

# HOUSTON SCHUERGER

573-587-2612 ◊ HoustonSchuerger@my.unt.edu ◊ houstonschuerger.wixsite.com/schuergermathematics

## RESEARCH INTERESTS

---

My research interests involve applying spatial reasoning to combinatorial structures and focus on zero forcing and other graph invariants, spanning trees, higher dimensional geometry, geodesics, and topological games; and in particular the interplay between the local structure given by vertex induced subgraphs and the global structure given by their adjacencies and intersections in graphs both infinite and finite. In addition to my own research I also have experience advising undergraduate research in graph theory and geometry.

## EDUCATION

---

<b>University of North Texas, Denton, TX</b> Doctor of Philosophy in Mathematics Advisor	<i>August 2013 - August 2020</i>  <i>Nick Anghel</i>
<b>Southeast Missouri State University, Cape Girardeau, MO</b> Masters of Natural Science in Mathematics Advisor	<i>January 2009 - August 2011</i>  <i>Haohao Wang</i>
<b>Southeast Missouri State University, Cape Girardeau, MO</b> Bachelor's of Science in Mathematics	<i>August 2004 - December 2008</i>

## ACADEMIC EXPERIENCE

---

<b>Department of Mathematics, Trinity College</b> Visiting Assistant Professor	<i>August 2020 - Present</i> <i>August 2020 - Present</i>
<b>Department of Mathematics, University of North Texas</b> Teaching Fellow	<i>August 2013 - August 2020</i> <i>August 2013 - August 2020</i>

- **Awards**

- Received the 2020 University of North Texas Outstanding Teaching Fellow Award
- Received the 2020 University of North Texas College of Science Outstanding Teaching Fellow Award
- Received the 2020 University of North Texas Department of Mathematics Outstanding Teaching Fellow Award

- **Teaching**

- Instructor of record for: Discrete Mathematics (MA2000), Math for Elementary Education Majors 2 (MA1351), Calculus 1 (MA1710), College Algebra and Developmental Math Tutorials (MA1100 and UGMT1300), Business Calculus (MA1190), College Math for Business and Economics (MA1180)
- Taught courses of many different formats, with class sizes ranging from less than 20 to more than 80 and semesters ranging from 16 week regular semester courses to 5 week summer semester courses
- Oversaw and coordinated multiple sections taught by recitation instructors
- Recitation instructor for: Calculus 1 (MA1710), Pre-Calculus (MA1650), College Algebra and Developmental Math Tutorials (MA1100 and UGMT1300)

- Served as a teaching assistant for Instructor Issues (MA5000), a course dedicated to discussing pedagogical theories and approaches in order to prepare graduate students for their teaching duties at UNT
- Attended National Inquiry Based Learning and Teaching in Mathematics Conference 2019 *Denver, CO*
- Tutored in Math Learning Center as well as the Specialized Tutoring Lab for Proofs Based Courses

- **Additional Academic Groups**

- Advised undergraduate research projects leading to two articles in progress, as well as undergrads presenting at conferences; in recognition of their efforts and research originality, the students involved in the projects were awarded the UNT Undergraduate Research Fellowship
- Founding member of the Graduate Group for Analysis
- Presented at the University of North Texas Department of Mathematics Logic and Dynamics Seminar
- Presented multiple times at the Graduate Logic Group

- **Service to University and its Programs**

- Member of the hiring committee for two different faculty positions
- Participated with the UNT Early Start Program
- Participated with the Department of Mathematics Graduate Student Mentor Program

**Department of Mathematics, Southeast Missouri State University** *August 2009 - May 2013*  
 Instructor of Mathematics *August 2011 - May 2013*

- **Teaching**

- Instructor of record for: College Algebra (MA134), Beginning and Intermediate Algebra (MA101 and MA102)
- Taught courses of many different formats, with class sizes ranging from less than 20 to more than 80 and curriculum delivery ranging from purely lecture based to varying degrees of computer involvement
- Piloted the use of an NCAT College Algebra design utilizing MyMathLab
- Member of College Algebra Committee
- Oversaw and coordinated multiple sections taught by recitation instructors

- **Service and Extracurriculars**

- **Southeast Missouri State University Math Field Day** *August 2011 - May 2013*  
 Test Writer, Proctor, and Grader *August 2011 - May 2013*
- **Redhawks Rugby Club** *August 2011 - May 2013*  
 Faculty Advisor *August 2011 - May 2013*  
 Coaching Staff *August 2011 - May 2013*

Graduate Assistant

- **Teaching**

- Instructor of record for: Beginning and Intermediate Algebra (MA101 and MA102)

- Recitation Instructor for: College Algebra (MA134), Beginning and Intermediate Algebra (MA101 and MA102)
- Tutored in Math Lab

• **Service and Extracurriculars**

- **Founding Member of Redhawks Rugby Club** *January 2009 - May 2011*  
   Coaching Staff *August 2009 - May 2011*  
   President *August 2009 - May 2010*
- **Redhawks Roller Rivals** *August 2010 - May 2011*  
   Faculty Advisor *August 2010 - May 2011*
- **Alpha Phi Alpha** *January 2010 - May 2010*  
   Alternate Faculty Advisor *January 2010 - May 2010*

**Additional Academic Experience**

*August 2008 - May 2010*

• **Substitute Teacher**

- **Jackson R-2 School District K-12**
  - \* Primary Duty: substitute teach in the high school math department
  - \* Secondary Duty: substitute teach high school PE
  - \* Tertiary Duty: substitute teach all disciplines at all grade levels
- **Cape Girardeau Public Schools K-12**
  - \* Substitute teach all disciplines at all grade levels
- **Kelso C-7 School District K-8**
  - \* Substitute teach all disciplines at all grade levels
- **Scott City R-1 School District K-12**
  - \* Substitute teach all disciplines at all grade levels

**PUBLICATIONS**

---

**Submitted (Pre-prints can be found on arXiv and on my website under “Research: Pre-Prints”)**

1. **The Measure Game**

*Logan Crone, Lior Fishman, Stephen Jackson, Houston Schuerger and David Simmons*

**Upcoming (Current Drafts can be found on my website under “Research: In Progress”)**

1. **Zero Forcing Numbers, Path Cover Numbers, and their Interactions with Cut-sets**

*Houston Schuerger*

2. **An n-Dimensional Generalization of Pascal’s Hexagon Theorem**

*Houston Schuerger*

In Preparation (Rough Drafts can be found on my website under “Research: Sketches”)

1. **An Exploration of Zero Forcing, Vertex Induced Subgraphs, and Underlying Graph Structure**  
*Houston Schuerger and Andrew Schwartz*
2. **A Generalization of Zero Forcing for Infinite Graphs**  
*Houston Schuerger*
3. **Graphs which Contain Spanning Trees of All Possible Types, and Related Topics**  
*John McSorley, Dinush Panditharathna, and Houston Schuerger*

## MATH RESEARCH COMMUNITIES, INVITED LECTURES, AND CONFERENCES

---

### Math Research Communities

1. **2020 AMS MRC Finding Needles in Haystacks: Approaches to Inverse Problems using Combinatorics and Linear Algebra**  
*Whispering Pines Conference Center, West Greenwich, RI, June 2020*

### Guest Lecturer

1. **The Kernels of Directed Graphs**  
*Southeast Missouri State University, February 2018*

### Past Conferences

1. **Skeletal Graph Pairs with Infinite Skeletons, and their Zero Forcing Sets**  
Joint Mathematics Meetings  
*Colorado Convention Center, Denver, CO, January 2020*
2. **Cut Sets and Zero Forcing Numbers**  
Midwest Conference on Combinatorics, Cryptography, and Computing  
*Rochester Institute of Technology, October 2019*
3. **Edge Adjoined Skeletal Graph Pairs and Zero Forcing Numbers**  
AMS Fall Central Section Meeting  
*University of Wisconsin-Madison, September 2019*
4. **The Measure Game**  
Langenhop Lecture and SIU Pure Mathematics Conference  
*Southern Illinois University Carbondale, May 2019*
5. **Generalizing the Power of a Point**  
MAA Texas Section Conference  
*El Centro College, April 2018*
6. **Generalizing the Power of a Point, Part 2**  
*(an impromptu presentation by popular demand when the scheduled speaker failed to attend)*  
MAA Texas Section Conference  
*El Centro College, April 2018*
7. **Finite Graphs and Topological Surfaces**  
IL-MO Regional Undergraduate Mathematics Conference  
*Southern Illinois University Carbondale, November 2010*
8. **Spherical Geometry and World Navigation**  
IL-MO Regional Undergraduate Mathematics Conference  
*Southern Illinois University Carbondale, November 2010*

## ADVISING UNDERGRADUATE RESEARCH

---

**Upcoming Publications (Current Drafts can be found on my website under “Advising Undergraduate Research”)**

1. **Landscapes of the Tetrahedron and Cube: An Exploration of Shortest Paths on Convex Polyhedra**  
*August Sangalli\* and Houston Schuerger*
2. **New Generalizations of the Wheel Graph and their Zero Forcing Numbers**  
*Sara Anderton, Rilee Burden\*, Isaac Echols\*, McKenzie Fontenot\*, Noah Fredrickson\*, Alexandria Kwon<sup>†</sup>, Sydney Le\*, Erin Raign\*, August Sangali\*, Houston Schuerger, and Andrew Schwartz*

### **Past Conferences and Presentations**

1. **Geodesics on the Surface of a Cube**  
*August Sangalli\**  
Texas Undergraduate Mathematics Conference  
*Stephen F. Austin State University, November 2018*
2. **Shortest Distance on Tetrahedra and Cubes**  
*August Sangalli\**  
Collin College Undergraduate Interdisciplinary Student Research Conference  
*Collin College, April 2019*
3. **Generalized Helm Graphs with Zero Forcing and Iteration**  
*McKenzie Fontenot\* and Noah Fredrickson\**  
Texas Undergraduate Mathematics Conference  
*University of Texas at Tyler, October 2019*
4. **Gear Graphs with Zero Forcing and Iteration**  
*Rilee Burden\* and August Sangali\**  
Texas Undergraduate Mathematics Conference  
*University of Texas at Tyler, October 2019*
5. **The Zero Forcing Numbers of Gear and Helm Graphs**  
*Rilee Burden\* and McKenzie Fontenot\**  
Nebraska Conference for Undergraduate Women in Mathematics  
*University of Nebraska-Lincoln, January 2020*
6. **Helm Graph Zero Forcing and Iteration Index**  
*McKenzie Fontenot\**  
University of North Texas Scholar’s Day  
*University of North Texas, April 2020*

---

\*Undergraduate Student

<sup>†</sup>High School Student - Texas Academy of Mathematics and Science (TAMS)