KURT W VINHAGE

CURRENT POSITION

UNIVERSITY OF UTAH
Assistant Professor
Fall 2021 - Present

PREVIOUS POSITIONS

PENNSYLVANIA STATE UNIVERSITY
A. Katok Center for Dynamical Systems Research Assistant Professor
Fall 2019 - Spring 2021

UNIVERSITY OF CHICAGO
LE Dickson Instructor & NSF Postdoctoral Fellow
Fall 2016 - Spring 2019

EDUCATION

FLORIDA STATE UNIVERSITY
B.S. in Mathematics, Summa cum Laude
June 2006 - May 2010

PENNSYLVANIA STATE UNIVERSITY
PhD in Mathematics
August 2010 - Summer 2016
Advisor: Anatole Katok

TEACHING EXPERIENCE

UNIVERSITY OF UTAH, DEPARMENT OF MATHEMATICS
Fall 2024 - MATH6510, Differentiable Manifolds & MATH4800, Undergraduate Research Seminar
Summer 2023 - pre-REU Program, *Approximately rational numbers and continued fractions*
Spring 2023 - MATH1320, Engineering Calculus II
Fall 2022 - MATH6510, Differentiable Manifolds
Summer 2022 - pre-REU Program, *(Almost) everything you can do to an interval*
Spring 2022 - MATH3210, Foundations of Analysis I
Fall 2021 - Topics Course (Uniform Hyperbolicity, Cocycles and Rigidity)

PENNSYLVANIA STATE UNIVERSITY, DEPARTMENT OF MATHEMATICS
Fall 2020 - MATH230, Calculus IIII
Spring 2020 - MATH311W, Concepts of Discrete Mathematics
Fall 2019, Spring 2014 and Fall 2013 - MATH017, Finite Mathematics
Fall 2015 - MATH250, Ordinary Differential Equations
Fall 2014 - MATH497B, Teaching Assistant in the PSU MASS Program
Fall 2012 - MATH497C, Teaching Assistant in the PSU MASS Program
Summer 2012 - REU Program Assistant and Group Coordinator
Fall 2011 - MATH018, Elementary Linear Algebra

UNIVERSITY OF CHICAGO, DEPARTMENT OF MATHEMATICS
Spring 2019 - MATH205(10), Analysis in $\mathbb{R}^n$ III (Accelerated)
Winter 2018 - MATH204(10), Analysis in $\mathbb{R}^n$ II (Accelerated)
Winter 2018 - MATH262, Point-Set Toplogy
July 2018 - Young Scholars Program, Instructor in 11-12th grade component

ORGANIZATIONAL/SERVICE EXPERIENCE
RTG SEMINAR
University of Utah
Organizer
Fall 2022 - Spring 2023

DEPARTMENTAL COLLOQUIUM
University of Utah
Committee Member
Fall 2021 - Spring 2023

DYNAMICAL SYSTEMS SEMINAR
Pennsylvania State University
Organizer
Fall 2019 - Spring 2021

DYNAMICAL SYSTEMS SEMINAR
University of Chicago
Organizer
Fall 2017 - Spring 2018

DYNAMICAL SYSTEMS STUDENT SEMINAR
Pennsylvania State University
Founder and Organizer
Fall 2012 - Fall 2015

RESEARCH INTERESTS
Dynamical Systems, Algebraic and Homogeneous actions, Higher-rank abelian actions, Invariants of Smooth Dynamical Systems

RESEARCH PAPERS
ANOSOV ACTIONS: CLASSIFICATION AND THE ZIMMER PROGRAM
Preprint under review.
Joint with Danijela Damjanovic, Ralf Spatzier and Disheng Xu.

INSTABILITY FOR RANK ONE FACTORS OF PRODUCT ACTIONS
Preprint under review.

CARTAN ACTIONS OF HIGHER RANK ABELIAN GROUPS AND THEIR CLASSIFICATION
Accepted - Journal of the American Mathematical Society.
Joint with Ralf Spatzier.

ENTROPY RIGIDITY FOR 3D CONSERVATIVE ANOSOV FLOWS AND DISPERSING BILLIARDS.
Geom. Funct. Anal. 30, 1337–1369 (2020).
Joint with Jacopo de Simoi, Marin Leguil and Yun Yang.

KAKUTANI EQUIVALENCE OF UNIPOTENT FLOWS
Duke Math. J. 170 (7) 1517 - 1583.
Joint with Adam Kanigowski and Daren Wei.

SLOW ENTROPY OF SOME PARABOLIC FLOWS
Comm. Math. Phys. 370 (2019), no. 2, 449-474.
Joint with Adam Kanigowski and Daren Wei

LOCAL RIGIDITY OF HIGHER RANK HOMOGENEOUS ABELIAN ACTIONS: A COMPLETE SOLUTION VIA THE GEOMETRIC METHOD
Geom. Dedicata 200 (2019), 385-439.
Joint with Zhenqi Jenny Wang

COCYCLE RIGIDITY OF PARTIALLY HYEPERBOLIC ABELIAN ACTIONS WITH ALMOST RANK ONE FACTORS
Ergodic Theory Dynam. Systems 39 (2019), no. 7, 2006-2016.

ON THE NON-EQUIVALENCE OF THE BERNOULLI AND K PROPERTIES IN DIMENSION FOUR
J. Mod. Dyn. 13 (2018), 221-250.
Joint with Adam Kanigowski and Federico Rodriguez-Hertz

ON THE RIGIDITY OF WEYL CHAMBER FLOWS AND SCHUR MULTIPLIERS AS TOPOLOGICAL GROUPS
Journal of Modern Dynamics, Volume 9 (2015), 25-49.

TALKS

DYNAMICS SEMINAR
Northwestern University
February 16, 2024
Title: Time changes of Anosov actions and the Katok-Spatzier conjecture

DYNAMICS SEMINAR
University of Chicago
February 15, 2024
Title: Topological constructions of algebraic structures

ANALYSIS AND MATHEMATICAL PHYSICS SEMINAR
Viriginia Tech
November 15, 2023
Title: Slow entropy and the variational principle

SUMMER SCHOOL: PARTIAL HYPERBOLICITY
Brin Mathematical Research Center
May, 2023
Tite: *Rigidity of higher rank group actions in continuous time* (3 lectures)

WORKSHOP: PARTIAL HYPERBOLICITY
Brin Mathematical Research Center
May 9, 2023
Anosov actions of higher-rank Lie groups

GLOBAL RIGIDITY OF ACTIONS BY HIGHER-RANK GROUPS
American Institute of Mathematics
May, 2022
Titles: *The Katok-Spatzier Program* and *Rigidity of totally Cartan abelian actions*

ANALYSIS AND MATHEMATICAL PHYSICS SEMINAR
Virginia Tech
September, 2021
Title: *Hyperbolic abelian group actions*

DYNAMICS SEMINAR
University of Maryland
October 10, 2019
Title: *Kakutani Equivalence of Unipotent Flows*

WORKSHOP ON DYNAMICAL SYSTEMS AND RELATED TOPICS
Pennsylvania State University
September 27, 2019
Title: *Classification of Cartan actions of abelian groups*

DEA 2019
AGH UST, Krakow, Poland
September 10, 2019
Title: *Classification of Totally Cartan Actions*

2020 VISION IN DYNAMICS
Bedlewo Conference Center
August 15, 2019
Title: *Dynamical Invariants for Unipotent Flows*

EQUILIBRIUM STATES FOR DYNAMICAL SYSTEMS ARISING FROM GEOMETRY
American Institute of Mathematics
July 29, 2019
Title: *Rigidity of abelian actions and interactions with Gibbs states*

DYNAMICS SEMINAR
University of Toronto
March 20, 2019
Title: *Dynamical invariants for some Unipotent Flows*

DYNAMICS SEMINAR
University of Maryland
September 6, 2018
Title: *Homogeneous Structures from Topoogical Flows and Applications in Dynamics*

DYNAMICS SEMINAR
Northwestern University
October 17. 2017
Title: *Polynomial Entropy of Unipotent Flows*

DYNAMICS SEMINAR
University of Chicago
October 5, 2015
Title: *Extending Cases of Smooth Rigidity by New Technology*

ROCKY MOUNTAIN DYNAMICAL SYSTEMS CONFERENCE
Brigham Young University
June 8, 2015
Title: *Local Rigidity of Homogeneous Actions*

ERGODIC THEORY AND DYNAMICAL SYSTEMS CONFERENCE
Toruń, Poland
May 12, 2014
Title: *Local Rigidity of Partially Hyperbolic Actions*

WORKSHOP ON DYNAMICAL SYSTEMS AND RELATED TOPICS
University of Maryland
April 13, 2014
Title: *Smooth Rigidity for Restrictions of Weyl Chamber Flows*

DYNAMICS SEMINAR
University of Houston
November 18, 2013
Title: *Local Rigidity of Algebraic Partially Hyperbolic Actions*

COMMITTEES AND OTHER DUITES
University of Utah, 2021-2023: Development Committee, Colloquium Committee, Putnam Committee
University of Utah, 2023-2024: Putnam Committee, Graduate Recruitment Comittee