tartaglino-Mazzucchelli, *Curvature squared invariants in six-dimensional $\mathcal{N} = (1, 0)$ supergravity*, JHEP **04** (2019) 013 [1808.00459].
- [J33] (6) K. Becker, M. Becker, D. Butter and W. D. Linch, *$N = 1$ supercurrents of eleven-dimensional supergravity*, JHEP **05** (2018) 128 [1803.00050].
- [J32] (11) D. Butter, S. Hegde, I. Lodato and B. Sahoo, *$N = 2$ dilaton Weyl multiplet in 4D supergravity*, JHEP **03** (2018) 154 [1712.05365].
- [J31] (12) K. Becker, M. Becker, D. Butter, S. Guha, W. D. Linch III, and D. Robbins, *Eleven-dimensional supergravity in 4D, $N=1$ superspace*, JHEP **11** (2017) 199 [1709.07024].
- [J30] (28) D. Butter, J. Novak and G. Tartaglino-Mazzucchelli, *The component structure of conformal supergravity invariants in six dimensions*, JHEP **05** (2017) 133 [1701.08163].
- [J29] (40) D. Butter, F. Ciceri, B. de Wit and B. Sahoo, *All $N=4$ Conformal Supergravities*, Phys. Rev. Lett. **118**, 081602 (2017) [1609.09083].
- [J28] (36) D. Butter, S. M. Kuzenko, J. Novak and S. Theisen, *Invariants for minimal conformal supergravity in six dimensions*, JHEP **12** (2016) 072 [1606.02921].
- [J27] (6) D. Butter, *On conformal supergravity and harmonic superspace*, JHEP **03** (2016) 107 [1508.07718].
- [J26] (21) D. Butter, G. Inverso and I. Lodato, *Rigid 4D $\mathcal{N} = 2$ supersymmetric backgrounds and actions*, JHEP **09** (2015) 088 [1505.03500].

- [J25] (42) D. Butter, S. M. Kuzenko, J. Novak and G. Tartaglino-Mazzucchelli, *Conformal supergravity in five dimensions: New approach and applications*, JHEP **02** (2015) 111 [1410.8682].
- [J24] (5) D. Butter and M. K. Gaillard, *The anomaly structure of regularized supergravity*, Phys. Rev. D **91**, 025015 (2015) [1410.6192].
- [J23] (16) D. Butter, *Projective multiplets and hyperkähler cones in conformal supergravity*, JHEP **06** (2015) 161 [1410.3604].
- [J22] (16) D. Butter, *A new approach to curved projective superspace*, Phys. Rev. D **92**, 085004 (2015) [1406.6235].
- [J21] (17) D. Butter, B. de Wit and I. Lodato, *Non-renormalization theorems and N=2 supersymmetric backgrounds*, JHEP **03** (2014) 131 [1401.6591].
- [J20] (74) D. Butter, B. de Wit, S. M. Kuzenko, and I. Lodato, *New higher-derivative invariants in N=2 supergravity and the Gauss-Bonnet term*, JHEP **12** (2013) 062 [1307.6546].
- [J19] (14) D. Butter and S. M. Kuzenko, *Nonlocal action for the super-Weyl anomalies: A new representation*, JHEP **09** (2013) 067 [1307.1290].
- [J18] (47) D. Butter, S. M. Kuzenko, J. Novak and G. Tartaglino-Mazzucchelli, *Conformal supergravity in three dimensions: Off-shell actions*, JHEP **10** (2013) 073 [1306.1205].
- [J17] (58) D. Butter, S. M. Kuzenko, J. Novak and G. Tartaglino-Mazzucchelli, *Conformal supergravity in three dimensions: New off-shell formulation*, JHEP **09** (2013) 072 [1305.3132].
- [J16] (20) D. Butter, S. M. Kuzenko and G. Tartaglino-Mazzucchelli, *Nonlinear sigma models with AdS supersymmetry in three dimensions*, JHEP **02** (2013) 121 [1210.5906].
- [J15] (7) D. Butter, *Relating harmonic and projective descriptions of N=2 nonlinear sigma models*, JHEP **11** (2012) 120 [1206.3939].
- [J14] (26) D. Butter, S. M. Kuzenko and J. Novak, *The linear multiplet and ectoplasm*, JHEP **09** (2012) 131 [1205.6981].
- [J13] (17) D. Butter, S. M. Kuzenko, U. Lindström and G. Tartaglino-Mazzucchelli, *Extended supersymmetric sigma models in AdS₄ from projective superspace*, JHEP **05** (2012) 138 [1203.5001].
- [J12] (29) D. Butter and J. Novak, *Component reduction in N=2 supergravity: the vector, tensor, and vector-tensor multiplets*, JHEP **05** (2012) 115 [1201.5431].
- [J11] (33) D. Butter and S. M. Kuzenko, *The structure of N=2 supersymmetric nonlinear sigma models in AdS₄*, JHEP **11** (2011) 080 [1108.5290].
- [J10] (35) D. Butter and S. M. Kuzenko, *A dual formulation of supergravity-matter theories*, Nucl. Phys. B **854** (2012) 1 [1106.3038].
- [J9] (32) D. Butter and S. M. Kuzenko, *N=2 supersymmetric sigma-models in AdS*, Phys. Lett. B **703** (2011) 620 [1105.3111].
- [J8] (26) D. Butter and S. M. Kuzenko, *N=2 AdS supergravity and supercurrents*, JHEP **07** (2011) 081 [1104.2153].
- [J7] (57) D. Butter, *N=2 conformal superspace in four dimensions*, JHEP **10** (2011) 030 [1103.5914].
- [J6] (39) D. Butter and S. M. Kuzenko, *New higher-derivative couplings in 4D N = 2 supergravity*, JHEP **03** (2011) 047 [1012.5153].
- [J5] (22) D. Butter and S. M. Kuzenko, *N=2 supergravity and supercurrents*, JHEP **12** (2010) 080 [1011.0339].

- [J4] (12) D. Butter, *Background field formalism for chiral matter and gauge fields conformally coupled to supergravity*, Nucl. Phys. B **828** (2010) 233 [0909.4901].
- [J3] (85) D. Butter, *$N=1$ conformal superspace in four dimensions*, Annals Phys. **325** (2010) 1026 [0906.4399].
- [J2] (12) D. Butter and M. K. Gaillard, *Anomaly structure of supergravity and anomaly cancellation*, Phys. Lett. B **679** (2009) 519 [0906.3503].
- [J1] (16) D. Butter and M. K. Gaillard, *The axion mass in modular invariant supergravity*, Phys. Lett. B **612** (2005) 304 [hep-th/0502100].

Preprints

- [P4] (1) D. Butter, “Type II Double Field Theory in Superspace,” [2209.07296].
- [P3] (1) D. Butter, “Notes on Ramond-Ramond spinors and bispinors in double field theory,” [2208.11162].
- [P2] (8) D. Butter, *Conserved supercurrents and Fayet-Iliopoulos terms in supergravity*, arXiv:1003.0249.
- [P1] (6) D. Butter, *One loop divergences and anomalies from chiral superfields in supergravity*, arXiv:0911.5426.

Conference proceedings

- [C4] (2) D. Butter, *The $\mathcal{N} = 2$ Gauss-Bonnet from conformal supergravity*, Phys. Part. Nucl. Lett. **11**, 941 (2014).
- [C3] (2) D. Butter, S. M. Kuzenko, J. Novak and G. Tartaglino-Mazzucchelli, *Off-shell actions for conformal supergravity in three dimensions*, Phys. Part. Nucl. Lett. **11**, 927 (2014).
- [C2] (1) D. Butter, S. M. Kuzenko, J. Novak and G. Tartaglino-Mazzucchelli, *New approach to \mathcal{N} -extended conformal supergravity in three dimensions*, Phys. Part. Nucl. Lett. **11**, 880 (2014).
- [C1] (1) D. Butter and S. M. Kuzenko, *Generating higher-derivative couplings in $N=2$ supergravity*, Fortsch. Phys. **60** (2012) 941 [1202.0336].