# MATTHEW G. WHEELER

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EDUCATION	
<b>Ph.D., Mathematics</b> <i>University of Pittsburgh</i> , Pittsburgh, PA	2016
<b>M.A., Mathematics</b> <i>University of Pittsburgh,</i> Pittsburgh, PA	2012
<b>B.A., Mathematics</b> <i>Bucknell University</i> , Lewisburg, PA	2008
Employment	
<b>Visiting Assistant Professor</b> <i>University of Florida</i> , Tucson, AZ	2019-Present
<b>Postdoctoral Research Associate</b> <i>University of Arizona</i> , Tucson, AZ	2016-2019

#### **Research Interests**

I am interested in a variety of mathematics, especially those areas which have a strong interplay with theoretical physics. I am particularly interested in gauge theory and the study of moduli spaces as well as the role of higher geometrical structures in high energy physics. In general, I employ techniques coming from differential geometry, aglebraic topology, and integrable systems.

#### **PUBLICATIONS**

- [1] Hisham Sati, Matthew Wheeler, *Topological actions via gauge variations of higher structures*, Physics Letters B, **789** (2019), Pages 114-118
- [2] Hisham Sati, Matthew Wheeler, *Variations of rational higher tangential structures*, Journal of Geometry and Physics, **130** (2018), Pages 229-248
- [3] Sergey Cherkis and Matthew Wheeler, A twistorial approach to instantons on ALF spaces, In preparation.
- [4] Matthew Wheeler, Abelian Instantons on Taub-NUT, In preparation.
- [5] Matthew Wheeler, Interlocking Exact Sequences in Differential Cohomology, In preparation.

# **INVITED TALKS**

Stetson University Physics Colloquium Stetson University Talk (50 min):Topology, Fields and Instantons	Deland, FL February 24, 2020
AMS Sectional Meetings University of Florida Talk (50 min): Twistor space Approach to Instantons on ALF Spaces,	Gainesville, FL November 2, 2019
Monopoles Mini-Conference University of Arizona Talk (50 min): Abelian instantons on Taub-NUT	Tucson, AZ January 16-21, 2019
<b>String Theory and M-Theory: The New Geometry of the 21st Century</b> IMS NUS Talk (50 min): Rational higher structures and variations of topological actions	Singapore December 10-14, 2018

<b>Differential Geometry Seminar Series</b> Arizona State University Talk (50 min): "The Nahm Transform for Taub-NUT"	Tempe, AZ April 27, 2018
<b>Cohomology Theories, Categories, and Applications Workshop</b> University of Pittsburgh Talk (50min):"Rational structures related to $O(n)$ "	Pittsburgh, PA Mar. 29,2017
<b>Geometry, Topology and Physics Seminar</b> University of Pittsburgh Talk (50min): "The Caloron Correspondence: Instantons, Monopoles, and String Classes"	Pittsburgh, PA Nov. 29, 2016
<b>Differential Geometry Seminar Series</b> University of Arizona Talk (50min): "Rational structures and differential refinements "	Tempe, AZ Oct. 16, 2015

# TALKS AND PRESENTATIONS

Topology and Dynamics Seminar	Gainesville, FL
University of Florida	November 19, 2019
Talk (50 min): Bows and twistors	
Mathematical Physics and Probability Seminar	Tucson, AZ
Talk (50 min): "Rational Fivebrane Structures"	Oct. 26, 2016
Graduate Student Conference in Algebra, Geometry, and Topology	Philadelphia, PA
Talk (50min): "Rational Differential Characters and Fivebrane Structures"	May. 14, 2016
Joint Mathematics Meetings	Seattle, WA
Talk (15min): "Rational Structures and Differential Cohomology"	Jan. 7, 2016
Geometry, Topology, and Physics Seminar	Pittsburgh, PA
Talk (50min): "The Euler Class and Obstruction Theory"	Sep. 16, 2015
Graduate Student Geometry and Topology Group	Pittsburgh, PA
Talk (50min): "An Introduction to Cobordism"	Apr. 8, 2015
Proseminar: Characteristic Classes and Geometric Structures	Pittsburgh, PA
Talk (105min): "Some Applications of Rational Homotopy Theory"	Sep. 16, 2014
Geometry, Topology, and Physics Seminar	Pittsburgh, PA
Talk (50min): "Chern Simons Theory as a TQFT Part 2"	Nov. 6, 2013
Geometry, Topology, and Physics Seminar	Pittsburgh, PA
Talk (50min): "Chern Simons Theory as a TQFT"	Spring 2013
Geometry, Topology, and Physics Seminar	Pittsburgh, PA
Talk (50min): "An Introduction to Chern Simons Theory"	Sept. 13, 2012

# **CONFERENCES AND WORKSHOPS ATTENDED**

Between Topology and Quantum Field Theory	Austin, Texas Jan. 14-18, 2019
EPSRC Durham Symposium	Durham, United Kingdom Aug. 12-18, 2018
Topology Festival	Ithaca, NY May. 11-13, 2018
Topological and Geometric Methods in QFT	Bozeman, Montana Jul. 31-Aug. 4, 2017

Graduate Student Conference in Algebra, Geometry, and Topology	Philadelphia, PA May 13-15, 2016
HIM Trimester Program: Homotopy theory, manifolds, and field theories	Bonn, Germany Aug. 3-22, 2015
String Math Summer School	Vancouver, British Columbia Jun. 2–6, 2014
12th Annual Graduate Student Topology and Geometry Conference	Austin, TX Apr. 5-6, 2014
11th Annual Graduate Student Topology and Geometry Conference	Notre Dame, IN Apr. 6–7, 2013

# **TEACHING EXPERIENCE**

## University of Arizona

Introduction to Linear Algebra (Math 313)	Lecturer	Spring 2019
Vector Calculus (Math 223)	Lecturer	Fall 2018
Supplemental Instruction for Vector Calculus	Lecturer	Fall 2018
Theory of Complex Variables (Math 424)	Lecturer	Spring 2018
Introduction to Linear Algebra (Math 313)	Lecturer	Fall 2017
Calculus Concepts for Business (MATH 116)	Lecturer	Spring 2017 Fall 2016

#### University of Pittsburgh

Analytic Geometry & Calculus I (MATH 0220)	Lecturer	Fall 2015 Summer 2012
Differential Equations (Math 0290)	Lecturer	Summer 2013
Advanced Calculus II (Math 1540)	Recitation Instructor and Grader	Spring 2012
Introduction to Theoretical Math (MATH 1240)	Recitation Instructor and Grader	Summer 2011
Linear Algebra 1 (MATH 1180)	Recitation Instructor and Grader	Fall 2010
Analytic Geometry & Calculus III (MATH 0240)	Recitation Instructor and Grader	Fall 2013 Fall 2012
Analytic Geometry & Calculus II (MATH 0230)	Recitation Instructor and Grader	Spring 2014 Spring 2013 Fall 2012 Spring 2011 Fall 2010
Analytic Geometry & Calculus I (MATH 0220)	Recitation Instructor and Grader	Fall 2014 Spring 2012 Spring 2011

# SERVICE

Community Outreach	2016-Present:	Tucson Math Circle volunteer
-	2012-2015:	Pittsburgh Integration Bee

Seminar Organizer	2014-2015:	Graduate Topology Proseminar
Departmental Service	2014-2016: 2014-2016:	Teaching Assistant Mentor Dietrich School of Arts & Sciences Graduate Student Organiza- tion, Officer

## REFERENCES

#### Sergey Cherkis

Professor Department of Mathematics University of Arizona cherkis@math.arizona.edu (412) 624-2483 **Robert Indik** (concerns teaching) Associate Professor Associate Head for Instruction Department of Mathematics University of Arizona indik@math.arizona.edu

#### Hisham Sati

Associate Professor Department of Mathematics NYU Abu Dhabi hsati@nyu.edu (412) 624-0198