
HOLLY PETERS HIRST

PROFESSOR OF MATHEMATICS
APPALACHIAN STATE UNIVERSITY
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EDUCATION

The Pennsylvania State University, University Park, Pennsylvania
Ph.D. - Mathematics, 1989, Numerical Analysis and Optimization
M.A. - Mathematics, 1987
Temple University, Philadelphia, Pennsylvania
B.A. - Mathematics, Magna Cum Laude, 1983, Phyllis Zayon Steinberg Award for Excellence in Mathematics

ACADEMIC EXPERIENCE

Appalachian State University, Boone, North Carolina
Professor, Department of Mathematical Sciences, 2004-
Director, Mathematics Graduate Program, 2022-
Co-Director, Mathematics Graduate Program, 2014-2020;
Associate Dean for Research and Graduate Studies, Cratis D. Williams Graduate School, 2005-13
Associate Professor, Department of Mathematical Sciences, 1998-04
Director, Mathematics Graduate Program, 1998-05
Director, SACS-COC University Self-study for Reaffirmation of Accreditation, 1999-02
Acting Assistant Dean, College of Arts and Sciences, 1998-99
Assistant Professor, Department of Mathematical Sciences, 1990-98
The Ohio State University, Columbus, Ohio
Assistant Director of Academic Computing, 1988-90
Instructor, Department of Mathematics, 1987-88, 1989-90

HONORS

Appalachian State University Excellence in Teaching Award, University of North Carolina Board of Governors, 2019
North Carolina Council of Teachers of Mathematics Innovator Award, 2013 (with D. Crocker, former editors of *The Centroid*)
Appalachian State University Cratis Williams Graduate School Academy of Outstanding Mentors, 2013
Appalachian State University Plemmons Leadership Medallion, 2007
Appalachian State University Arts & Sciences James R. Smith Outstanding Service Award, 2003
First Prize for Quantitative Literacy, 1996-1997 Annenberg/CPB Innovative Uses of Technology in Mathematics Service Courses
Awards Competition, 1996 (with J. Bennett, N. Sexton, J. Smith, W. Sprunt)
Appalachian State University Alumni Association Outstanding Teaching Award, 1995
Undergraduate Computational Science Education Award, U.S. Department of Energy, 1995
Nominee, Richard Henson Outstanding Advisor Award, College of Arts and Sciences, Appalachian State University, 2020
Nominee, Appalachian State University Arts & Sciences Academy of Outstanding Teachers, 1992, 1994, 1996, 2003

PUBLICATIONS

Using Leslie Models Built from Scientific Data to Illustrate Matrix Arithmetic, *The Centroid* **47**(1), 2021.
Revising General Education Math Courses with Partner Discipline Input, *PRIMUS* **29**(9), 2019 (with T. Palmer)
Tessellations: Tiling the Plane, *The Centroid* **44**(1), 2018 (with M. Barrier)
Motivating Computational Science Through Systems Modeling, *JOCSE* **9**(1), 2018
Introducing Students to the Modeling Process, *The Centroid* **41**(1), 2016 (with T. Abel, A. Baird, T. Salinas)
The Racing Game – A Probability Activity, *The Centroid* **40**(2), 2015
Six entries in *The Encyclopedia of Mathematics and Society*, S. Greenwald and J. Thomley, Eds., Salem Press, 2012 (*Predator-Prey Models*; *Income Tax*; *Sudoku*; *Home Buying: Mortgages & Amortization*; *Forest Fires*; *Musical Scales & Tuning*)
Functions as Graphs: Depth Versus Volume in a Vase, *The Centroid* **38**(1), 2012
How Do You Know? Using Mathematics to Make Decisions [course text for MAT 1010], Kendall-Hunt, 1996, 1998, 2000, 2003, 2005, 2011 (Co-Editor: J. Smith; with: J. Bennett, N. Sexton, J. Smith, W. Sprunt)
Sudoku – Serious math? Yes! *The Centroid* **33**(1), 2007
Increasing the Relevance to and Engagement of Students in a Quantitative Literacy Course, in *Current Practices in Quantitative Literacy*, *MAA Notes #70*, R. Gillman, Ed., Mathematical Association of America, 2006 (with: S. Greenwald)
Using the Historical Development of Predator-Prey Models to Teach Mathematical Modeling, in *From Calculus to Computers: Using the Last 200 Years of Mathematics History in the Classroom*, Mathematical Association of America, 2005
A Primer for Logic and Proof [course text for MAT 2110], Appalachian State University, 2004 (with J. Hirst)
A Web-Based, Calculator-Skills Tutorial and Self-Test for General Chemistry Students. *The Chemical Educator* **6**, 2001. (with: N. Pienta, H. Thorp, R. Gotwals, R. Panoff)
Math Modeling with Stella, in *Proceedings of the Thirteenth International Conference on Technology in Collegiate Mathematics*, Addison Wesley, 2001

- Fractals in the Classroom*, in Proceedings of the Eleventh International Conference on Technology in Collegiate Mathematics, Addison Wesley, 2000
- Incorporating Modeling into Undergraduate Courses*, in Proceedings of the International Conference on Teaching Mathematics, Samos Greece, John Wiley and Sons, Inc., 1998 (with J. Hirst)
- A Laboratory Course in Mathematics for Liberal Arts Majors*, in Exemplary Programs in Introductory College Mathematics, Corporation for Public Broadcasting, 1998 (with J. Smith)
- Writing In College Algebra Using Linear Programming Projects*, in Proceedings of the Ninth International Conference of Technology in Collegiate Mathematics, Addison Wesley, 1998 (with J. Smith)
- Bounding the Roots of Polynomials*, The College Mathematics Journal **28**(4), 1997 (with W. Macey)
- Investigating Eigensystems in Introductory Linear Algebra*, The Maple Technical Newsletter **2**(2), 1995 (with W. Bauldry)

GRANTS AND OTHER FUNDING

- Mathematical Association of America TENSOR Grant, *A Vertically Integrated Workshop for Women*, 2005-06 (co-PI with S. Greenwald)
- NSF CCLI-National Dissemination Grant, *National Computational Science Institute*, \$2.7 Million, 2001-05 (co-PI with R. Panoff (Shodor Foundation), E. Jacobsson (U. Illinois), D. Stevenson (Clemson))
- National Center for Supercomputing and Applications EdGrid Grant, *Carolinas Middle School Math Initiative*, \$240,000, 2000-02 (co-PI with R. Panoff (Shodor Foundation))
- Shodor Foundation Grant, *Middle Grades Teacher Preparation and Enhancement Project*, \$36,000, 2001-03 (co-PI with G. Foley, P. Schram, M. Searcy, D. Wasman)
- Appalachian State University Academic Affairs Computing Initiative Grants, *Experiment in Computer Enhanced Learning Project (EXCEL)*, 1998-99; *Using Web-CT for Supplemental Course Materials in Liberal Arts Mathematics and Calculus*, 1999
- NSF Undergraduate Faculty Enhancement Grant, *The Shodor Computational Science Institute*, \$370,000. 1998-2000 (co-PI with R. Panoff (Shodor))

WORKSHOPS TAUGHT

- XSEDE-The Extreme Science and Engineering Discovery Environment Program, *Computing MATTERS* Weeklong Workshops, University of Nebraska, July 2015; Oklahoma State, May 2016; Boise State U, June 2016 (team taught with R. Panoff (Shodor))
- Using Sage as a Tool for Mathematics Investigation*, Three Day Workshop Series at SuperComputing'11, Seattle, Nov 2011, and SuperComputing'10, New Orleans, Nov 2010 (with N. Calkin (Clemson), D. Warner (Clemson))
- Preparing Mathematicians to Educate Teachers (PMET) Initiative, Mathematical Association of America
- *Teaching Mathematics for Middle Grades Mathematics Concentrators*, Weeklong Workshop, Appalachian State University, May 2004, June 2005 (with G. Foley, G. Kader, S. Rachlin (ECU), M. Searcy)
 - *Teaching Middle Grades and Secondary Mathematics for Teachers*, Half-Day Workshop, Winter Meeting of the Mathematical Association of America, Jan 2004 (with J. Narayan (MAA)), International Conference on Teaching Mathematics with Technology, Oct 2004 (with M. Searcy)
 - *Teaching Mathematics for Elementary Education Majors*, Weeklong Workshop, Appalachian State University, Aug 2003 (with S. Beckman-Kaziz (U. Georgia), D. Royster (UNC-C), M. Searcy)
- Mathematics Education Leadership Training (MELT) Program, Appalachian State University
- *Matrices in 4th Level Math Courses*, Online Workshop, Appalachian State University, July 2020
 - *Middle Grades Mathematics on the Web and in Print*, Weeklong Workshop, Appalachian State University, June 2001, June 2002, June 2003 (with R. Boyd, M. Searcy)
- National Computational Science Institute (NCSI) Workshops, Shodor Education Foundation
- *Computational Science, Modeling and Simulation*, Weeklong Workshops, Appalachian State University, June 2002, Wofford University, Feb 2003 (with R. Panoff (Shodor)), University of Alabama at Birmingham, Birmingham AL, May 2003 (with L. Bievenue (NCSA)), High Point University, July 2003 (with D. Warner (Clemson)), University of Alabama at Birmingham, July 2003, University of Arkansas at Little Rock, July 2003 (with R. Panoff (Shodor)), Embry-Riddle Aeronautical University June 2004 (with R. Panoff (Shodor)), San Diego State University, Aug 2004 (with R. Panoff (Shodor))
 - *Introduction to Computational Biology*, Weeklong Workshops, Ohio Supercomputer Center, June 2004, North Carolina A&T State University, July 2004 (with E. Marland, T. Weisstein (Troy))
 - *Computational Science* (specific titles vary), Two- to Four-hour Workshops, SuperComputing'01, Denver CO, Nov 2001 (with G. Love (Shodor), S. Ragan (MVHS)), Grace Hopper Conference for Women in Computing, Vancouver BC, Oct 2002 (with A. Shiflet (Wofford)), SuperComputing'02, Baltimore MD, Nov 2002 (with R. Allen (U. New Mexico), Southeastern SIAM Meeting, Clemson SC, Mar 2003 (with D. Warner (Clemson)), Winston-Salem State University, Mar 2003, SC'03, Phoenix AZ, November 2003, SC'04, Pittsburgh PA, Nov 2004 (with E. McNelis (WCU))
 - *National Computational Science Leadership Program*, Two Week Workshop, National Center for Supercomputing Applications, Urbana IL, July 2002 (with E. Gentry (NCSA), G. Love (Shodor), R. Panoff (Shodor))
- Shodor Computational Science Institute Undergraduate Faculty Development Workshops, Shodor Education Foundation
- *Computational Science and Modeling*, Week-long Workshops, North Carolina Central University, July 1998, Appalachian State University, July 1999, July 2000, June 2001 (with R. Panoff (Shodor), D. Stevenson (Clemson), D. Warner (Clemson))

INVITED PRESENTATIONS

Teaching Modeling using Predator-Prey Models, Southeastern MAA and SIAM Joint Meetings, Mar 2003
Calculator Numerical Methods, Greater Spartanburg Area Mathematics Colloquium, Feb 2003
Mathematical Modeling and Quantitative Reasoning, Plenary Address, SuperComputing'02, Baltimore MD, Nov 2002
Topics in Quantitative Literacy: Writing, Technology, Applications, NCTM Southern Regional Conference, Charlotte NC, June 1999 (with J. Smith)
Quantitative Literacy as Core Mathematics, Sam Houston State University, Huntsville TX, Feb 1998

OTHER PRESENTATIONS

Using Real Applications to Motivate Matrix Computations, NCCTM, online, Feb 2022
New 4th Math Courses in NC, NCMATYC, online, Mar 2021
The MA Program in Math at Appalachian, NCMATYC, Hudson NC, Mar 2019 (with R. Gosky)
Designing a Computational Mathematics Course for Math Majors, Joint Math Meetings, Baltimore MD, Jan 2019 (with G. Rhoads)
– Lead presentation in MAA Contributed Paper Session coordinated with G. Rhoads
Bipartite Graphs, Group Membership, and Linear Algebra, North Carolina Mathematical Association of Two-year Colleges, Morehead City NC, Mar 2018
Developing Student Interest in Computation Through the Use of Modeling Tools, International Conference on Computational Science, Zurich, Switzerland, June 2017
Rate of Change and Modeling with Systems Modeling Tools, North Carolina Council of Teachers of Mathematics, Greensboro NC, Oct 2016; NCMATYC, Durham NC, Mar 2017
Report on the Integrating Modeling into Secondary and Post-Secondary Classrooms Project, NC Ready for Success State Math Summit, Sep 2014 (with T. Salinas, T. Abel)
Field Guide to Functions with Help from JAVA, North Carolina Mathematical Association of Two-year Colleges, Raleigh NC, March 2005; ICTCM, Orlando FL, Oct 2002
Computational Science and K-12 Education, Society for Industrial and Applied Mathematics Meeting on Computational Science, Orlando FL, Feb 2005
Quantitative Literacy as an Alternative to College Algebra, Joint Mathematics Meetings, San Diego CA, Jan 2002
Using JAVA Applets to Teach Probability, Geometry, Function and Number Concepts, Joint Mathematics Meetings, San Diego CA, Jan 2002
Project Interactivate - Interactive Web-based Activities for Middle Grades Math, North Carolina Council of Teachers of Mathematics, Greensboro NC, Oct 2001
Incorporating Modeling into Mathematics Courses, North Carolina Council of Teachers of Mathematics, Greensboro NC, Oct 2001
Fractals in the Liberal Arts Classroom, Joint Math Meetings, New Orleans LA, Jan 2001
Interactivating Middle School Mathematics, ShowMe Conference on Middle School Math Teacher Prep, Branson MO, May 2000
Web-Based Homework and Quizzes, Joint Math Meetings, Washington, DC, Jan 2000 (with J. Smith, J. Hirst)
Environmental Mathematics in a Liberal Arts Class, Joint Math Meetings, Washington, DC, Jan 2000 (with J. Smith)
A Laboratory-Based Liberal Arts Math Course (MAT 1010), AMATYC- 1997, ICTCM – 1997, 1996, 1994, 1993; NCCTM - 1997, 1994; AMS – 1999, 1997, 1994, 1993; Southeast Section of MAA - 1997, 1995 (many with J. Smith)
Teaching Techniques of Proof, Joint Math Meetings, San Antonio TX, Jan 1999, and Southeastern Section Meeting of the MAA, Charlotte NC, Apr 1999 (with J. Hirst)
Fractals in the Classroom, ICTCM, New Orleans LA, Nov 1998
Incorporating Modeling into Undergraduate Courses, International Conference on Teaching Math, Samos Greece, July 1998 (with J. Hirst)
Applying Technology in Pure Mathematics Courses for Undergraduates, International Conference on Teaching Math, Samos Greece, July 1998 (with J. Hirst)
An Honors Course in Mathematics for Liberal Arts Majors, Southeast Section Meeting of the Mathematical Association of America, Charleston SC, Mar 1998
Fractals in the High School and College Algebra Classroom, International Conference on Technology in Collegiate Mathematics, Chicago IL, Nov 1997
Incorporating Statistics into a Quantitative Literacy Course, Southeast Section of the MAA, Atlanta GA, Mar 1997 (with J. Smith)

TEACHING / MENTORING

Undergraduate Courses Taught: Intro to Math; College Algebra; Business Math with Calculus; Intro to Computer Science; PreCalculus; Calculus 1, 2, 3; Computational Mathematics; Linear Algebra; Intro to Logic and Proof; Modern Algebra; Differential Equations; Applications of Math/Discrete and Continuous Math Modeling; Junior Honors Seminar (topics: Dunham's Great Theorems of Math; Casti's Five Golden Rules; Math of the last 100 Years Through the Gibbs Lectures); Operations Research; Numerical Methods
Graduate (Master's Level) Courses Taught: Linear Algebra; Mathematical Modeling; Numerical Analysis; Numerical Linear Algebra; Operations Research; Nonlinear Optimization; Graduate Teaching Seminar; Graduate Teaching Apprenticeship
Graduate Capstone/Directed Research: Andrew Blevins, 2004; Jeanine Lynch, 2004; Melissa Mogensen, 2004; Cindy Kotseos, 2005; Natasha Mabe, 2005; Marie Murphy, 2006; Kenneth Jones, 2015; Warren Colavito 2019; Julia Butler, 2020; Jose Salazar, 2020; Karlie Neigel, 2020; Thomas Keener, 2021-22
Senior Honors Thesis: Briquelle Martin 2019; Wyatt Andreson 2019; Anton Hengst, 2020; Anna Jenkins, 2022

Senior Capstone: Lilly Xiong, 2016; Tessa Belk, 2017; Tim Wilkie 2017; Sidney Anderson 2019; Jessica Hawks 2019; Matthew Hefner 2019; Hailey Howett 2019; Katie Pryor 2019; Blake Shook 2019; Graham Tobin 2019; Matthew Young 2019; Caity Johnson 2020; Danielle Gilmore 2020; Forrest Myers 2020; John LeBlanc 2020; Jordan Greene 2020; Kassidy Borum 2020; Seth Harrison 2020; Sophia Elhag, 2021; Andrew Kinneberg, 2021; Zoe Robino, 2021

SERVICE

Regional / National:

- Secretary, Board of Directors, Shodor Foundation, 1994-
- Member, Steering Committee, Vice Chair, Special Interest Group on High Performance Computing Education (SIGHPCedu), ACM, 2015-20 (Vice Chair 2016-17)
- Member, Selection Committee for Outstanding Master's Thesis in the Southeastern Region, Conference of Southern Graduate Schools, 2012-2014
- Member, Undergraduate Computational Science and Engineering Education Advisory Committee, U.S. Department of Energy, 1994-96
- Member, SACS Reaffirmation Committees: Offsite Reviews 2005, 2010, 2013, 2018; Onsite Reviews 2001, 2013, 2020

Disciplinary:

- Webmaster, North Carolina Council of Teachers of Mathematics (NCCTM), 2015-
- Co-Editor, *The Centroid*, The Journal of the NCCTM, 2003- (with D. Crocker); author *Problems to Ponder* Column, 2010-
- Member, Committee on the Mathematical Education of Teachers (COMET), Mathematical Association of America, 2008-13
- State Coordinator, Preparing Mathematicians to Educate Teachers (PMET) Initiative, Mathematical Association of America, 2003-06 (with D. Royster)
- Co-Chair, Education Program, Supercomputing'04, Pittsburgh PA, 2004 (with R. Panoff); SuperComputing'03, Phoenix AZ, 2003 (with S. Lathrop)

Departmental:

- Chair, Distinguished Professor of Math Education, 2022
- Director, MA Mathematics Program, 2022
- Member Post-tenure Review Committee, 2015-18, 2020-
- Coordinator, Product of Learning Committee, 2014-
- Chair, Applied Math Faculty Search Committee, 2020-21
- Member, Department Personnel Committee, 2018-2020
- Member, Graduate Program Assessment Committee, 2014-
- Co-Director, Mathematics MA program (with R. Gosky), 2013-2020
- Co-Director, Mathematics Education Leadership Training (MELT) Program (with D. Crocker), 2004-05
- Academic Advisor, average load 8 students per year, 1995-05, 2014-
- Math Lab Tutor Room Coordinator, 1994-05
- Member, Department Personnel Committee, 1995-07, 2001-04, 2014-16, 2018-2020
- Member, Department Curriculum Committee, 2003-05
- Advisor, Math Club, 1992-98

College and University (as faculty):

- Member, Graduate Academic Policies and Procedures Committee, 2021-
- Member, Professional Education Council, Spring 2020
- Chair, Scholarship Advisory Council, 2014-
- Chair, RCOE Dean Review Reading Committee, 2018-19
- Member, Distance Education Taskforce and Chair of Academic Oversight, Effectiveness and Integrity Subcommittee, 2017
- Member, Graduate Academic Policies and Procedures Committee 2014-17, and Chair, Curriculum Committee, 2014-16
- Member, Arts and Sciences Online Teaching and Learning Task Force, 2014-15
- Chair, Overseas Education Committee, 2010-14
- Chair, Health College Creation Task Force, 2008-09
- Chair, Cultural Affairs Advisory Committee, 1995-98; Member, Arts and Cultural Programs Committee, 2001-
- Director, University Reaccreditation Self-Study, 1999-02
- Member, Academic Policies and Procedures Committee, 1998-04
- Member, Faculty Senate, 1998
- Member, Distance Education Task Force; Chair of Subcommittee on Faculty Compensation, 1998
- Member, Selection Committee for the University Chancellor's Scholars, 1996
- Chair, Faculty Grievance Mediation Committee, 1993-96

Graduate Education (as associate dean):

- Secretary, North Carolina Conference of Graduate Schools, 2010-13
- Graduate School Representative: Graduate Education Taskforce; Enrollment Management Council; Residence Appeals Board; Admissions Judicial Review Committee; Academic Policies and Procedures Committee; University Research Council; Overseas Education Committee; Scholarship Advisory Council; Military Affairs Committee; Degreeworks Oversight Committee, 2005-13

- Deputy Chair, Graduate Council, and Chair, Graduate Council Curriculum Committee, 2005-13
- Supervisor, Graduate Recruiting, Admissions, Assistantship, and Records Staff, 2007-13
- Advisor, Graduate Student Association Senate, 2006-13
- Coordinator, GRAM Program, Cratis Williams Society, Alpha Epsilon Lambda Honor Society, 2005-13
- Co-Webmaster, Graduate School, 2005-13 (with A. Basnight)
- Developer, Online Graduate Assistant Training Materials, 2009-13
- Presenter, Annual Meeting of the Southern Conference of Graduate Schools, February 2009, 2012, 2013