

SAMUEL BRUCE SMITH

EDUCATION

University of Minnesota

Ph.D. in Mathematics, June 1993

Thesis: *On the Rational Homotopy Theory of Function Spaces*

Thesis Advisor: Professor Donald W. Kahn

Bucknell University

B.S. in Mathematics, *Summa Cum Laude*, May 1988

EXPERIENCE

Saint Joseph's University

Professor, Fall 2007 -present

Chair, Fall 2012 – Spring 2018

Director of the Honors Program, Fall 2003-Spring 2008

Associate Professor, Fall 2000-Spring 2006

Assistant Professor, Fall 1995-Fall 2000

Washington College, Chestertown, MD

Assistant Professor, Fall 1993-Spring 1995

AWARDS

The Tenglemann Award for Research and Teaching, Saint Joseph's University, 2012

The University Prize for Teaching, Saint Joseph's University, 2003

The University Prize for Research, Saint Joseph's University, 2002

Project Next Fellow, Mathematics Association of America, 1995

Citation For Excellence in Teaching, University of Minnesota, 1993

Excellent Thesis in Mathematics Award, University of Minnesota, 1993

Phi Beta Kappa, Bucknell University, 1988

RESEARCH

Books

Chance, Strategy and Choice: An Introduction to the Mathematics of Games and Elections
Cambridge University Press (2015)

Homotopy Theory of Function Spaces and Related Topics,
Contemporary Mathematics, volume 519, (2010)
American Mathematical Society, Providence, Rhode Island
editor with Yves Félix and Gregory Lupton

Articles

The universal fibration with fibre X in rational homotopy theory,
submitted for publication, **Journal of Homotopy and Related Structures**
in press, with Gregory Lupton

The rational sectional category of certain universal fibrations,
Revista Matemática Complutense, vol. 33, (2020) 187-196
with Gregory Lupton

Realizing spaces as classifying spaces,
Proceedings of the American Mathematical Society, vol. 144,
(2016), 3619-3633 with Gregory Lupton

Gottlieb groups of function spaces,
Mathematical Proceedings of the Cambridge Philosophical Society vol 159,
(2015), 61-77 with Gregory Lupton

The effect of cell attachment of on the group of self-equivalences of an R -localized space,
Journal of Homotopy and Related Structures, vol. 10 (2015), 549-564
with Mahmoud Benkhalifa

Rational homotopy type of classifying space for fibrewise self-equivalences,
Proceedings of the American Mathematical society, vol .141 (2013), 2153-2167
with Urtzi Buijs

Fibrewise rational H -spaces,
Algebraic & Geometric Topology, vol. 12 (2012), 1667-1694
with Gregory Lupton

Rational homotopy type of the monoid of self-equivalences of a fibration,
Homology, Homotopy and its Applications, vol 12, (2010) 371-400
with Yves Félix and Gregory Lupton

From rational homotopy to K-theory for commutative trace algebras,
Proceedings of Symposia in Pure Mathematics, vol 8, (2010) 165-171
with John Klein and Claude Schochet

The homotopy theory of function spaces: a survey
Contemporary Mathematics, vol 519 (2010), 3-39

Localization of grouplike function and section spaces
Contemporary Mathematics, vol 519 (2010), 189-202
with Claude Schochet

Whitehead products in function spaces: Quillen model formulae
Journal of the Mathematical Society of Japan vol 62 (2010), 49-81
with Gregory Lupton

Continuous trace C^ -algebras, gauge groups, and rationalization*
Journal of Topology and Analysis vol 1 (2009) 261-288
with John Klein and Claude Schochet

Banach algebras and rational homotopy theory,
Transactions of the American Mathematical Society, vol 265 (2009), 267-295
with Gregory Lupton, Christopher Phillips, Claude Schochet

A criteria for components of a function space to be homotopy equivalent,
Mathematical Proceedings of the Cambridge Philosophical Society
vol 145, (2008) 95-106 with Gregory Lupton

Cardinality of the set of real functions with a given continuity set,
Pi Mu Epsilon Journal, 12, no. 8, (2008) 449-454 with Jiaming Chen

The evaluation subgroup of a fibre inclusion,
Topology and its Applications, vol 154 (2007) pg. 1107-1118
with Gregory Lupton

Rank of the fundamental group of a component of a function space,
Proceedings of the American Mathematical Society vol 135 (2007) pg. 2649-2659
with Gregory Lupton

Rationalized evaluation subgroup of a map II: Quillen models and adjoints,
Journal of Pure and Applied Algebra, 209, (2007), pg.159-171
with Gregory Lupton

Rationalized evaluation subgroup of a map I: Sullivan models, derivations and G-sequences

Journal of Pure and Applied Algebra, 209, (2007), pg.173-188
with Gregory Lupton

Innovative possibilities for undergraduate topology,

Mathematics Association of America Notes, 67, (2005) pg. 81-88

Cyclic maps in rational homotopy theory,

Mathematische Zeitschrift, 249, (2005), 113-124, with Gregory Lupton

Rational type of classifying spaces for fibrations,

Contemporary Mathematics 274, American Mathematical Society, (2001) pg 299-307

The rational homotopy Lie algebra of classifying spaces for formal, two-stage spaces

Journal of Pure and Applied Algebra vol 160 (2001) pg 333-343

Rational L.S. category of function space components for F_0 -Spaces,

Bulletin of the Belgian Mathematical Society, vol. 6, (1999) pg. 295-304

Rational classification of simple function space components for flag-manifolds,

Canadian Journal of Mathematics, vol. 49, (1997) pg. 855-866

A based Federer spectral sequence and the rational homotopy of function spaces,

Manuscripta Mathematica, vol. 93, (1997), pg. 59-66z

Rational evaluation subgroups,

Mathematische Zeitschrift, vol. 221, (1996), pg. 387-400

Postnikov sections of formal and hyperformal spaces,

Proceedings of the American Mathematical Society, vol. 122, (1994), pg. 893-903.

Rational homotopy of the space of self-maps of complexes with finitely many homotopy groups,

Transactions of the American Mathematical Society, vol. 342, (1994), pg. 895-915

Other Published Work

Review of Algebraic Models for Geometry, Oxford University Press, 2008
by Yves Félix, John Oprea and Daniel Tanré

Journal of Geometry and Symmetry in Physics, vol. 13 (2008) 89-93

Homotopy Theory of Function Spaces and Related Topics

Mathematisches Forschungsinstitut Oberwolfach Report 19/2009

Rationalization of the G-sequence for Gottlieb groups (published lecture)

Proceedings of the International Conference on Homotopy Theory and Related Topics, Korea University (2005), 87-97

102 Mathematical Reviews for **Math Reviews** including 3 book reviews

51 Mathematical Reviews for **Zentralblatt für Mathematik** including 3 book reviews

Research Grants

Travel Grant,

Clay Mathematics Institute

supporting participation in the conference *Rational Homotopy and its Interactions*

Rabat, Morocco, July, 2016

Research in Pairs,

Mathematisches Forschungsinstitut Oberwolfach, Germany, June, 2014

International Conference on the Homotopy Theory of Function Spaces and Related Topics,

Mathematisches Forschungsinstitut Oberwolfach, Germany, April, 2009

organized with Yves Félix and Gregory Lupton

Public Lectures

The universal fibration with fibre X in rational homotopy theory,

Deformation Theory Seminar, University of Pennsylvania, July, 2019

Realization problems in algebra and topology,

Second International Spring School on Algebra, Analysis, and Topology,

University of Sharjah, United Arab Emirates, March, 2019

A Quillen model for the evaluation fibration for the classifying space,

Rational Homotopy Theory Workshop

Lille, France, January 2018

Two realization problems for self-equivalences in rational homotopy theory,
Deformation Theory Seminar, University of Pennsylvania, August 2016

Classifying spaces and rational homotopy theory,
CIMPA Summer School on Rational Homotopy Theory
Rabat, Morocco July 2016

Function spaces and rational homotopy theory,
CIMPA Summer School on Rational Homotopy Theory
Rabat, Morocco July 2016

Open problems in rational homotopy theory,
Algebra and Topology Seminar, Temple University April 2013

Fibrewise rational H-spaces,
Chinese Academy of Sciences, Beijing, China, June 2012

Fibrewise constructions in rational homotopy theory
Nankai University Mathematics Seminar, Tianjin, China, June 2012

Derivations and function spaces,
Nankai University Mathematics Seminar, Tianjin, China, June 2012

Fibrewise rational homotopy theory,
Rational Homotopy Theory Festschrift for Yves Félix, Ottawa, Canada, May 2012

A Quillen model for the monoid of fibrewise self-equivalences
Deformation Theory Seminar, University of Pennsylvania, February, 2012

Algebraic models for function spaces
Drexel University Mathematics Colloquium, Drexel University, March, 2010

Problems on function spaces
International Conference on the Homotopy Theory of Function Spaces and Related Topics,
Mathematisches Forschungsinstitut Oberwolfach, Germany, April, 2009

Why gauge groups are rationally abelian
Topology and Geometry Tetrahedral Seminar, Lancaster, PA March, 2009

Gauge groups and related structures in rational homotopy theory,
Special Session on Homotopy Theory
Central Meeting of the American Mathematical Society
Kalamazoo, MI October, 2008

Actions of the space of self-equivalences on the components of a function space,
International Conference on Groups of Self Equivalences and Related Topics
Halifax, Canada June 2008

Rank of the fundamental groups of a component of a function space,
Annual Meeting of the American Mathematical Society,
New Orleans, January 2007

Detecting C^ -algebra invariants with rational homotopy theory,*
The Deformation Theory Seminar, University of Pennsylvania, June 2006

Banach algebras and rational homotopy theory,
The Deformation Theory Seminar, University of Pennsylvania, October, 2005

Rationalized evaluation subgroup of a map and the rationalized G -sequence,
International Conference on Homotopy Theory and Related Topics,
Korea University, Seoul, Korea February 2005

The evaluation subgroup of fibre inclusion,
International Conference on Homotopy Theory and Related Topics,
Hannam University, Korea January 2005

Graded Lie derivations, adjoints and a question of Gottlieb,
The Deformation Theory Seminar, University of Pennsylvania, March 2004

Groups and Lie algebras in homotopy theory,
The Mathematics Seminar, Shippensburg University, October 2003

Rationalization of the G (ottlieb)-sequence,
The Deformation Theory Seminar, University of Pennsylvania, June 2000

Rational evaluation maps, derivation spaces and the G -sequence for Gottlieb groups,
Lehigh University Topology and Geometry Conference,
Bethlehem, PA, June 2003

Some new results in homotopy theory,
The Deformation Theory Seminar, University of Pennsylvania, June 1998

Applications of rational derivation algebras in topology and geometry,
Cleveland Geometry and Topology Seminar,
Case Western Reserve University, March 2002

Function spaces, classifying spaces and the Halperin conjecture for F_0 -spaces,
The Deformation Theory Seminar, University of Pennsylvania, July 1997

Rational homotopy Lie algebra of classifying spaces for fibrations,
Annual Meeting of the American Mathematical Society,
New Orleans LA, January 2001

Computing the rational homotopy nilpotence of some spaces of self-equivalences,
International Workshop on the Space of Self-Equivalences,
Gargnano, Italy September 1999

Modeling topology with algebra,
The Mathematics Colloquium, Vassar College, May 1998

Rational L.S. category of function spaces,
Annual Meeting of the American Mathematical Society
Baltimore MD January 1998

Sullivan-Haefliger models for mapping spaces for flag manifolds,
Northeast Sectional Meeting of the American Mathematical Society
Lawrenceville, NJ October 1996

Rational homotopy of mapping spaces,
The Mathematics Seminar, Università di Milano, Italy June 1995

Distinguishing components of function spaces,
Annual Meeting of the American Mathematical Society
San Francisco, CA January 1995

TEACHING

Courses Developed

- *Discoveries in Mathematics*

A First Year Seminar and Honors course exploring the history of mathematics and current open problems.

- *Mathematics of Games and Politics*

A General Education and Honors course covering aspects of probability, game theory, and social choice theory.

- *Honors: Paradoxes, Problems and Proofs*

An interdisciplinary Honors course examining the mathematical and philosophical issues arising from the set-theoretic and logical foundations of mathematics, team-taught with Dr. Audre Brokes, Department of Philosophy

Courses Taught

Calculus I-III, Applied Calculus, I, II, Business Math, I, II, Excursions in Mathematics I,II
Topics in Contemporary Math, Statistics, Advanced Calculus, Number Theory,
Discrete Structures, Linear Algebra, Problem Solving, Real Analysis, Complex Analysis,
Modern Algebra I-II, Mathematical Logic, Topology of Point Sets, Paradoxes Problems
and Proofs, Mathematics of Games and Politics, History of Mathematics, Problem
Solving/Capstone, Combinatorics and Graph Theory, Probability

Honors Theses

- | | |
|---|-----------------------|
| • Departmental Honors, Sarah Cooney | Fall 2016-Spring 2017 |
| • Departmental Honors, Meghan O'Keefe | Fall 2016-Spring 2017 |
| • Departmental Honors, Annamarie Everman | Fall 2013-Spring 2014 |
| • University Scholar Project, Brittany Fasy | Fall 2006-Spring 2007 |
| • Departmental Honors, Justin Day | Fall 2006-Spring 2007 |
| • Departmental Honors, Bill Semus | Fall 2004-Spring 2005 |

Independent Studies

- | | |
|--|-------------|
| • Topology of Point Sets, Brian Klatt | Spring 2011 |
| • Elements of Algebraic Topology, Dmytro Yeroshkin | Spring 2008 |
| • Introduction to Algebraic Topology, Dmytro Yeroshkin | Fall 2007 |
| • Topology of Point Sets, Brittany Fasy | Fall 2006 |
| • Topology of Point Sets, Allison Keating | Fall 2004 |

- Introduction to Algebraic Topology, Vincent Russo Spring 2003
- Introduction to Algebraic Topology, Bill Semus Spring 2001
- Topology of Point Sets, Bill Semus Fall 2000
- Topology of Point Sets, Harry Smith and Stephen Bochanski Spring 1998
- Logic and Number Theory, Harry Smith Summer, Fall 1997

Undergraduate Research

- Student: **Sarah Cooney** Fall 2016-Spring 2017
Two Methods for Computing the Betti Numbers of a Complete Intersection Algebra in the Differential Graded Algebra Setting
Departmental Honors Thesis
- Student: **Meghan O'Keefe** Fall 2016-Spring 2017
Insolvability of groups and polynomials
Departmental Honors Thesis
- Student: **Annamarie Everman** Fall 2014-Spring 2015
Faithful Homotopy Invariants of Surfaces,
Departmental Honors Thesis
- Student: **Brittany Fasy** Summer 2006-Spring 2007
Some algebraic classification problems arising from the homotopy theory of function spaces,
University Scholar Project
- Student: **Justin Day** Summer 2006- Spring 2007
Foundations of game theory,
Departmental Honors Thesis
- Student: **Joseph McPeak** Summer 2006
Impossibility theorems in social choice theory
SJU Summer Scholar Undergraduate Research Grant
- Students: **Julia Fox and Brittany Fasy** Spring 2006
Realizability problems in group theory
conference lectures
EPADEL Section of the Mathematics Association of America
Institute for Advanced Study, Summer REU, Student Research Talks

- Student: **Jiaming Chen** Fall 2005- Summer 2006
Cardinality of the set of real functions with a given continuity set,
published in the **Pi Mu Epsilon Journal**
Discontinuity sets and cardinality

- Student: **Vincent Russo** Spring 2003
Covering spaces of topological groups
Sigma Xi Research Symposium, SJU, April 2003

- Student: **Kathleen Ryan** Spring 2003
Induction Proofs with Topological Groups,
Math Awareness Day, SJU, March 2003

- Student: **Bill Semus** Fall 2000- Spring 2001
Realization problems in group theory and topology,
Departmental Honors Thesis
Sigma Xi Research Symposium, SJU, April 2001

- Students: **Stephen Bochanski** and **Harry Smith** Fall 1998
Algorithms for Classifying Surfaces I: Orientable Surfaces
(Stephen Bochanski)
Algorithms for Classifying Surfaces II: The General Case
(Harry Smith)
conference lectures*
Annual Meeting of the Mathematical Association of America, Toronto, July 1998

- *These lectures won the
Pi Mu Epsilon Award for Best Student Presentations

- Student: **Harry Smith** Spring 1997-Fall 1998
Two applications of diophantine equations
Annual Meeting of the Mathematical Association of America, Atlanta, GA, July 1997
Moravian College, Student Mathematics Conference,
Sigma Xi Research Symposium, SJU April 1998