Benjamin F. Dribus

Curriculum Vitae

Chair, Department of Mathematics
Assistant Professor of Mathematics
William Carey University
498, Tuscan Avenue, Hattiesburg, MS, 39401
985-285-5821

bdribus@wmcarey.edu
bdribus@gmail.com
www.causalphysics.com
(links are blue)

Education

2006-2013:
Louisiana State University, Ph.D. in Mathematics (graduated May 2014);
Thesis: *Infinitesimal Theory of Chow Groups*

2004-2006:
Tulane University, M.A. in Mathematics, July 2006

1998-2003:
University of Oklahoma, B.S. in Physics, December 2003;
B.A. in Mathematics, December 2003

Affiliations

Foundational Questions Institute (FQXi)
Member, beginning December 2012

Academics

FQXi Prize Winner, December 2012;
GAANN Fellowship, LSU, 2010-2013;
Board of Regents Fellowship, LSU, 2006-2010;
VIGRE Fellowship, Tulane, 2004-2006;
National Merit Scholarship, OU, 1998-2003;
Tests: GRE 170/169/5 verbal/quant/writing (2013)

Research Interests

Mathematics:
mathematical physics, algebraic geometry, algebraic K-theory, noncommutative geometry, graph theory, order theory

Physics:
Spacetime microstructure, quantum gravity, quantum information theory, ultra-cold matter

Writing

Research:

1. *Discrete Causal Theory: Emergent Spacetime and the Causal Metric Hypothesis* (To be published by Springer)
2. *On the Axioms of Causal Set Theory*
3. *On the Infinitesimal Theory of Chow Groups* (Thesis: *slides*)
4. *On the Foundational Assumptions of Modern Physics*
5. *A Goodwillie-type Theorem for Milnor K-Theory*
6. *Bose-Einstein Condensation Transition Studies for Atoms Confined in Laguerre-Gaussian Laser Modes* (main author: Eric Abraham)

In Preparation:

1. *Path Algebras in Quantum Causal Theory*
2. *Infinitesimal Theory of Chow Groups via K-Theory, Cyclic Homology, and Relative Chern Character* (with J.W. Hoffman and Sen Yang)
3. *Relation Space in Discrete Causal Theory*
4. *Causal Atomic Resolution*
5. *Emergent Poincaré Group in Discrete Causal Theory*

Expository:

Quantum Circuit Graphs
Bell's Theorem
Notes on Simplicial Theory
Abel's Theorem
Abelian Sums and Higher Tangents on Algebraic Curves

Translation:

Differential Calculus and Characteristic Classes in Algebraic Geometry
(from *Calcul Différentiel et classes caractéristiques en géométrie algebrique,* by B. Angéniol and M. LeJeune-Jalabert)

Research Experiences

2014-2015:

Independent research in mathematical physics and algebraic geometry

2007-2014

Thesis work with J. W. Hoffman (LSU) on Chow groups;
Quantum information theory with Jimmie Lawson;
Algebra cohomology with James Madden;
Supervised undergraduate research on graph theory

2001-2005:

Bose-Einstein condensation, with Eric Abraham at OU;
Helped lead VIGRE research group studying differential geometry at Tulane
Four-color theorem, capstone in mathematics;
Wavelet methods in signal processing, capstone in physics

Teaching

Assistant Professor at William Carey

MAT 2490: Directed Reading Calculus III and Calculus IV;
MAT 2510: Calculus with Analytic Geometry III;
MAT 2520: Calculus with Analytic Geometry IV;
MAT 3090: Mathematics Seminar III;
MAT 3350: Foundations of Mathematics;
MAT 3380: Discrete Mathematics;
MAT 3410: Linear Algebra I;
MAT 3420: Linear Algebra II;
MAT 3490: Directed Reading Linear Algebra;
MAT 3530: Differential Equations;
MAT 4410: Abstract Algebra;
MAT 4510: Advanced Calculus;
MAT 4710: History and Philosophy of Mathematics;
MAT 5410: Abstract Algebra (graduate);
MAT 6350: Foundations of Higher Mathematics (graduate);
MAT 6710: History of Mathematics (graduate);
MAT 6900: Topics in Discrete Mathematics (graduate)

Graduate assistant at LSU (as instructor of record)

Math 1552, Calculus II, Fall 2011
Math 1550, Calculus I, Fall 2010 and Fall 2012
Math 1100, Nature of Mathematics, Summer 2010

Computer Skills

Symbolic Calculation:
Mathematica, Maple, Matlab

Algebra:
Singular

General Programming:
C++, Fortran

Technical Writing:
Very proficient with LaTeX, PGF/TikZ, Beamer

Web Site:
www.causalphysics.com