

# Gabriel C. Drummond-Cole

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## Curriculum Vitae

### Education

- 2010 **PhD**, *City University of New York*
- 2010 **MPhil**, *City University of New York*
- 2003 **BA**, *University of California, Berkeley*

### PhD thesis

- Title *Homotopy Batalin-Vilkovisky algebras, trivializing circle actions, and moduli space*
- Advisor John Terilla

### Employment

- 2013–2019 **IBS Fellow**,  
*IBS Center for Geometry and Physics (IBS-CGP)*, Pohang (Republic of Korea)
- 2010–2013 **NSF postdoctoral research fellow and Ralph P. Boas assistant professor**,  
*Northwestern University*, Evanston (Illinois)

### Publications and preprints

#### Publications

- 2025 (with J. Bellier-Millès). *Homotopy theory of curved operads and curved algebras*. **312** (1580), 89 pages.
- 2022 (with B. H. An and B. Knudsen). *Asymptotic homology of graph braid groups*. *Geom. Topol.* **26** (4), 1745–1771.
  - (with M. Tavakol). *An action of the Polishchuk differential operator via punctured surfaces*. *Int. Math. Res. Not. IMRN* **2022** (2), 959–998.
- 2021 (with P. Hackney). *Coextension of scalars in operad theory*. *Math. Z.* **301**, 275–314.
  - (with P. Hackney). *Dwyer–Kan homotopy theory for cyclic operads*. *Proc. Edinb. Math. Soc.* (2) **64** (1), 29–58.
  - (with G. Horel). *Homotopy transfer and formality*. *Ann. Inst. Fourier (Grenoble) Online First*, 20 pages.
- 2020 (with J. Hirsh and D. Lejay). *Endomorphisms are adjoint to representations*. *J. Homotopy Relat. Struct.* **15**, 377–393.
  - (with B. H. An and B. Knudsen). *Edge stabilization in the homology of graph braid groups*. *Geom. Topol.* **24** (1), 421–469.

- 2019 (with P. Hackney). *A criterion for existence of right-induced model structures*. Bull. London Math. Soc. **51** (2), 309–326.
- (with B. H. An and B. Knudsen). *Subdivisional spaces and graph braid groups*. Doc. Math. **24**, 1513–1583.
- 2018 *An operadic approach to operator-valued free cumulants*. Higher Structures **2** (1), 42–56.
- *A non-crossing word cooperad for free homotopy probability theory*. MATRIX Book Series **1**, 77–99.
- 2017 (with B. Knudsen). *Betti numbers of configuration spaces of surfaces*. J. London Math. Soc. **96** (2), 367–393.
- (with J. Terilla). *Homotopy probability theory on a Riemannian manifold and the Euler equation*. New York J. Math. **23**, 1065–1085.
- 2016 (with J. Hirsh). *Model structures for coalgebras*. Proc. Amer. Math. Soc **144**, 1467–1481.
- 2015 (with J.-S. Park and J. Terilla). *Homotopy probability theory I*. J. Homotopy Relat. Struct. **10** (3), 425–435.
- (with J.-S. Park and J. Terilla). *Homotopy probability theory II*. J. Homotopy Relat. Struct. **10** (3), 623–635.
- 2014 *An update on domineering on rectangular boards*. Integers **14**, 13 pages.
- *Formal formality of the hypercommutative algebras of low dimensional Calabi-Yau varieties*. Comm. Math. Phys. **327** (2), 433–441.
- *Homotopically trivializing the circle in the framed little disks*. J. Topol. **7** (1), 641–676.
- 2013 (with B. Vallette). *The minimal model for the Batalin–Vilkovisky operad*. Selecta Math. (N.S.) **19** (1), 1–47.
- 2010 (with J. Terilla and T. Tradler). *Algebras over  $\Omega(\text{coFrob})$* . J. Homotopy Relat. Struct. **5** (1), 15–36.
- 2009 (with D. O’Donnol). *Intrinsically  $n$ -linked complete graphs*. Tokyo J. Math. **32**, 113–125.
- 2005 *Positions of value  $*2$  in generalized domineering and chess*. Integers **5** (1), 13 pages.
- [Preprints](#)
- 2019 (with J. Hirsh and D. Lejay). *Endomorphism operads of functors*. arXiv:1906.09006, 20 pages.
- *Betti numbers of unordered configuration spaces of small graphs*. arXiv:1906.00692, 728 pages.
- 2015 (with K. Poirier and N. Rounds). *Chain level string topology operations*. arXiv:1506.02596, 67 pages.
- 2014 (with J. Terilla). *Cones in homotopy probability theory*. arXiv:1410.5506, 8 pages.
- 2004 *Temperature two in domineering*. Unpublished note, 2 pages.

## Teaching Experience

✉ [gabriel.c.drummond.cole@gmail.com](mailto:gabriel.c.drummond.cole@gmail.com)

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## POSTECH

- Spring 2018 Homological algebra  
[Northwestern University](#)  
Spring 2013 Introduction to Game Theory  
Fall 2012 Differential Calculus of Multivariable Functions *two sections*  
Spring 2011 Introduction to Game Theory *redesigned course and wrote new text*  
Winter 2011 Differential Calculus of Multivariable Functions  
Algebraic Topology *independent study*  
Fall 2010 Integral Calculus of One Variable Functions

## [Lehman College](#)

- Spring 2010 College Algebra  
Problem Solving for Management, Economics, and Life Sciences  
Differential Calculus *two sections*  
Fall 2009 College Algebra *two sections*  
Precalculus  
Integral Calculus

## [Baruch College](#)

- Spring 2009 Applied Calculus  
Fall 2008 Precalculus *two sections*

## [Stony Brook University](#)

- Fall 2007 Differential Calculus *large lecture*  
Summer 2005 Differential Calculus  
Spring 2005 Functions  
2003–2008 Various *Teaching assistant, seven courses*  
2004–2008 Various *Grader, six courses*

## [Other](#)

- 2000–2009 Various *Private tutor*

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## Talks and Presentations

### [Lecture series](#)

- 2018 Homotopy Probability Theory, Sichuan University (China) *Three lectures*  
2016 Model Categories, KIAS (Republic of Korea) *Three lectures*  
2013 Operadic Algebra, IBS-CGP (Republic of Korea) *Three lectures*  
2011 Summer school on string topology, UC Berkeley *Seven lectures*

### [Invited Talks](#)

- 2018 Topology Seminar, Stockholms universitet  
Geometry and Topology Seminar, UC Irvine  
2017 Australian Category Seminar, Macquarie University (Sydney)

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🌐 <https://drummondcole.com/gabriel/academic/>

- AG Topologie Seminar, Freie Universität Berlin  
 Homotopy Probability Theory Workshop, Universität des Saarlands (Saarbrücken)
- 2016 Winter School on Higher Categories and TQFT, KIAS (Seoul)  
 Einstein chair seminar, CUNY  
 Topology seminar, Massachusetts Institute of Technology (Cambridge)  
 Deformation theory seminar, University of Pennsylvania (Philadelphia)  
 Topology seminar, University of Indiana (Bloomington)  
 Topology seminar, University of Illinois (Urbana-Champaign)  
 AMS Sectional meeting: Topology and physics session, University of Saint Thomas (Minneapolis)  
 Higher Structures: Advances, MATRIX (Creswick)  
 Colloquium, Yonsei University (Seoul)
- 2015 Einstein chair seminar, CUNY  
 East Asian Symplectic Conference, CUHK  
 Topology seminar, UC Berkeley  
 Topology seminar, Stanford University
- 2014 IBS Research Conference, Daejeon convention center  
 Géométrie Algébrique, Champs et Homotopie Seminar, Institut de Mathématiques de Toulouse
- 2012 Special guest lecture, IBS-CGP (Pohang)  
 Topology seminar, University of Indiana (Bloomington)  
 Topology seminar, University of Illinois (Urbana-Champaign)  
 Topology seminar, UC Berkeley
- 2011 Topology seminar, University of Chicago  
 Topology seminar, Purdue (West Lafayette)
- 2010 Workshop: Topology and Quantization, UC Berkeley
- 2009 Workshop: Strings, Fields, and Topology, Mathematisches Forschungsinstitut Oberwolfach

## Other Professional Activities

### Organization

- 2020 **Organizer**, *Configuration spaces of graphs*, AIM
- 2019 **Organizer**, *Current directions in homotopical algebra*, IBS Center for Geometry and Physics
- 2018 **Organizer**, *Pohang Operadic Workshop*, IBS Center for Geometry and Physics  
**Organizer**, *Topology in Australia and South Korea*, IBS Center for Geometry and Physics
- 2017 **Organizer**, *Topology in Australia and South Korea*, University of Melbourne
- 2016 **Organizer**, *String topology mini-workshop*, IBS Center for Geometry and Physics

**Organizer**, *Paired workshops on string field theory of the B model and homotopical methods in quantum field theory*, IBS Center for Geometry and Physics

2011 **Organizer**, *Summer school on string topology*, UC Berkeley

**Organizer**, *Koszul duality for operads seminar*, Northwestern University

#### Thesis committees

2018 **Committee member**, *Taesu Kim*, Seoul National University

#### Course design

2011 **Developer**, *New undergraduate course on combinatorial game theory, including new textbook*, Northwestern University

#### Computer-related

2003–present Compile and maintain extensive notes in  $\text{\LaTeX}$  of many conferences, seminars, workshops, and courses, available on my web page

2006–2008 Coded websites and internal scripts for Stony Brook Mathematics departmental staff and Research Training Group

2006 Compiled and edited official course notes for Park City/IAS Summer School on low dimensional topology