# 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 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**

DEPARTMENTAL COLLOQUIUM
University of Utah
Co-Organizer
Fall 2021

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*
In preparation.
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*
Preprint under review.
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**

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