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Current Employment:	Institut des Hautes Études Scientifiques (IHES), France Postdoc Sponsor: Vasily Pestun	2019-2021
Previous Employment:	University of Connecticut (UConn), Storrs, CT Assistant Research Professor in Mathematics Sponsor: Ambar Sengupta	2016-2019
Education:	The CUNY Graduate Center (GC), New York, NY Ph.D., Physics, completed Sept. 2016 Thesis advisors: V. Parameswaran Nair (Physics) and Scott O. Wilson (Math)	2010-2016
	Macaulay Honors College at Queens College, Flushing, NY Magna Cum Laude, Physics (BS), Mathematics (BA), and Japanese (minor)	2006-2010
	Archbishop Molloy High School, Briarwood, NY	2002-2006
Grants, Honors & Awards:	Graduate Center Capelloni Dissertation Fellowship (Physics) National Science Foundation Graduate Research Fellowship (Mathematics) Grant No. 40017-01-04, 40017-06-05, and 40017-06-06 Tomaszkiewicz-Florio Scholarship Arthur Sard Memorial Award (Mathematics) Max Kupferberg Physics Scholarship (Physics) Thomas Budne Memorial Award (Mathematics) Young Scientist Award Member of Phi Beta Kappa Summer Program for Undergraduate Research Fellowship	2015-2016 2011-2014 Jun 2010 May 2010 Jun 2009 May 2009 Mar 2009 Jan 2009-Present Summer 2008
Publications:	“Stinespring’s construction as an adjunction” <i>Compositionality</i> 1 , 2 (2019) doi: 10.32408/compositionality-1-2 , arXiv: 1807.02533 [math.OA]	Dec 2019
	“Two-dimensional algebra in lattice gauge theory” <i>Journal of Mathematical Physics</i> 60 043506 (2019), doi: 10.1063/1.5078532 arXiv: 1802.01139 [hep-th]	Apr 2019
	“From Observables and States to Hilbert Space and Back: A 2-Categorical Adjunction” <i>Applied Categorical Structures</i> 26 , Issue 6 (2018), pp 1123–1157, doi: 10.1007/s10485-018-9522-6 arXiv: 1609.08975 [math-ph]	Mar 2018
	“Gauge invariant surface holonomy and monopoles,” <i>Theory and Applications of Categories</i> 30 , 2015, No. 42, pp 1319-1428, arXiv: 1410.6938 [math-ph]	Oct 2015
	“Sufficient conditions for two-dimensional localization by arbitrarily weak defects in periodic potentials with band gaps,” with Karen K. Y. Lee, Yehuda Avniel, and Steven G. Johnson, <i>Phys. Rev. B</i> 81 , 155324 (2010); doi: 10.1103/PhysRevB.81.155324 , arXiv: 1002.4426 [cond-mat.other]	Apr 2010
Submitted:	“A non-commutative Bayes’ theorem” with Benjamin P. Russo (61 pages) arXiv: 2005.03886 [quant-ph]	May 2020
	“Inverses, disintegrations, and Bayesian inversion in quantum Markov categories” (38 pages) arXiv: 2001.08375 [quant-ph]	Jan 2020
	“Non-commutative disintegration: existence and uniqueness in finite dimensions” with Benjamin P. Russo (Farmingdale State College SUNY) (78 pages) arXiv: 1907.09689 [quant-ph]	Jul 2019

	“Discrete probabilistic and algebraic dynamics: a stochastic commutative Gelfand-Naimark Theorem” (71 pages) arXiv: 1708.00091 [math.FA]	Jul 2017
Work in progress:	“Convex categories and entropy” (110 pages) “A functorial characterization of von Neumann entropy” (35 pages) “Jeffrey conditioning and Bayesian inference in quantum mechanics” (12 pages) “Noncommutative differential K-theory” with Byungdo Park, Corbett Redden, and Augusto Stoffel	
Authored course material:	Categorical probability theory (7 videos) Advanced topics in Linear Algebra video lectures (28 videos) Calculus handouts (22 pages) Linear Algebra lecture notes (284 pages) Analysis II video lectures (68 videos, each \approx 12 minutes long) Analysis II lecture notes (204 pages) Analysis I lecture notes (118 pages)	Fall 2020 Spring 2019 Fall 2018 Fall 2018 Spring 2017 Spring 2017 Fall 2016
Teaching experience:	“Stationary observers outside a black hole II” (Math 3799) at UConn Independent Study with undergraduate Aleksey Fylypiv Applied Linear Algebra (Math 2210Q) at UConn “Stationary observers outside a black hole I” (Math 3799) at UConn Independent Study with undergraduate Aleksey Fylypiv Honors Calculus I (Math 1151Q) at UConn Applied Linear Algebra (Math 2210Q) at UConn Applied Linear Algebra (Math 2210Q) at UConn Applied Linear Algebra (Math 2210Q) at UConn Applied Linear Algebra (Math 2210Q) at UConn Analysis II (Math 3151) at UConn (video lectures now available) Applied Linear Algebra (Math 2210Q) at UConn Analysis I (Math 3150) at UConn Applied Linear Algebra (Math 2210Q) at UConn	Spring 2019 Spring 2019 Fall 2018 Fall 2018 Fall 2018 Spring 2018 Fall 2017 Spring 2017 Spring 2017 Fall 2016 Fall 2016
Other Experience:	Adjunct lecturer at The City College of the CUNY Teacher’s assistant for Classical Mechanics Lab and recitation instructor for first year physics Independent study/research under V. Parameswaran Nair Independent study/research under Scott O. Wilson Senior thesis advised under Scott O. Wilson, Queens College Research intern under Steven G. Johnson, MIT Research assistant in the Nano-structured Photonics and Materials Laboratory under Sajan Saini, Queens College Employee of Kinokuniya Bookstores Company, New York, NY Tutored high school, college, and graduate students in math and physics	Spring 2015 Fall 2014-Fall 2016 Spring 2012-2016 Spring 2011-2016 Spring 2010 Summer 2009 2008-2009 2007-2009 2004-2016
Seminar & Conference Talks:	Category Theory 2019 at the University of Edinburgh title: “Non-commutative disintegrations and regular conditional probabilities” (slides) Operator Algebras and Applications at the Simons Center title: “Non-commutative disintegrations” (video) UConn Math Club title: “The contraction mapping theorem: Fractals from iterations” (slides) Joint Mathematics Meeting (JMM) 2019 Baltimore title: “Non-commutative disintegration” (slides) Category Theory OctoberFest 2018 at CUNY	Jul 9, 2019 Jun 17, 2019 Feb 6, 2019 Jan 19, 2019

title: “Non-commutative disintegration” (slides)	Oct 28, 2018
The Analysis Learning Seminar at UConn	
title: “Non-commutative disintegration”	Oct 26, 2018
Third Northeastern Analysis Meeting (NEAM) at SUNY New Paltz	
title: “Non-commutative disintegration” (slides)	Oct 20, 2018
The Mathematical Physics Seminar at UConn	
title: “Direct integrals”	Oct 3, 2018
UConn Math Club	
title: “The Physics and Mathematics of Special Relativity” (notes and handout)	Feb 21, 2018
The S.I.G.M.A. Seminar at UConn	
title: “Cupcakes versus muffins: support vector machines” (slides)	Jan 26, 2018
Second Northeastern Analysis Meeting (NEAM) at University at Albany (SUNY)	
title: “Categories in Probability” (slides)	Oct 14, 2017
The Analysis Learning Seminar at UConn	
title: “Algebraic Probability and Stochastic Processes III”	
subtitle: “A stochastic Gelfand-Naimark Theorem”	Apr 14, 2017
title: “Algebraic Probability and Stochastic Processes II”	
subtitle: “The Gelfand-Naimark Theorem”	Mar 31, 2017
title: “Algebraic Probability and Stochastic Processes I”	
subtitle: “Finite probability theory and positive maps”	Mar 24, 2017
Mathematical Physics, Fourier Analysis, and Applications Seminar at the CUNY Graduate Center	
title: “Completely positive maps in quantum mechanics and probability theory”	Mar 17, 2017
The S.I.G.M.A. Seminar at UConn	
title: “Convex categories and entropy” (notes)	Dec 2, 2016
Representation Theory Seminar at the GC	
title: “From observables and states to Hilbert space and back”	Oct 7, 2016
CCNY Student Research Symposium at the City College of New York of CUNY	
title: “Two-dimensional algebra and gauge theory” (slides)	May 10, 2016
High Energy Physics Seminar at the City College of New York of CUNY	
title: “Two-dimensional algebra and gauge theory for strings” (slides)	Mar 18, 2016
Mathematical Physics, Fourier Analysis, and Applications Seminar at the GC	
title: “The mathematics of the Berry phase: an introduction to vector bundles with connection”	Oct 2015
CCNY Physics Journal Club	
title: “Homotopy Theory for Physicists” (notes)	May 2015
AMS Spring Eastern Sectional Meeting at Georgetown University, Washington, DC	
title: “Two-dimensional iterated integrals and applications in classical gauge theory” (slides)	Mar 2015
Topology Student Seminar at the GC	
title: “The model category of simplicial sets”	Nov 2014
title: “Simplicial sets, Kan complexes, and model structures” (notes)	Oct 2014
7th Annual Binghamton University Graduate Conference in Algebra and Topology	
title: “Two-dimensional algebra and higher holonomy” (slides)	Oct 2014
Topology Student Seminar at the GC	
title: “Postnikov systems”	Sep 2014
title: “Monoidal categories, the fundamental 2-group, and H-spaces”	Feb 2014
11th Annual Graduate Student Topology & Geometry Conference at the University of Notre Dame	
title: “2-bundles over 2-spaces”	Apr 2013
Topology Student Seminar at the GC	

	title: “2-bundles and 2-holonomy”	Apr 2013
	Boosting the Power of SUNY and CUNY: A Celebration of Graduate Research in Albany, New York	
	poster presentation title: “Configuration Spaces”	Feb 2013
	1st GC Interdisciplinary Science Student Conference at the GC	
	role: member of panel for professional development	Apr 2012
	Student Algebraic Topology Seminar at the GC	
	title: “Preparation for K-Theory”	Oct 2011
Seminars Organized:	Mathematical Physics Seminar at UConn	Spring 2018–Fall 2019
	CCNY Physics Journal Club	Fall 2014–Spring 2016
	Algebraic Topology Student Seminar (w. other students)	Fall 2014–Spring 2015
	Mathematical Physics, Fourier Series, and Applications (w. Azita Mayeli)	Fall 2014
	Mathematical Physics and Harmonic Analysis (w. Azita Mayeli)	Spring 2014
	Mathematical Physics Seminar	Spring 2013–Fall 2013
	Foundations of Physics (w. Ryan Abrahams and Marcelo Nomura)	Spring 2012–Fall 2014
	Gauge Theory Seminar (w. Brian Sulkow)	Fall 2011–Fall 2012
	Categories and Linear Algebra (unofficial course taught by me)	Fall 2011
Conferences Attended (participant only):	“Strongly Correlated Topological Phases of Matter” at the Simons Center, New York	Jun 2017
	“Graduate Workshop on Topological Quantum Field Theory” at the Simons Center, New York	Sep 2015
	“Prospects in Theoretical Physics—Princeton Summer School on Condensed Matter Physics,” at Princeton and IAS, New Jersey	Jul 2015
	“Progress and Application of Modern Quantum Field Theory” at the Aspen Center for Physics, Colorado	Feb 2015
	“CUNY workshop on differential cohomologies” at the CUNY Graduate Center, New York	Aug 2014
	“String Geometry and Loop Spaces” at the Institute for Mathematics at Greifswald, Germany	Jul 2014
	“The Mathematics of Quantum Theory” at the University of California, Davis	May 2014
	“GAP XI: Higher Geometry and Quantum Field Theory” at the University of Pittsburgh, Pennsylvania	Aug 2013
	“Higher Algebras and Lie-infinity Homotopy Theory” at the University of Luxembourg	Jun 2013
	“New Perspectives in Topological Field Theories” at the Center for Mathematical Physics, Hamburg, Germany	Aug 2012
	“FRG Conference on Topology and Field Theories” at the Center of Mathematics at Notre Dame University	Jun 2012
	“Supersymmetric Field Theories and Their Mathematical Implications” at the Simons Center for Geometry and Physics, New York	Mar 2012
Further activities:	Member of “Topological K-theory and Algebraic Topology Group” at the CUNY Graduate Center (leader: Mahmoud Zeinalian)	Fall 2013–Spring 2016
Skills:	Proficient in \LaTeX including plots, graphs, for-loops, graphics, etc. in TikZ & xy Experience with Photoshop and Gimp	
Languages:	English (fluent), Polish (fluent), Japanese (intermediate)	
Enjoys:	Painting, bouldering, rock climbing, drawing, snowboarding, cooking, agriculture, architecture, swimming, hiking	