

# Charity Cayton

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## Education

PhD in Mathematics Education, North Carolina State University, December 2012  
Dissertation Title: Teachers' Implementation of Pre-constructed Dynamic Geometry Tasks in Technology-Intensive Algebra 1 Classrooms  
Advisor: Dr. Karen Hollebrands

MAEd in Mathematics Education, East Carolina University, May 2007  
Thesis Title: Assessing Connections between Multiple Representations of Linear Functions  
Advisor: Dr. Robin Rider

BS Mathematics, East Carolina University, May 1996

## Licensure

North Carolina Teaching License, Secondary Mathematics

National Board Certification, Adolescent Young Adult Mathematics

## Professional Experience

### Post Secondary Experience

*Assistant Professor, East Carolina University*

*August 2013-Present*

Secondary Mathematics Education

- Teaching: MATE 3300-Geometry for High School Teachers; MATE 6351-Data & Probability for Middle Grades Teachers; MATE 3523-Topics in High School Mathematics; MATE 4324-Supervision of Interns
- Service: Co-Faculty Advisor, Gamma Student Chapter of NCCTM; MSITE Curriculum Committee; Lead Contact for Mathematics Teacher Education Project with North Carolina State University

*Research Associate, North Carolina State University*

*August 2012-August 2013*

Scaling Up STEM Learning with the Virtual Computing Lab, NSF Funded ITEST Grant

- Provide classroom level support for participating teachers
- Conduct classroom observations and process video from observations
- Coordinate data collection, processing, organization, and inventory
- Research teachers' use of dynamic geometry software in Algebra and Geometry classrooms
- Assist in writing final project report to be submitted to NSF
- Assist in writing new grant proposal

*Adjunct Mathematics Education Instructor, East Carolina University*

MATE 6341 Teaching and Learning Geometry  
MATE 3067 Algebra: Number and Foundations

*Spring 2013*  
*Spring 2008*

*Graduate Research Assistant, North Carolina State University*      *January 2010-August 2012*

Scaling Up STEM Learning with the Virtual Computing Lab, NSF Funded ITEST Grant

- Co-planned/co-taught four, week-long summer institutes focused on using dynamic mathematics software in Algebra and Geometry 1:1 laptop classrooms
- Moderated online professional development
- Provided classroom level support for participating teachers
- Conducted classroom observations and process video from observations
- Researched teachers' use of dynamic geometry software in Algebra and Geometry classrooms

*Graduate Teaching Assistant, North Carolina State University*

EMS 203 Introduction to Teaching Mathematics      August 2008-December 2009  
EMS 480/580 Technology in Mathematics Education      January-May 2010

*Student Teacher Supervisor, North Carolina State University*      *August 2008-December 2009*

Supervised middle and high school student teachers in Wake County

*Professional Development Instructor, North Carolina State University*

STEM Career Awareness Technology Learning Workshop, Five days, 40 teachers,  
Weldon Middle School, Halifax, NC. August 2011

SMART for Teachers Technology Learning Workshop, Four days, 30 teachers, Chowan  
Middle School, Tyner, NC. June 2010.

SMART for Teachers Technology Learning Workshop, Five days, 30 teachers, Bertie  
Middle School, Windsor, NC. June 2009.

*Mathematics Instructor, Pitt Community College*

MAT 161 College Algebra

*Summer 2009*

## **High School**

*Mathematics Teacher, Pitt County Schools, DH Conley High School*      *1996-2006, 2007-2008*

Courses Taught: Intro to Mathematics, Algebra I, Geometry, Algebra II, Discrete Math,  
AP Calculus AB/BC

Other Responsibilities: Mentor for Initially Licensed Teachers, Cooperating Teacher for  
Student Teachers, Mu Alpha Theta Mathematics Honor Society Sponsor, Comprehensive  
Math Team Coach

*Mathematics Teacher, Guilford County Schools, Northwest Guilford High School*      *2006-2007*

Courses Taught: Algebra I, AP Statistics

*Curriculum Evaluator/Author* 2004  
Cisco Learning Systems. Evaluated and wrote Calculus curriculum materials as part of a joint US/Jordanian team whose task was to evaluate and revise national Jordanian mathematics curriculum

*Curriculum Author* 2002  
Math and Technology Resource Center, East Carolina University  
Wrote online lessons for teacher training in Algebra strand of Principles and Standards for School Mathematics

### **Professional Service**

*Reviewer of Research*  
Association of Mathematics Teacher Educators 2014  
National Council Teachers of Mathematics 2013-Present  
Psychology of Mathematics Education, North American Chapter 2012-Present  
Editorial Board Member 2009-2013  
*Meridian: A Middle School Computer Technologies Journal*

*Curriculum Evaluator/Reviser* 2006-2008  
North Carolina Department of Public Instruction  
Reviewed and revised 2003 North Carolina High School Mathematics Curriculum in reference to national standards including the American Diploma Project, Principles and Standards for School Mathematics, and College Board Standards for the 2008 curriculum

*Curriculum Alignment & Resource Author* 2002  
Pitt County Schools  
Assisted AP Calculus teachers in aligning textbooks with North Carolina and College Board standards, created pacing guides, instructional guides, and classroom resources

### **Publications**

Cayton, C., Hollebrands, K., Boehm, E., & Okumuş S. (Under Review). Pivotal teaching moments in technology-intensive secondary geometry classrooms. *Journal of Mathematics Teacher Education*.

Sherman, M. and Cayton, C. (Under Review). Using appropriate tools strategically for instruction. *Mathematics Teacher*.

Sherman, M., James, C. M., Hillen, A., and Cayton, C. (2014). Using dynamic geometry software to engage students in the standards for mathematical practice: The case of Ms. Lowe. In D. Polly (Ed.), *Cases on Technology Integration in Mathematics Education* (pp. 227-256). Hershey, PA: IGI Global

- Cayton, C. (2013). Teachers' implementation of pre-constructed dynamic geometry tasks in technology-intensive Algebra 1 classrooms. *Proceedings for the 35<sup>th</sup> Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education-North America Chapter*. Chicago, IL.
- Hollebrands, K., Cayton, C., & Boehm, E. (2013). Types of questions posed during pivotal teaching moments in a technology-intensive secondary geometry classroom. *Proceedings for the 35<sup>th</sup> Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education-North America Chapter*. Chicago, IL.
- Hollebrands, K., Cayton, C., & Boehm, E. (2013). Pivotal teaching moments in a technology-intensive secondary geometry classroom. *Proceedings for the 36<sup>th</sup> Conference of the International Group for the Psychology of Mathematics Education*. Kiel, Germany.
- Cayton, C. (2012). Examining the cognitive demand of tasks in three technology-intensive high school algebra 1 classrooms. In J. J. Lo & L. Van Zoest (Eds.), *Proceedings for the 34<sup>th</sup> Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education-North America Chapter*. Kalamazoo, MI.
- Hollebrands, K., Cayton, C., & Patterson, L. (2011). Characterizing discourse in two technology-intensive high school geometry classrooms. In T. Lamberg (Ed.), *Proceedings for the 33<sup>rd</sup> Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education-North America Chapter*. Reno, NV.
- Cayton, C. (2004). Fifteen years later: Multiple representations in upper level high school mathematics. In D. McDougall & J. Ross (Eds.), *Proceedings of the 26<sup>th</sup> Annual Meeting of the North American Chapter Of the International Group for the Psychology of Mathematics Education*. Toronto, Ontario

## **Presentations**

### **International**

- Hollebrands, K., Cayton, C., & Boehm, E. (2013). Pivotal teaching moments in a technology-intensive secondary geometry classroom. *Research Report Presented at the 36<sup>th</sup> Conference of the International Group for the Psychology of Mathematics Education*. Kiel, Germany.

## **National**

Cayton, C., Sherman, M., and Chandler, K. (2014). Beyond bells and whistles: Evaluating and Designing Dynamic Geometry Tasks. *Workshop presented at the National Council Teachers of Mathematics Annual Meeting & Exposition*. Boston, MA.

Sherman, M., Cayton, C., and Chandler, K. (2015). Supporting teachers using appropriate tools strategically: A framework for evaluating and designing DGS tasks. *Research report presented at the 19<sup>th</sup> Annual Meeting of the Association of Mathematics Teacher Educators*. Orlando, FL.

Okumuş S., Hollebrands, K., and Cayton, C. (2015). Teacher and student interactions in technology-intensive high school algebra classrooms. *Research symposium presented at the 19<sup>th</sup> Annual Meeting of the Association of Mathematics Teacher Educators*. Orlando, FL.

Cayton, C., Sherman, M., McCulloch, A., Nickell, J., and Chandler, K. (2014). Technological tasks & cognitive demand in secondary classrooms & teacher education. *Research symposium presented at the National Council Teachers of Mathematics Research Conference*. New Orleans, LA.

Hollebrands, K., Cayton, C., Stockero, S., and Leatham, K. (2014). Analyzing critical moments in high school mathematics classrooms. *Research Symposium presented at the National Council Teachers of Mathematics Research Conference*. New Orleans, LA.

Patterson, L., Wiebe, E., Okumuş S., Cayton, C., & Hollebrands, K. (2014). An investigation of teacher pedagogical strategies and student engagement in 1:1 laptop mathematics classrooms. *Presented at the AERA Annual Meeting*. Philadelphia, PA.

Cayton, C. (2013). Teachers' implementation of pre-constructed dynamic geometry tasks in technology-intensive algebra 1 classrooms. *Brief Research Report Presented at the 35<sup>th</sup> Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education-North America Chapter*. Chicago, IL.

Hollebrands, K., Cayton, C., & Boehm, E. (2013). Types of questions posed during pivotal teaching moments in a technology-intensive secondary geometry classroom. *Brief Research Report Presented at the 35<sup>th</sup> Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education-North America Chapter*. Chicago, IL.

Cayton, C. (2013). Implementation of pre-constructed dynamic tasks in 1-1 algebra 1 classrooms. *Interactive paper session presented at the National Council Teachers of Mathematics Conference*. Denver, CO.

Cayton, C. (2013). Teacher's implementation of pre-constructed dynamic sketches in three technology-intensive high school algebra 1 classrooms. *Brief report presented at the 17<sup>th</sup> Annual Meeting of the Association of Mathematics Teacher Educators*. Orlando, FL.

Cayton, C., Hollebrands, K., & Wiebe, E. (2012). Characterizing discourse in technology-intensive high school geometry classrooms. *Interactive paper session presented at the National Council Teachers of Mathematics Conference*. Philadelphia, PA.

Hollebrands, K., Cayton, C., & Patterson, L. (2011). Characterizing discourse in two technology-intensive high school geometry classrooms. *Brief research report presented at the 33<sup>rd</sup> Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education-North America Chapter*. Reno, NV.

Wiebe, E. N., Hollebrands, K., Patterson, L., & Cayton, C. (2012). Ubiquitous computing environments and mathematics discourse: differential approaches by teachers. *Presented at the AERA Annual Meeting*. Vancouver, BC.

Cayton, C. (2004). Fifteen Years Later: Multiple Representations in Upper Level High School Mathematics. *Poster presentation at the 26<sup>th</sup> Annual Meeting of the Psychology of Mathematics Education North America*. Toronto, Canada.

### **State**

Cayton, C. and Preston, R. (2014). Co-teaching in mathematics. *Workshop presented at the State Conference of the North Carolina Council Teachers of Mathematics*. Greensboro, North Carolina.

Cayton, C., Patterson, S., Clemson, J., Springer, L. (2014). EdTPA: Experiences and Reflections. *Presentation at the State Conference of the North Carolina Council Teachers of Mathematics*. Greensboro, North Carolina.

Chandler, K., Cayton, C. and Nickell, J. (2014). Designing technological tasks. *Workshop presented at the State Conference of the North Carolina Council Teachers of Mathematics*. Greensboro, North Carolina.

Cayton, C. (2013). Dynamic geometry in high school math. *Presentation at the State Conference of the North Carolina Council Teachers of Mathematics*. Greensboro, North Carolina.

Cayton, C. (2004). From here to there: A look at multiple representations. *Presentation at the State Conference of the North Carolina Council Teachers of Mathematics*. Greensboro, North Carolina.

### **Local**

Cayton, C. (2013). Teachers' implementation of pre-constructed dynamic geometry tasks in

technology-intensive Algebra 1 Classrooms. *Poster presented at North Carolina State Graduate Research Symposium*. Raleigh, NC.

Cayton, C. (2013). Facilitating mathematical discussions in middle and secondary mathematics classrooms. *Eastern Regional Conference for the North Carolina Council Teachers of Mathematics*. Greenville, NC.

Cayton, C. (2012). Algebra 1 teachers' use of pre-constructed dynamic Geometry tasks in 1:1 computing environments. *Poster session presented at the Math, Science, and Technology Education Research Symposium*. Raleigh, NC.

Cayton, C., Patterson, L & Ware, J. (2011). Scaling Up STEM Learning with the VCL. *Poster session presented at the Math, Science, and Technology Education Research Symposium*. Raleigh, NC.

### **Awards**

*Scholarship, Teaching and Research Fellow (STaR Fellow)* *December 2013*  
Accepted to 5<sup>th</sup> cohort of STaR program. Thirty fellows selected nationwide per cohort. The Service, Teaching and Research (STaR) Program is a 1 year induction program for early career mathematics educators working at institutions of higher education. The program was initiated through a grant from the National Science Foundation. It includes a 5-day summer institute, academic year networking via electronic means, and a follow-up session in conjunction with the annual meeting of the Association of Mathematics Teacher Educators (AMTE).

*Provost Fellow, North Carolina State University* *August 2008*  
Award given to selected incoming graduate students that demonstrate high scholastic potential.

*State Finalist, Presidential Award for Excellence in Mathematics and Science Education* *2005*  
National Science Foundation

*Katherine Hodgin Award for Teaching Excellence* *July 2004*  
Given to one teacher within 2-county service area exhibiting excellence, innovation, and professionalism

*University Award* *May 1996*  
East Carolina University's recognition for the most outstanding undergraduates

### **Professional Organizations**

Association of Mathematics Teacher Educators	2012-Present
International Group for the Psychology of Mathematics Education	2013
National Council Teachers of Mathematics	2009-Present

North Carolina Council Teachers of Mathematics

1994-2006, 2013-Present

North American Chapter of the International Group for the Psychology of Mathematics  
Education

2004, 2010-Present