

Anthony L. Tongen, Ph.D.

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EDUCATION

Ph.D. Applied Mathematics, Northwestern University, December 2002

- Thesis Title: A Continuum Model of Multigrain Thin Film Deposition
- Advisor: David L. Chopp

M.S. Applied Mathematics, Northwestern University, December 2000

B.S. Applied Mathematics (Honors Program), University of Pittsburgh, April 1997

- Phi Beta Kappa

APPOINTMENTS

2012 - 2013 *Fulbright-García Robles Scholar, Universidad de Colima, México*

2009 - present *Associate Professor, James Madison University*

2005 - 2009 *Assistant Professor, James Madison University*

2003 - 2005 *NSF-IGERT Visiting Assistant Professor, University of Arizona*

2001 - 2003 *Assistant Professor, Trinity International University*

1998 - 2001 *Teaching/Research Assistant, Northwestern University*

1997 - 1998 *Walter P. Murphy Fellowship, Northwestern University*

RESEARCH PUBLICATIONS

- Mancala Matrices, with L.A. Taalman, B. Warren, F. Wyrick-Flax, and I. Yoon, *College Mathematics Journal* (in press)
- Solitaire Mancala Games and the Chinese Remainder Theorem, with B.C. Jones and L.A. Taalman, *American Mathematical Monthly* (in press)
- Reinventing the Wheel: The Chaotic Sandwheel, with R.J. Thelwell and D. Becerra-Alonso, *American Journal of Physics*, 81(2):127-133, 2013
- Connections between Power Series Methods and Automatic Differentiation, with D.C. Carothers, S.K. Lucas, G.E. Parker, J.D. Rudmin, J.S. Sochacki, R.J. Thelwell, and P.G. Warne, *In Recent Advances in Algorithmic Differentiation*, Eds. S. Forth et. al., Springer, p. 175-186, 2012
- And the dead shall walk, but how?, with C.V. Johnson and S.M. Francis, *Braaaaaiinnssss: From Academics to Zombies* (Ed. Robert Smith?), 2011
- Biomechanics of Running and Walking, with R.E. Wunderlich, in *Mathematics and Sports*, edited by Joe Gallian, *Mathematical Association of America*, Washington, D.C., 313-325, 2010
- An Optimal Strategy for Energy Allocation in a Multiple Resource Environment, with D.B. Walton and B.P. Leard, *Bulletin of Mathematical Biology*, 72(5):1092-1123, 2010
- A 3-D Nonlinear Anisotropic Spherical Inflation Model for Intracranial Saccular Aneurysm Elastodynamics, with J.C. Daniel, D.A. Warne, and P.G. Warne, *Mathematics and Mechanics of Solids*, 15:279-307, 2010

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- A morpho-elastic model of hyphal tip growth in filamentous organisms, with A. Goriely and M. Tabor, Proceedings of the IUTAM Symposium on Cellular, Molecular, and Tissue Mechanics (Ed. Krishna Garikipati and Ellen M. Arruda) Springer Verlag, 2009
- Biomechanical Model of Appressorial Design in Magnaporthe grisea, with A. Goriely and M. Tabor, Journal of Theoretical Biology, 240(1):1-8, 2006
- Simulation of Multigrain Thin Film Growth, with D.L. Chopp, Interfaces and Free Boundaries, 8(1):1-19, 2006
- Ethics Involved in Simulation-based Medical Planning, with M. Adam, Ethics & Medicine, 22:1, 2006
- Does gravitational gossip weigh heavy on your local area network?, with A. Billups, et al, *Los Alamos National Laboratory Internal Report*, Summer 2004
- Will Biological Computers Enable Artificially Intelligent Machines to Become Persons?, *Dignity* (Quarterly Newsletter published by the Center for Bioethics and Human Dignity), 9:4, Winter 2003
- Interaction of Coherent Nanoscale Precipitates with Screw Dislocations to Lower the Peierls Stress in Low Carbon Steels, with M.E. Fine and M.S. Gagliano, The Minerals, Metals and Materials Society (TMS) Annual Meeting, March 2003

EDUCATIONAL PUBLICATIONS

- Keeping it R.E.A.L.: Research Experiences for All Learners, with C.D. Martin, Mathematical Association of America Classroom Resource Material Book Series, Washington, D.C., 2011
- Instructor's Resource Guide and Test Bank for Briggs/Cochran Calculus: Early Transcendentals, with B. Gillett, Pearson, 0-321-69173-3, 2010
- Instructor's Resource Guide and Test Bank for Briggs/Cochran Calculus, with B. Gillett, Pearson, 0-321-66526-0, 2010
- Teaching Time Savers: I Wholeheartedly Recommend Myself, FOCUS, 27(8):15, November 2007
- Course notes for Math 248 Computers and Numerical Algorithms, with C.D. Pruett, unpublished

GRANTS

Undergraduate Research and Teaching

- García Robles Fulbright Scholar, Universidad de Colima, Facultad de Ciencias, August 2012 – July 2013
- MAESTRO – Mathematics and Earth Science Teachers Resource Organization, with Eric Pyle, Anna Courtier, and Andy Jackson, National Science Foundation Geoscience Education, May 2012 – April 2014, \$149,577
- M³: Mentoring for Minorities in Mathematics, M³: More Mancala Madness, Mathematical Association of America (MAA) National Research Experience for Undergraduates Program (NREUP), Summer 2012, \$27,500.00
- M³: Mentoring for Minorities in Mathematics, M³: More Mancala Madness, with John Johnson, Mathematical Association of America (MAA) National Research Experience for Undergraduates Program (NREUP), Summer 2011, \$25,547.00
- M³: Mentoring for Minorities in Mathematics, Dynamical Systems and Games, with Laura Taalman and Paul Warne, Mathematical Association of America (MAA) National Research Experience for Undergraduates Program (NREUP), Summer 2010, \$27,499.19
- M³: Mentoring for Minorities in Mathematics, Dynamical Systems and Games, with Roger Thelwell, Mathematical Association of America (MAA) National Research Experience for Undergraduates Program (NREUP), Summer 2009, \$27,030
- M³: Mentoring for Minorities in Mathematics, with Roger Thelwell, JMU 2009 Innovative Diversity Efforts Award (IDEA) Program, Summer 2009, \$4,000
- Mathematical Association of America (MAA) Professional Enhancement Program (PREP) grant to lead a workshop on A Discovery Learning Approach to Computational Mathematics, with C. David Pruett, Summer 2009, \$19,400
- M³: Mentoring for Minorities in Mathematics, Dynamical Systems and Chaos, with Roger Thelwell, Mathematical Association of America (MAA) National Research Experience for

Undergraduates Program (NREUP), Summer 2008, \$24,190.50

- National Science Foundation (NSF) Interdisciplinary Training for Undergraduates in Biological and Mathematical Sciences (UBM) Research in Undergraduate Institutions (RUI): Quantitative Skills in Biology through Scientific Inquiry at James Madison University, with D. Brian Walton, Reid Harris, and Nusrat Jahan, September 2007 – August 2012, \$700,000
- Center for Undergraduate Research in Mathematics (CURM) grant to financially support four undergraduates in an academic year research experience with D. Brian Walton, 2007-2008 Academic Year, \$19,900
- M³: Mentoring for Minorities in Mathematics, Discrete Mathematics with Applications to Biology, Mathematical Association of America (MAA) National Research Experience for Undergraduates Program (NREUP), Summer 2007, \$24,985

Travel and additional grants

- Received local and travel expenses to attend National Institute for Mathematical and Biological Synthesis (NIMBIOS) workshop on Modeling Dengue Fever, July 2012
- Travel Grant from the Mathematical Association of America (MAA) for Deena Hannoun to travel to MathFest in Madison, WI, \$400, August 2008
- Travel Grant from the Mathematical Association of America (MAA) for Charell Wingfield to travel to the Joint Mathematics Meetings in San Diego, with Elizabeth Brown, \$500, January 2008
- Received local and travel expenses to attend Center for Discrete Mathematical and Theoretical Computer Science (DIMACS) for Summer 2007
- Received James Madison University Faculty Assistance Grant for Summer 2006 (summer support)
- Received department nomination and acceptance into Project NExT, which is a professional development program for new or recent Ph.D.s in the mathematical Sciences.
- Received local and travel expenses to assist graduate and undergraduate students with research projects at the *Mathematical and Theoretical Biology Institute*, July/August 2004
- Received local and travel expenses to attend a tutorial on Synapses and Muscles at the *Mathematical Biosciences Institute*, March 2004
- Received local and travel expenses to present at *Arizona Days Conference* held at Los Alamos National Laboratory, January 2004
- Received local and travel expenses to attend the *2003 Red Raider Mini-Symposium on Mathematical and Computational Modeling of Biological Systems* at Texas Tech University, November 2003
- Received local and travel expenses to attend a short course on Cellular Physiology at the *Institute for Mathematics and its Applications*, Summer 2003
- *Reduced Load Grant* from Trinity International University, Spring 2003
- Participated in a grant from Thinkquest that promotes the *implementation of technology into the classroom*, Fall 2001 – Spring 2003
- Received Northwestern University Travel Grant to attend and present at the *2002 Annual Meeting of The Minerals, Metals, and Materials Society*, February 2002

RECENT PRESENTATIONS

- *Mathematics and Sowing Games*, Conferencia de Física y Matemáticas, Universidad de Colima, Colima, COL, México, April 2013.
- *Introduction to Sowing Games*, Conferencia de Física y Matemáticas, Universidad de Colima, Colima, COL, México, March 2013.
- *M³: Mentoring, Motivation and Mancala*, Joint Mathematics Meeting, San Diego, CA, Jan. 2013.
- *Tchoukaillon: A single player Mancala game*, Joint Mathematics Meeting, San Diego, CA, January 2013.
- *Reinventing the Wheel: The Chaotic Sandwheel*, Conferencia de Física y Matemáticas, Universidad de Colima, Colima, COL, México, September 2012.
- *Reinventing the Wheel: The Chaotic Sandwheel*, Joint Mathematics Meeting, Boston, MA, January 2012.
- *Examining the mathematically rich 'game' of Tchoukaillon*, Biola University, La Mirada, CA,

October 2011.

- *Examining the mathematically rich 'game' of Tchoukaillon*, UC-Irvine Math Club, Irvine, CA, October 2011.
- *M³: Mentoring for Minorities in Mathematics – Five years later*, MathFest 2011, Lexington, KY, August 2011.
- *Solitaire Mancala*, Joint Mathematics Meeting, New Orleans, LA, January 2011.
- *Taking the Minor out of Minority Programs!*, Center for STEM Education and Outreach Brown Bag Lunch, Harrisonburg, VA, April 2010.
- *Biomechanics of Running and Walking*, Joint Mathematics Meeting, San Francisco, CA, January 2010.
- *Reinventing the Wheel*, Grove City College Colloquium, Grove City, PA, November 2009.
- *Reinventing the Wheel*, Wake Forest University Colloquium, Winston-Salem, NC, November 2009.
- *An Optimal Strategy for Energy Allocation in a Multiple Resource Environment*, Joint Mathematics Meeting, Washington, DC, January 2009.
- *Reinventing the Wheel*, University of Mary Washington, Fredericksburg, VA, October 2008.
- *If I May Make a Generalization, Generalizations are Generally Good (in numerics)*, MathFest (Projects, Applications, and Demonstrations to Enhance a Numerical Analysis or Computational Mathematics Course), Madison, WI, August 2008.
- *Biomechanical Models Applied to the Rice Blast Fungus*, Mathematical Biosciences Institute, Ohio State University, Columbus, OH, March 2008.
- *Biomechanical Models Applied to the Rice Blast Fungus*, Center for Undergraduate Research in Mathematics Conference and MAA Intermountain Section Meeting, Provo, UT, March 2008.
- *Optimal Strategies for Energy Allocation*, with D. Brian Walton, Keynote address at JMU's College of Science and Mathematics Faculty Research and Teaching Symposium, JMU, February 2008.
- *Patterns in Biology*, Joint Mathematics Meeting (MAA session on the power of inductive and recursive thinking), San Diego, CA, January 2008.
- *Discrete Models of Two-Gender Populations*, Society of Mathematical Biology Annual Meeting (Ecology Session), San Jose, CA, August 2007.
- *Computer Error is Not a Contradiction in Terms*, MathFest (Challenges and Successful Strategies in Teaching a Numerical Analysis Course), San Jose, CA, August 2007.
- *M³: Mentoring for Minorities in Mathematics Summer 2007*, MathFest (MAA-Summa: National Research Experience for Undergraduates Program), San Jose, CA, August 2007.
- *Stepping to Success in Numerical Analysis*, MathFest (The Best Approximation of a Good Numerical Methods Course), Albuquerque, NM, August 2006.
- *Deformation of Biological Membranes*, Longwood University, March 2006; James Madison University, April 2006.
- *Biomechanical Model for Apressorial Design in *Magnaporthe grisea**, Arizona State University, April 2005.
- *A Cereal Killer with Unbe-LEAF-able Pressure*, University of Arizona, February 2005; Rose-Hulman Institute of Technology, February 2005; Mathematical and Theoretical Biology Institute, July 2004; James Madison University, July 2004.
- *Mathematician + Pressure = Fungi*, James Madison University, January 2005.
- *Biomechanical Model of Apressoria Formation*, Utah-Arizona (IGERT) Biomathematics Summit, May 2004.
- *Introduction to the M-step and Infinite-step Methods with Application to the Level Set Formalism*, University of Arizona, April 2004.
- *Simulation of Multigrain Thin Film Growth*, Los Alamos National Laboratory, January 2004.
- *Mathematical Modeling Applied to Materials Science*, Calvin College, April 2003; University of Arizona, March 2003; United States Military Academy, March 2003; Hope College, November 2002; Trinity International University, April 2002.
- *A Continuum Model for Thin Film Deposition*, Elmhurst College, October 2002; Northwestern University, September 2002.

RESEARCH EXPERIENCES FOR UNDERGRADUATES ADVISOR

56 Undergraduate research students, Summer 2006-present

- James Madison University Math NREUP (Summer 2012). Co-advisor (with John Johnson) for Mabel Adubofour (JMU), Tyesha Hall (JMU), Luis Parada (JMU), Ben Sebuufu (Gordon), Samuel Thoronka (JMU), Iris Yoon (Swarthmore), and Rita Zevallos (Swarthmore).
- James Madison University Interdisciplinary Training for Undergraduates in Biological and Mathematical Sciences (UBM) (2011-2012). Co-advisor (with Brian Walton and Patrice Ludwig) for Emily Cate (JMU), Theresa Dalmut (JMU), Kassim Rahawi (JMU), Jennifer Roth (JMU), and Lauren Taylor (JMU).
- James Madison University Math NSF REU (Summer 2011). Co-advisor (with Laura Taalman) for Jeff Anway (Longwood), David Creech (Central Michigan), Benjamin Warren (Ramapo), and Fanya Wyrick-Flax (Bard).
- James Madison University Math NREUP (Summer 2011). Co-advisor (with John Johnson) for Amanda Fernandez (JMU), Tyesha Hall (JMU), Mikias Kidane (JMU), Spencer Sims (Oakwood) and Qian Zhang (JMU).
- James Madison University Interdisciplinary Training for Undergraduates in Biological and Mathematical Sciences (UBM) (2010-2011). Co-advisor (with Roshna Wunderlich) for Heather Lambert (JMU) and Brittany Wilhelm (JMU). Co-advisor (with Brian Walton and Rajeev Vaidyanathan) for David MacDonald (JMU) and Alison Horley (JMU).
- James Madison University Math NREUP (Summer 2010). Co-advisor (with Laura Taalman and Paul Warne) for Anthony Chieco (JMU), Brittney Dyson (JMU), Rex Ford (JMU), Durrell Lewis (JMU), and Fierra Mason (JMU).
- James Madison University Interdisciplinary Training for Undergraduates in Biological and Mathematical Sciences (UBM) (2009-2010). Co-advisor (with Roshna Wunderlich) for Sean Francis (JMU) and Caitlin Johnson (JMU).
- James Madison University Math NREUP (Summer 2009). Co-advisor (with Roger Thelwell) for Rex Ford (JMU), David Melendez (JMU), Juan Ortega (JMU), Zurisadai Pena (JMU), and Melinda Vergera (JMU).
- James Madison University UBM (2008-2009). Co-advisor (with Corey Cleland) for Christina Bence (JMU) and Glenn Young (JMU).
- James Madison University Math NSF REU (Summer 2008). Co-advisor (with D. Brian Walton) for Phillip Andreae (Emory), Adam Falk (Grand Valley State), Theresa Klinkhammer (St. Mary's), and Sarah Mecholsky (Agnes Scott).
- James Madison University Math NREUP (Summer 2008). Co-advisor (with Roger Thelwell) for Michael Dankwa (JMU), Jan Herbut-Hewell (JMU), Lianne Loizou (JMU), and Juan Ortega (JMU).
- James Madison University UBM (2007-2008). Co-advisor (with Corey Cleland) for Deena Hannoun (JMU) and Joe Schutte (JMU).
- Brigham Young University Center for Undergraduate Research in Mathematics (2007-2008). Co-advisor (with D. Brian Walton) for Maggie Guy (JMU), Deena Hannoun (JMU), Leslie Hindman (JMU), and Scott McHardy (JMU).
- James Madison University Materials Science NSF REU (Summer 2007). Advisor for Callie Johnson (JMU) and Sarah Sellman (JMU).
- James Madison University Math NREUP (Summer 2007). Advisor for Michael Dankwa (JMU), Michael Frempong (JMU), Jan Herbut-Hewell (JMU), and Charell Wingfield (JMU).
- James Madison University Math (Summer 2006). Co-advisor (with D. Brian Walton) for Ben Leard (JMU).
- James Madison University Math (Summer 2006). Advisor for Callie Johnson (JMU).
- Mathematical and Theoretical Biology Institute (Summer 2004). Consultant for all undergraduate and graduate students who participated in the summer institute.

AWARDS WON BY UNDERGRADUATE STUDENT RESEARCHERS

- James Madison University Mathematics Research Award, Spring 2013, Theresa Dalmut, Tyesha Hall, Jennifer Roth, and Lauren Taylor.
- James Madison University Mathematics Research Award, Spring 2012, Brittany Wilhelm and David MacDonald.
- James Madison University Mathematics Research Award, Spring 2011, Reginald Ford and Juan C. Ortega.
- James Madison University Applied Mathematics Award, Spring 2010, Glenn Young.
- James Madison University Mathematics Research Award, Spring 2009, Deena Hannoun and Jan Herburt-Hewell.
- MathFest Janet Anderson Prize for best mathematical biology presentation, Madison, WI, August 2008, Deena Hannoun (cash prize \$100).
- James Madison University Mathematics Research Award, Spring 2008, Callie Johnson and Ben Leard.
- Travel grant from MAA for Deena Hannoun to attend MathFest in Madison, WI, August 2008 (\$400).
- Second place MAA MD-DC-VA section Student Paper Competition, James Madison University, April 2008, Deena Hannoun and Leslie Hindman (cash prize \$50).
- Travel grant from MAA for Charell Wingfield to attend Joint Mathematics Meetings in San Diego, CA, January 2008 (\$500).
- Research prize Shenandoah Undergraduate Mathematics and Statistics Conference poster competition, James Madison University, October 2007, Callie Johnson.
- James Madison University Mathematics Research Award, Spring 2007, Ben Leard.

REFEREE

- National Science Foundation's Division of Undergraduate Education
- National Science Foundation's Division of Mathematical Sciences
- American Mathematical Monthly
- Mathematics and Computers in Simulation
- Journal of Online Mathematics and its Applications (JOMA)
- PRIMUS: Problems, Resources, and Issues in Mathematics Undergraduate Studies

PROFESSIONAL SOCIETY MEMBERSHIP (present and past)

- Mathematical Association of America (MAA)
- Society of Mathematical Biology (SMB)
- Association of Christians in the Mathematical Sciences (ACMS) - Board member
- Society for Industrial and Applied Mathematics (SIAM)
- American Mathematical Society (AMS)

COURSES TAUGHT

- James Madison University
 - Nature of Mathematics, Calculus with Functions I, Calculus with Functions II, Calculus I, Calculus II, Computers and Numerical Algorithms, Mathematical Models in Biology, Numerical Analysis of Differential Equations, Biomechanics
- Universidad de Colima
 - Optativa II: Modelos Matemáticos 1, Optativa V: Modelos Matemáticos 2
- Trinity International University
 - College Algebra, Finite Mathematics, Calculus I, Differential Equations, Computer Programming I, Computer Programming II, Physics I, Physics II

MAJOR COMMITTEES AND SERVICE ACTIVITIES

- Chair College of Science and Mathematics Council, 2011-2012
- Chair-elect College of Science and Mathematics Council, 2010-2011
- MAA Committee on the Undergraduate Program in Mathematics (CUPM) Subcommittee on Undergraduate Research, 2009-present.
- College of Science and Mathematics College Council, 2008-2011.
- James Madison University Applied Mathematics Committee, 2005 – present.
- University-wide committee to write grant for Howard Hughes Medical Institute (HHMI), 2007 (co-PI) and 2011 (PI).
- Mathematics Colloquium Committee, 2006-2012.
- Honor Council Hearing faculty representative, 2007-2012.
- Honors Thesis Advisor for Nina Bence, 2009-2010.
- Honors Thesis Advisor for Deena Hannoun, 2008-2009.
- Honors Thesis Committee for Joe Schutte, 2008-2009.
- Honors Thesis Committee for Ben Leard, 2007-2008.
- MAA Poster Competition Judge, Joint Mathematics Meetings, January, 2006-2009.
- Janet Anderson prize judge, MathFest, August, 2007-2008.
- MAA student paper judge, MathFest, August, 2008.
- MAA Project NExT Fellow, Sterling dot, 2005-2006.
- Advised two teams for the COMAP mathematical modeling competition: one Mathematical Contest in Modeling (MCM) team and one Interdisciplinary Contest in Modeling (ICM) team, 2007.
- Science fair judge for Reedemer Classical School, 2008, 2010, 2012
- Graduate School panel participant, JMU Math Club, January 31st 2007
- Graduate School panel participant, SUMS conference, October 28th 2006
- Co-organizer of a panel discussion “Time and stress management: balancing research, teaching, and service in creative ways”, MathFest, August 10th 2006
- Co-organizer of a panel discussion “Interdisciplinary Research and teaching,” Joint Mathematics Meeting, January 2006.
- Supervise technology classroom for Shenandoah Undergraduate Mathematics and Statistics Conference (SUMS) conference at JMU, 2006-2007.
- Judge for the Shenandoah Undergraduate Mathematics and Statistics Conference (SUMS) poster contest at James Madison University, Fall 2005.
- Ongoing advising of majors and writing recommendation letters.