

# KELLY B. YANCEY

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## Positions Held

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- Research Staff Member** August 2016 - Present  
*Institute for Defense Analyses - Center for Computing Sciences*
- Research Associate** August 2013 - August 2016  
*University of Maryland*  
Department of Mathematics  
Mentored by Giovanni Forni
- Consulting Research Staff Member** March 2015 - August 2016  
*Institute for Defense Analyses - Center for Computing Sciences*  
Full Time Researcher during SCAMP June - August 2015

## Education

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- Ph.D., Mathematics** August 2013  
*University of Illinois at Urbana-Champaign*  
Advised by Joseph Rosenblatt  
**Supported by NSF Graduate Research Fellowship**
- M.A., Mathematics** May 2008  
*University of Louisville*  
Advised by Robert Powers  
**Supported by NSF GEMS Fellowship (GK-12)**
- B.S., Mathematics with Minor in Biology** May 2007  
*University of Louisville*  
Advised by Prasanna Sahoo  
*Suma Cum Laude* and Honors Scholar

## Research Interests

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My primary areas of research are ergodic theory, symbolic dynamics, and topological dynamics. I am also interested in connections with Teichmüller dynamics and automata theory from computer science.

## Publications and Preprints

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11. Primitive substitution systems and their ergodic properties. *In Preparation* (with J. Fickenscher).
10. Bipartite communities. *Submitted* (with M. Yancey).
9. Regular language distance and entropy. *To Appear in the Mathematical Foundations of Computer Science Conference Proceedings* (2017) (with A. Parker and M. Yancey).
8. Dynamics of self-similar interval exchange transformations on three intervals. *Ergodic Theory, Dynamical Systems, and the Continuing Influence of John C. Oxtoby, Contemporary Mathematics*, vol. 678, Amer. Math. Soc., Providence, RI (2016) 297-316.
7. Weakly mixing and rigid rank-one transformations preserving an infinite measure. *New York Journal of Math*, Vol. 21 (2015) 615-636 (with R. Bayless).
6. Topologically weakly mixing homeomorphisms of the Klein bottle that are uniformly rigid. *Topology and its Applications*, Vol. 160, Issue 14, 1 (2013) 1853-1861.
5. Uniform rigidity sequences for topologically weakly mixing homeomorphisms. *Proc. of the Erg. Th. Workshops at Univ. of North Carolina*, 2011-2012, (2013) 283-299.

4. On weakly mixing homeomorphisms of the two-torus that are uniformly rigid. *Journal of Mathematical Analysis and Applications*, Vol. 399, Issue 2 (2013) 524-541.
3. Simultaneous generalizations of the theorems of Ceva and Menelaus for field planes\*. *Inter. Journal of Mathematical Education in Science and Tech.*, Vol. 40, Issue 8 (2009) 1085-1091 (with R. Powers).
2. On two functional equations and their solutions\*. *Appl. Math. Lett.*, Vol. 21, Issue 9 (2008) 974-977 (with P.K. Sahoo).
1. On a functional equation related to the determinant of symmetric two-by-two matrices\*. *Sarajevo Journal of Mathematics*, 3 (2007) 61-71 (with P.K. Sahoo).

\* Published under Kelly B. Houston.

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## Teaching Experience

At the *University of Maryland*

### Instructor:

As a course instructor I chose the textbook and content for the semester, taught the material through discussion style lectures and active learning, wrote weekly homework assignments and quizzes, wrote exams, and incorporated presentations and/or projects in the course.

- *Differential Equations for Scientists and Engineers (Honors Section)*      Spring 2015, Spring 2014
- *Calculus I (Honors Section)*      Fall 2015
- *Introduction to Dynamics and Chaos*      Fall 2014
- *Introduction to Mathematical Proof*      Fall 2013

At the *University of Illinois at Urbana-Champaign*

### MERIT Program:

As a MERIT instructor, I taught group-work-focused workshops that were associated with a lecture. I wrote group worksheets and guided inquiry based discussions.

- Mentor: *PreCalculus, Calculus I, Calculus II*      Spring 2012, Fall 2011
- Workshop Instructor: *Calculus II*      Spring 2010\*, Spring 2011\*

### Instructor:

As a course instructor I chose the course content, taught the material through lectures and active learning, wrote weekly quizzes, assigned weekly homework, wrote exams, and designed course projects.

- *A Mathematical World*      Fall 2010\*\*

### Teaching Assistant:

As a lab administrator I reviewed the lecture material, administered group worksheets, facilitated group discussions, administered quizzes, and graded.

- Mentor: *Calculus I, Calculus II*      Fall 2011
- Lab Administrator: *Elementary Mathematics*      Fall 2009\*

### \* Named to the List of Teachers Ranked as Excellent

Requires the instructor to be rated among the top 30% across campus in overall teaching effectiveness.

### \*\* Instructor Ratings were Outstanding

Requires the instructor to be rated among the top 10% across campus in overall teaching effectiveness.

At *Conway Middle School* in Louisville, KY

### **GEMS Program**

As a fellow, I assisted a  $K - 12$  teacher in planning, writing, and implementing an inquiry-based learning curriculum in mathematics.

o Fellow: *6-th Grade Mathematics* Fall 2007 - Spring 2008

## **Supervision of Undergraduate Research**

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### **Exploring Ambiguity in Nondeterministic Finite Automata:**

This project involves the study of nondeterministic finite automata from theoretical computer science. We seek to understand the ambiguity in NFA and write a computer program to aid in the computation of ambiguity for given classes of examples. The goal is to use the computer program to understand how various operations (intersection, union) affect the ambiguity.

o Student: *Chris Lowman* Fall 2015

## **Selected Grants, Fellowships, and Awards**

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**AMS Simon's Travel Grant** July 2015 - July 2017

### **AMS Travel Grant**

Joint Mathematics Meetings in *San Diego, CA* January 2013

AMS Fall Central Sectional Meeting at *University of Akron* October 2012

AMS Spring East Sectional Meeting at *George Washington University* March 2012

### **Department Teaching Assistant Instructional Award**

*University of Illinois at Urbana-Champaign* Fall 2011

### **Research Experience for Graduate Students Fellowship:**

*University of Illinois at Urbana-Champaign*

REGS2 Summer Research Fellowship May - August 2011

REGS1 Summer Research Fellowship May - August 2010

### **Graduate Research Fellowship**

*National Science Foundation* Awarded March 2008

### **Groundwork Education in Mathematics and Science Fellowship**

*National Science Foundation* Fall 2007 - Spring 2008

### **Outstanding Senior Honors Thesis (campus wide)**

*University of Louisville* Spring 2007

## **Programming Languages**

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Experience with Python, Mathematica, and Matlab.

## **Service and Professional Development**

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### **Advisory Boards**

Illinois Mathematics Development Advisory Board Member November 2013 - November 2016

### **Advising**

Advise students on courses and careers (UMD) Fall 2013 - Spring 2016

### **Faculty Sponsor**

Women in Math (UMD AWM Chapter) Fall 2015 - Spring 2016

### **Conference Co-Organizer**

Workshop on Dynamical Systems and Related Topics (UMD) April 2014, April 2016

Midwest Dynamical Systems Conference (UIUC) November 2013

**Workshop Co-Organizer**

Summer Math Program for Women Career Workshop (MathFest) August 2015

**Seminar Co-Organizer**

Dynamics Seminar (UMD) Fall 2013 - Spring 2014  
 Women in Mathematics Seminar (UIUC) Fall 2010 - Spring 2013  
 Graduate Analysis Seminar (UIUC) Fall 2010 - Spring 2012

**Outreach Activities**

Panelist (AMS Panel on Non-Academic Careers at JMM) January 2017  
 Mentor (Graduate Education Mentoring Workshop at JMM) January 2017  
 Judge: PROMISE Research Symposium (UMD) February 2016  
 Mathematician in Residence (Summer Math Program for Women) June 2014  
 Judge: Graduate Research Interaction Day (UMD) April 2014  
 Freshman Focus: Illinois Geometry Lab Activity May 2013  
 Organized the first Sonia Math Day at UIUC May 2013  
 Invited Graduate Student Mentor (NCUWM) February 2011

**Reviewer**

Mathematical Reviews May 2013 - Present  
 Zentralblatt December 2012 - Present

**Association for Women in Mathematics, UIUC Chapter**

President Fall 2012 - Spring 2013  
 Vice President Fall 2011 - Spring 2012  
 Event Coordinator Fall 2010 - Spring 2011

**Committee Work**

Alumni Awards Committee (UIUC) Spring 2017  
 Graduate Affairs Committee (elected graduate student member) Fall 2011 - Spring 2013  
 Academic Disciplinary Committee (graduate student member) Fall 2009 - Spring 2012  
 Undergraduate Affairs Committee (graduate student member) Fall 2010 - Spring 2011

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**Invited Talks**

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**JMM AMS Special Session on Measure and Measurable Dynamics** January 2017  
*(Atlanta, GA)*

**JMM AMS Special Session on Dynamical Systems** January 2017  
*(Atlanta, GA)*

**Dynamics Seminar** *(University of Maryland)* January 2017

**AMS Special Session on Zero Dimensional Dynamics** October 2016  
*(Denver, CO)*

**Operator Algebra and Dynamics Seminar** *(US Naval Academy)* September 2016

**Carolina Dynamics Symposium** *(Furman University)* April 2016

**Dynamical Systems Seminar** *(University of Houston)* March 2016

**Colloquium** *(Rochester Institute of Technology)* October 2015

**Operator Algebra and Dynamics Seminar** *(US Naval Academy)* September 2015

**Applied Math Seminar** *(US Naval Academy)* September 2015

**MathFest Session on the Contributions of Women to Mathematics** August 2015  
*(Washington, DC)*

**Rocky Mountain Dynamical Systems Conference** *(Provo, UT)* June 2015

**Ergodic Theory and Statistical Mechanics Seminar** *(Princeton University)* March 2015

**Geometry, Topology, and Dynamical Systems Seminar** March 2015  
*(University of Illinois at Chicago)*

**Dynamics Seminar** *(University of Chicago)* March 2015

<b>AMS Special Session on Num. Theory in Erg. Theory and Dyn. Systems</b> ( <i>Georgetown University</i> )	March 2015
<b>Midwest Dynamical Systems Meeting</b> ( <i>University of Michigan</i> )	November 2014
<b>Analysis Seminar</b> ( <i>George Washington University</i> )	October 2014
<b>Colloquium</b> ( <i>Institute for Defense Analysis - CCS</i> )	May 2014
<b>Carolina Dynamics Symposium</b> ( <i>Davidson College</i> )	April 2014
<b>Operator Algebra and Dynamics Seminar</b> ( <i>US Naval Academy</i> )	April 2014
<b>JMM AMS Special Session on Ergodic Theory and Symbolic Dynamics</b> ( <i>Baltimore, MD</i> )	January 2014
<b>Operator Algebra and Dynamics Seminar</b> ( <i>US Naval Academy</i> )	January 2014
<b>Analysis Seminar</b> ( <i>George Washington University</i> )	November 2013
<b>Ergodic Theory Seminar</b> ( <i>University of Illinois at Urbana-Champaign</i> )	November 2013
<b>AMS Special Session on Ergodic Theory and Topological Dynamics</b> ( <i>University of Louisville</i> )	October 2013
<b>Rice Dynamics Meeting</b> ( <i>Rice University</i> )	May 2013
<b>AMS Special Session on Multi-Dimensional Dynamical Systems</b> ( <i>Iowa State</i> )	April 2013
<b>Applied Math Seminar</b> ( <i>University of Alberta</i> )	February 2013
<b>Colloquium</b> ( <i>McDaniel College</i> )	January 2013
<b>Dynamical Systems Seminar</b> ( <i>Northwestern University</i> )	November 2012
<b>Analysis Seminar</b> ( <i>University of Birmingham, UK</i> )	November 2012
<b>One Day Ergodic Theory Meeting</b> ( <i>Queen Mary University of London, UK</i> )	November 2012
<b>Ergodic Theory and Dynamical Systems Seminar</b> ( <i>University of Warwick, UK</i> )	November 2012
<b>Williams Ergodic Theory Conference</b> ( <i>Williams College</i> )	July 2012
<b>Analysis Seminar</b> ( <i>Indiana University</i> )	April 2012
<b>Geometry, Topology, and Dynamical Systems Seminar</b> ( <i>University of Illinois at Chicago</i> )	April 2012
<b>Dynamics Seminar</b> ( <i>Indiana University-Purdue University Indianapolis</i> )	April 2012
<b>Dynamics Seminar</b> ( <i>University of Maryland</i> )	March 2012
<b>Geometric Analysis Seminar</b> ( <i>Purdue University</i> )	March 2012
<b>Analysis Seminar</b> ( <i>University of Louisville</i> )	February 2011
<b>Graduate Education Mentoring Workshop</b> ( <i>JMM New Orleans, LA</i> )	January 2011
<b>Oxtoby Centennial Conference</b> ( <i>Bryn Mawr College</i> )	October 2010

## Talks for Undergraduates

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<b>MAPS - REU Seminar</b> ( <i>UMD</i> )	July 2016
<b>Math and Stat Club</b> ( <i>Mount Holyoke College</i> )	January 2016
<b>MAPS - REU Seminar</b> ( <i>UMD</i> )	July 2015
<b>Pi Mu Epsilon Math Club</b> ( <i>UMD</i> )	December 2014
<b>Summer Math Program for Women Symposium</b> ( <i>Carleton College</i> )	July 2013
<b>Women in Math Seminar for Undergraduates</b> ( <i>UIUC</i> )	March 2013
<b>Undergraduate Colloquium</b> ( <i>McDaniel College</i> )	January 2013

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## Workshops Attended

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**Analytical Methods in Classical and Quantum Dynamical Systems***Centro di Ricerca Matematica Ennio De Giorgi, Pisa, Italy*

July 2016

**Dynamics and Analytic Number Theory***Durham University, UK*

April 2014

**Dynamics on Homogeneous Spaces and Number Theory***Ohio State University*

September 2011

**Dynamical Systems School on Periodic Approx. in Ergodic Theory***Centro di Ricerca Matematica Ennio De Giorgi, Pisa, Italy*

January 2010

**Women and Mathematics Program***Institute for Advanced Study and Princeton University*

May 2007

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## Professional Memberships

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American Mathematical Society