

Vicky Williams Klima

Department of Mathematical Sciences – Appalachian State University

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Education

Ph.D., North Carolina State University 2003
Major: Mathematics, Algebra

M.S., North Carolina State University 2000
Major: Mathematics

B.A. & B.S., Erskine College 1998
Majors: Mathematics and Business Administration

Professional Experience

Professor, Appalachian State University July 2014 – Present

Associate Professor, Appalachian State University July 2009 – June 2014

Assistant Professor, Appalachian State University August 2003 – June 2009

Graduate Teaching Assistant, North Carolina State University August 1998 – June 2003

Teaching

Teaching Experience.....

MAT 1020, College Algebra	MAT 3220, Introduction to Real Analysis
MAT 1025, Pre-calculus	MAT 3530, Communicating Mathematics
MAT 1030, Calculus with Business Applications	MAT 4040, Senior Capstone
MAT 1110, Calculus with Analytic Geometry I	MAT 4010/5530, Lie Algebra
MAT 1120, Calculus with Analytic Geometry II	MAT 4510, Senior Honors Thesis
MAT 2130, Calculus with Analytic Geometry III	MAT 4720/5210, Abstract Algebra
MAT 2240, Introduction to Linear Algebra	MAT 5220, Ring Theory
MAT 2110, Techniques of Proof	MAT 5530, Graduate Linear Algebra
MAT 2510, Sophomore Honors Seminar	MAT 5950, Mathematical Modeling – Analytical Models
MAT 3110, Introduction to Modern Algebra	

Directed Student Learning.....

Undergraduate Research Assistantship	Sergei Miles
<i>Quantifying Gerrymandering</i>	<i>Fall 2017</i>

S-STEM and Academy of Sciences Research Clusters

17 Students

Fall 2011 - Spring 2016

Topics in Algebra and its Applications

Scheduling and the Max Plus Algebra (Fall 2015, Spring 2016); Poset Diagrams of the Symmetric Groups (Spring 2014); A Study of Elliptic Curves (Spring 2013); Outcomes in Two-Player Games (Fall 2012); Groebner Bases and Sudoku (Spring 2012); Symmetry and Music (Fall 2011). Advised: Amanda Adams, Brett Boyles, Michael de Camera, Aneisy Cardo, Amanda Copeland, Stephen Graham, Lee Fisher, Brandon Flinchum, Austin Flinn, Taylor Jones, Nadine Lambert, Richard Madison, Lauren Murray, Sierra Milosh, Sergei Miles, Jonathan Suits, Tyrel Winebarger.

Graduate Directed Research

Ethan Smith

On Crystal Bases

Spring 2015

Presented by E. Smith at MAA-SE in Cookeville, TN (March 2014).

Honors Thesis, Graduate Directed Research

Tyrel Winebarger

Poset Diagrams for θ -Twisted Involutions of Weyl Groups

Spring 2014 – Spring 2015

Presented by T. Winebarger at JMM in San Antonio, TX (January 2015) and MAA-SE in Cookeville, TN (March 2014).

Honors Thesis

Kristie Kennedy

Mathematics and Music: Using Group Theory to Qualify n -Note Tonal Systems

Spring 2015

Honors Thesis

Alison McClay

Geometry and Tonal Music: A Mathematical and Musical Analogy in Microtonal Systems

Spring 2014

Presented by A. McClay at the National Conference on Undergraduate Research [NCUR] in Lexington, KY (April 2014).

Honors Thesis

Kent Vashaw

Positional Weighted Voting and Linear Algebra

Spring 2014

Presented by K. Vashaw at NCUR in Lexington, KY (April, 2014) and MAA-SE in Cookeville, TN (March 2014).

Undergraduate Research Assistantship

Ashley AsKew

Symmetry in Microtonal Pitch Systems

Spring 2013

Presented by A. AsKew at MAA-SE in Rock Hill, SC (March 2013).

Product of Learning

Kristen Johnson

Student Reactions to an Authentic Pedagogy

Spring 2011

Undergraduate Research

Timothy Shatley, Andrew Wilson, Kyle Thomas

Investigating Root Multiplicities in E_{10}

Fall 2010 – Spring 2011

Presented by A. Wilson, T. Shatley, and K. Thomas at the Center for Undergraduate Research in Mathematics Spring Conference in Provo, UT (March 2011).

Graduate Directed Research

John Grubbs

Exploring Patterns in the Decimal Expansion of Purely Periodic Rational Numbers

Fall 2008

Graduate Directed Research

Bryan Snare

G-Graphs of Groups

Fall 2007

Research

Publications.....

Klima V.W. A Two-Color Approach to Weekly Homework (under review).

AsKew A., Kennedy K, and Klima V.W. Modular Arithmetic and Microtonal Music Theory. *PRIMUS* (in press).

Buell C., Helminck A.G., Klima V.W., Schaefer J., Wright C., and Ziliak E. On the Structure of Symmetric spaces of $SL_2(\mathbb{F}_q)$ and $GL_2(\mathbb{F}_q)$. *Note di Matematica* (in press).

Buell, C., Helminck, A., Klima, V.W., Schaefer, J., Wright, C., and Ziliak, E. (2017). On the Structure of Generalized Symmetric Spaces of $SL_n(\mathbb{F}_q)$. *Communications in Algebra*, (vol. 45 issue 12, pp. 5123-5136).

Klima V.W., Klima R., and Sigmon N. (2016). Symmetry in Western Music in *Applications of Abstract Algebra with Maple and Matlab* (3rd edition). CRC Press, Boca Raton, FL.

Klima, V.W., Wilson, A., Thomas, K., and Shatley, T. (2014). Investigating root multiplicities in the indefinite Kac-Moody Lie algebra E_{10} . *Involve*, (vol. 7 issue 4, pp. 529 -546).

Klima, V.W. (2013). Improving communication skills through student-produced videos. *Proceedings of the 25th International Conference on the Teaching of Collegiate Mathematics*.

Klima, V.W. (2010). A different sort of calculus debate. *Mathematical Time Capsules: Historical Modules for the Mathematics Classroom* (pp. 139-149).

Klima, V.W. (2009). Discussion activities in an online abstract algebra course. *Proceedings of the 25th International Conference on the Teaching of Collegiate Mathematics*.

Klima, V.W., and Misra, K. (2008). Root multiplicities in the indefinite Kac-Moody algebras of symplectic type. *Communications in Algebra*, (vol. 32, issue 2, pp. 764-782).

Klima, R, and Klima, V.W. (2008). Abstract algebra, an online course. Learn NC. <http://www.learnnc.org>.

Greenwald, S., Klima, V. W., and Mawhinney, K. (2006). Marjorie Lee Browne: North Carolina educator. *The Centroid*, (vol. 32, issue 1).

Misra, K., and Williams V. (2004). Combinatorics of quantum affine Lie algebra representations. *Contemporary Mathematics*, (vol. 343, pp. 764-782).

Presentations.....

Incorporating Reflection into Calculus Assignments **JMM**
Atlanta, GA *January 2017*

Inquiry Based Learning and Two-Color Problem Sets **ASU Hubbard Center Workshop**
Boone, NC *January 2016*

Increasing Student Engagement Through Two-Color Problem Sets **JMM**
Seattle, WA *January 2016*

Listening Carefully to Abstract Algebra **MAA-SE**
Wilmington, NC *March 2015*

Generalized Symmetric Spaces of $SL_2(\mathbb{F}_q)$ **JMM**
San Antonio, TX *January 2015*

Student Engagement with GeoGebra Applets in the Calculus I Classroom **ICTCM; MAA-SE**
San Antonio, TX; Cookeville, TN *January 2014; March 2014*

Improving Communication Skills Through Student-Produced Videos <i>San Diego, CA; Boston, MA</i>	JMM; ICTCM <i>January 2013; March 2013</i>
Undergraduates, Sudoku and Groebner Bases <i>Rock Hill, SC</i>	MAA-SE <i>March 2013</i>
Investigating Musical Groups <i>Morrow, GA</i>	MAA-SE <i>March 2012</i>
The three M's: Math, Music and Mattresses <i>Raleigh, NC</i>	Sonia Kovalevsky Workshop <i>October 2011</i>
Using Music to Demonstrate Group Theory <i>Washington, DC</i>	JMM <i>January 2009</i>
Crystal Basis Theory and Representations of Affine Lie Algebras <i>Beaumont, TX</i>	Lamar University Colloquium <i>October 2008</i>
Root Multiplicities of the Kac-Moody Algebras $HC_n^{(1)}$ <i>San Francisco, CA; Chapel Hill, NC</i>	AMS Sectional Meeting Mid Atlantic Algebra Conference (MAAC) <i>April 2008; January 2008</i>
Using Online Discussion Activities in an Abstract Algebra Course <i>San Antonio, TX; San Diego, CA</i>	ICTCM; JMM <i>March 2008; January 2008</i>
Seeing Least Squares in Action <i>New Orleans, LA</i>	JMM <i>January 2007</i>
A Different Sort of Calculus Debate <i>San Antonio, TX</i>	JMM <i>January 2006</i>
Root Multiplicity Bounds for Indefinite Algebras of Symplectic Type <i>Raleigh, NC</i>	NCSU Algebra Colloquium <i>September 2005</i>
End of Course Projects in Calculus II <i>Atlanta, GA</i>	JMM <i>January 2005</i>
Organizer, Project NeXT Panel Discussion; Appropriate Uses of Technology in the Collegiate Mathematics Classroom <i>Atlanta, GA</i>	JMM <i>January 2005</i>
A Combinatorial Approach to Finding Root Multiplicities in Indefinite Algebras <i>Phoenix, AZ</i>	JMM <i>January 2004</i>
Root Multiplicities of the Indefinite Algebras of Symplectic Type <i>Chapel Hill, NC; Raleigh, NC</i>	AMS Sectional Meeting; MAAC <i>October 2003; November 2002</i>

External Funding.....

Success in Calculus through Active Learning and Algebraic Reasoning <i>Not funded; received competitive ranking</i>	SEMINAL, \$98,208 <i>October, 2017</i>
Mawhinney, K. (Principal), Greenwald, S. (Co-Principal), Klima, V.W. (Co-Principal), Palmer, K (Co-Principal)	

High-Achievers Scholarship Program in Computer Science and Math **NSF S-STEM, \$620,750.00**
Funded *September 2013 – August 2017*

Tashakkori, R. (Principal), Norris, C. (Co-Principal), Wilkes, J. (Co-Principal), Ginn, M. (Co-Principal), Klima, V. W. (Co-Principal). This grant provides academic support through research clusters and study halls as well as financial support through \$2,680 scholarships to 20+ Appalachian undergraduate students as they pursue their studies in computer science and mathematics.

Collaborate @ ICERM **ICERM, Travel Grant**
Funded *July 2016, August 2017*

Buell, C. (Co-Principal), Helminck, A. (Co-Principal), Klima, V.W. (Co-Principal), Schaefer, J. (Co-Principal), Wright, C. (Co-Principal), and Ziliak, E. (Co-Principal). This grant funded all participants' travel and lodging expenses for two week-long stays at ICERM on Brown University's Campus. During that time we worked together to investigate orbit decompositions of symmetric spaces for the special linear groups over finite fields. We also discussed applying for NSF funding to support a Research Experience for Undergraduates involving students from each of our diverse institutions.

Mathematical Community for Transfer Student Success **NSF IUSE, \$249,528.00**
Not funded; received good and very good reviews *October 2016*

Klima, V. W. (Principal), Rhoads, G. (Co-Principal), Mawhinney, K. (Co-Principal), Palmer, K. (Co-Principal), Goodson-Espy, T. (Supporting).

Structured Quartet Research Ensembles **American Institute of Mathematics (AIM), Travel Grant**
Funded *August 2014*

Buell, C. (Co-Principal), Helminck, A. (Co-Principal), Klima, V.W. (Co-Principal), Schaefer, J. (Co-Principal), Wright, C. (Co-Principal), and Ziliak, E. (Co-Principal). This grant funded all participants' travel and lodging expenses for a week-long stay at AIM headquarters in Palo Alto, CA. During that time we worked together to investigate the structures of the generalized and extended symmetric spaces of special linear groups over finite fields.

CURM Mini Grant **CURM, Brigham Young University, \$13,000.00**
Funded *June 2010 – May 2011*

Klima, V.W. (Principal). This grant supported three undergraduate students in a year-long research project involving combinatorics and Lie Algebra. The grant also provided me with training and support as I directed my first undergraduate research project.

REU Site: Pure and Applied Computational Experiments **NSF REU, \$238,195**
Not funded; received good and very good reviews *August 2010*

Klima, V. W. (Principal), Cook, W. (Co-Principal). This grant proposed hosting a summer Research Experience for Undergraduates in Mathematics at Appalachian State University with a focus on problems with computational or experimental components. We aimed for vertical integration by including experienced students alongside beginning students with efforts to recruit beginning students from regional community colleges.

Appalachian State Vertically Integrated Workshop for Women **MAA Tensor Foundation, \$3,000**
Funded *Fall 2005,2006; Spring 2006, 2007*

Greenwald, S. (Co-Principal), Hirst, H. (Co-Principal), Mawhinney, K. (Co-Principal), Palmer, K. (Co-Principal), Thomley, J. (Co-Principal), and Williams, V. (married name Klima - Co-Principal). This grant provided funding to support workshops in which regional high school women met with current Appalachian undergraduate and graduate students to work together to solve open-ended mathematics problems and to discuss issues related to women in mathematics.

Service

Mathematical Sciences Committee Work

Department

Fall 2004 – present

Tenure Track Search Committee (Fall 2017 – present); Placement Committee (Fall 2017 – present); College Algebra Assessment Committee (Fall 2016 – present); Course Evaluation Revision Committee (Chair, Fall 2016 – present); Teaching Guidelines Committee (Spring 2016 – Fall 2017); Departmental Personnel Committee (Fall 2015 – Spring 2017, Fall 2012 – Spring 2013, Fall 2007 – Spring 2008); Undergraduate Program Assessment Committee (Fall 2012 – Spring 2015); Graduate Program Assessment Committee (Fall 2008 – Summer 2012); Directed Research and Product of Learning Guidelines Committee (Spring 2007 – Summer 2008); Curriculum Revision Subcommittee on Logic and Proof (Fall 2005 – Spring 2006); Curriculum Revision Subcommittee on the Employment of Mathematics Majors (Fall 2004).

Graduate Student Teaching Supervision

Department

Fall 2007 - present

Stephen Graham (Spring 2018); Caleb Davis (Fall 2017); Kevin Winfree (Spring 2016); Katie Severin (Fall 2015); Matthew Jobrack (Fall 2014); Kenneth Jones (Spring 2014); Thomas Cook (Spring 2013); Jonah Winkler (Spring 2012); Misty Silver (Spring 2009); Jessica Miller (Fall 2009) and Kayla Corkery (Fall 2009); Jay Gant (Fall 2008); Jenny Tabat (Fall 2008); Bradley Wandler (Fall 2007); John Sevier (Fall 2007).

Department of Mathematical Sciences Honors Coordinator

Department / University

Fall 2004 – Spring 2017

Responsible for recruiting and supporting mathematical sciences honors students, helping to find thesis mentors, and arranging for thesis defenses. As a departmental honors coordinator I also serve on the university's honors council.

Quantitative Literacy Faculty Coordinating Committee

University

Fall 2016 - present

This committee makes recommendations to the general education council regarding proposals for general education quantitative literacy designations. I chaired the committee in the 2017-2018 academic year as part of my chair duties sat on the General Education Council for that year.

Office of Student Research Advisory Board Member

University

Fall 2013 – Spring 2016

Served in an advisory role to the Office of Student Research. Duties included participation in the Undergraduate Research Assistantship Selection Committee (Spring 2014; Fall 2014) and the Travel and Research Grant Awards Committee (Fall 2015, Fall 2013) as well as serving as session moderator and poster judge for the Celebration of Student Research and Creative Endeavors (April 2013, 2014, 2016).

Reviewing Activities

Professional

Fall 2012 - Spring 2014

Rose Hulman Undergraduate Journal (2014); National Conference on Undergraduate Research Proceedings (2014); Society for Industrial and Applied Research Online (2012); Wiley Publishing *Explorations in College Algebra* (2010); Taylor and Francis *Linear Algebra: Crossing The Bridge* (2006).

Undergraduate Poster and Presentation Judge

Professional

January 2005, 2015; March 2012, 2013

National JMM Undergraduate Mathematics Poster Judge (January 2005, 2015); Regional MAA-SE Undergraduate Mathematics Poster Judge (March 2013); Regional MAA-SE Undergraduate Presentation Judge (March 2012).

Science and Technology Masters Thesis Award Committee

University

Spring 2013

Reviewed several nominated masters thesis, ranking them according to a provided rubric and choosing one to receive a graduate school outstanding thesis award.

Faculty Advisor, ASU Math Club**Department**
Fall 2005 – Spring 2010

With R. Klima organized and supervised weekly meetings, homecoming activities, semester fund raisers, travel to mathematics lectures, and various service projects.

Instructor, Summer Ventures in Science and Mathematics**Professional**
July 2005, 2007 – 2010

Presented approximately six hour and a half meetings each summer to talented high school juniors and seniors who were taking part in Summer Ventures in Science and Mathematics. Through hands-on activities the students used the mathematics of symmetry to explore cryptography, music, and art.

College of Arts and Sciences Dean's Advisory Council**College**
Fall 2005 – Spring 2008

Convened monthly to discuss concerns related to the college and to provide feedback from our respective departments. As part of the Dean's Advisory Council, I also took part in monthly Arts and Sciences Council meetings.

Awards

*Appalachian State University College Excellence in Teaching Award**Spring 2016 – Fall 2017*

Each year the university awards a maximum of seven Board of Governors Excellence in Teaching Awards. Nominees come from throughout the campus community. I was selected as a recipient of the college-level award for the 2016-2017 academic year.

*ASU College STAR Faculty**Fall 2014*

After being nominated by one of my students, I was selected as ASU College STAR (Supporting Transition Access and Retention) faculty. The College STAR office interviewed me concerning my use of two-colored problem sets in the classroom and published a short article concerning this practice at <https://www.collegestar.org/modules/ib1/introduction>.

*Funded Participant, Research Experiences for Undergraduate Faculty**July 2013*

Invited, fully funded workshop participant. The week-long Research Experiences for Undergraduate Faculty was sponsored by the American Institute of Mathematics and held at ICERM located on Brown University's campus. The workshop exposed faculty to problems accessible to undergraduate students and supported network-building for faculty from various primarily undergraduate universities.

*Project NExT Fellow**Fall 2004 – Spring 2005*

Sponsored by the Mathematical Association for America, Project NExT (New Experiences in Teaching) is a long-standing professional development program for recent Ph.D.s in mathematical science. The program supports new professionals in teaching and research while also helping them connect to fulfilling service opportunities. The program also provides an extensive network of support for participants throughout their academic careers.

*Funded Participant, AWM Workshop for Women Graduate Students and Recent Ph.D.s**January 2004*

Invited, fully funded workshop participant. This workshop was sponsored by the Association for Women Mathematicians (AWM) and took place in conjunction with the Joint Mathematics Meetings. As part of the workshop, participants gave talks presenting their research and were connected with female mentors who had found success in the mathematical sciences.

Outstanding Teaching Assistant; Department of Mathematics, North Carolina State University

2003

Preparing the Professoriate Fellow; North Carolina State University

Fall 2002 – Spring 2003

Additional Nominations

- Harvey R. Durham Freshman Advocate Award (Spring 2013)
- College of Arts and Sciences Academic Advisor of the Year (2011, 2009, 2008, 2007)
- Academy of Outstanding Teachers in the College of Arts and Sciences (Fall 2008)
- Strickland Award for Young Faculty in the College of Arts and Sciences (Fall 2008)
- ASU Club Advisor of the Year (Spring 2008, 2007)
- William H. Plemmons Leadership Medallion at ASU (Fall 2006)