

## *J. Patrick Wilber*

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### **Professional Preparation**

- Ph.D. in Applied Mathematics, University of Maryland at College Park, May 1999.  
Adviser: Stuart S. Antman.
- M.A. in Political Science, University of Maryland at College Park, December 1993.
- B.A. in International Relations, Magna Cum Laude, University of Notre Dame, May 1989.

### **Appointments**

- Professor, Department of Mathematics, University of Akron, May 2017 to Present.
- Associate Professor, Department of Mathematics, University of Akron, May 2008 to May 2017.
- Assistant Professor, Department of Mathematics, University of Akron, August 2002 to May 2008.
- VIGRE Assistant Professor, Department of Mathematics, Texas A&M University, January 2001 to June 2002.
- Visiting Assistant Professor, Department of Mathematics, Texas A&M University, September 1999 to December 2000.

### **Refereed Journal Publications**

1. M. Espanol, D. Golovaty, and J.P. Wilber, A Discrete-to-Continuum Model of Weakly Interacting Incommensurate 2-Dimensional Lattices, *Proceedings of the Royal Society A*, DOI: 10.1098/rspa.2017.0612, 2017.
2. K.B. Sutton, C.B. Clemons, K. Kreider, J.P. Wilber, and G.Y. Young, Surface Nonuniformities in Waterborne Coatings due to Evaporative Mechanisms, *AIChE Journal*, DOI: 10.1002/aic.16057, 2017
3. M. Espanol, D. Golovaty, and J.P. Wilber, A Discrete-to-Continuum Model of Weakly Interacting Incommensurate Chains, *Physical Review E*, 96:033003-033015, 2017.
4. M. Espanol, D. Golovaty, and J.P. Wilber, Euler Elastica as a  $\Gamma$ -Limit of Discrete Bending Energies of One-Dimensional Chains of Atoms, *Mathematics and Mechanics of Solids*, Published online (May 2017). <https://doi.org/10.1177/1081286517707997>.
5. R. Bagwell, J. Leta, D. Golovaty, and J.P. Wilber, An Elastica Model that Predicts Radial Corrugations in a Double-Walled Carbon Nanotube, *European Journal of Mechanics - A/Solids*, 54:74–83, 2015.
6. A.E. Stine, D. Nassar, J.K. Miller, C.B. Clemons, J.P. Wilber, G.W. Young, Y.H. Yun, C.L. Cannon, J.G. Leid, W.J. Youngs, and A. Milsted, Modeling the Response of a Biofilm to Silver-Based Antimicrobial, *Mathematical Biosciences*, 244:29–39, 2013.

7. J.K. Miller, J.S. Brantner, C. Clemons, K.L. Kreider, A. Milsted, J.P. Wilber, Y.H. Yun, W.J. Youngs and G. Young, H.T. Badawy P.O. Wagers, Mathematical Modelling of *Pseudomonas aeruginosa* Biofilm Growth and Treatment in the Cystic Fibrosis Lung, *Mathematical Medicine and Biology: A Journal of the IMA*, doi:10.1093/imammb/dqt003, 2013.
8. J.K. Miller, R. Neubig, C. Clemons, K.L. Kreider, J.P. Wilber, G. Young, A.J. Ditto, Y.H. Yun, A. Milsted, H.T. Badawy, M.J. Panzer, W.J. Youngs, C.L. Cannon, Nanoparticle Deposition onto Biofilms, *Annals of Biomedical Engineering*, 41:53–67, 2013.
9. S.D. Ryan, D. Golovaty, J.P. Wilber, An Elastica Model of the Buckling of a Nanoscale Sheet Perpendicular to a Rigid Substrate, *International Journal of Solids and Structures*, 49:3681–3692, 2012.
10. J.K. Miller, H.T. Badawy, C. Clemons, K.L. Kreider, J.P. Wilber, A. Milsted, G. Young, Development of the *Pseudomonas aeruginosa* Mushroom Morphology and Cavity Formation by Iron-starvation: a Mathematical Modeling Study, *Journal of Theoretical Biology*, 308:68–78, 2012.
11. J.G. Leid, A.J. Ditto, A. Knapp, P.N. Shah, B.D. Wright, R. Blust, L. Christensen, C.B. Clemons, J.P. Wilber, G. Young, In Vitro Antimicrobial Studies of Silver Carbene Complexes: Activity of Free and Nanoparticle Carbene Formulations Against Clinical Isolates of Pathogenic Bacteria, *Journal of Antimicrobial Chemotherapy*, 67:138–148, 2012.
12. M.W. Roberts, A. Buldum, C. Clemons, D. Quinn, J.P. Wilber, and G. Young, Continuum Plate Theory and Atomistic Modeling to Find the Flexural Rigidity of a Graphene Sheet Interacting with a Substrate, *Journal of Nanotechnology*, 2010:868492, 2010.
13. J.P. Wilber, Buckling of Graphene Layers Supported by Rigid Substrates, *Journal of Computational and Theoretical Nanoscience*, 7:2338–2348, 2010.
14. S.S. Antman and J.P. Wilber, The Asymptotic Problem for the Springlike Motion of a Heavy Piston in a Viscous Gas, *Quarterly of Applied Mathematics*, 65:471–498, 2007.
15. D. Quinn, J.P. Wilber, C. Clemons, G. Young, and A. Buldum, Buckling Instabilities in Coupled Nano-Layers, *International Journal of Non-Linear Mechanics*, 42:681–689, 2007.
16. J.P. Wilber, A. Buldum, C. Clemons, D. Quinn, and G. Young, Continuum and Atomistic Modeling of Interacting Graphene Layers, *Physical Review B*, 75:045418, 2007.
17. J.P. Wilber, Invariant Manifolds Describing the Dynamics of a Hyperbolic-Parabolic Equation from Nonlinear Viscoelasticity, *Dynamical Systems, An International Journal*, 21:465–490, 2006.
18. J.P. Wilber and J. Criscione, The Baker-Ericksen Inequalities for Hyperelastic Models Using a Novel Set of Invariants of Hencky Strain, *International Journal of Solids and Structures*, 42:1547–1559, 2005.
19. J.P. Wilber and J.R. Walton, Deformations of a Neo-Hookean Elastic Wedge Revisited, *Mathematics and Mechanics of Solids*, 9:307–322, 2004.
20. J.P. Wilber, Absorbing Balls for Equations Modeling Nonuniform Deformable Bodies with Heavy Rigid Attachments, *Journal of Dynamics and Differential Equations*, 14:855–887, 2002.
21. J.P. Wilber and J.R. Walton, The Convexity Properties of a Class of Constitutive Models for Biological Soft Tissues, *Mathematics and Mechanics of Solids*, 7:217–236, 2002.
22. J.P. Wilber and J.R. Walton, Sufficient Conditions for Strong Ellipticity for a Class of Anisotropic Materials, *International Journal of Non-Linear Mechanics*, 38: 441-455, 2002.

23. J.P. Wilber and S.S. Antman, Global Attractors for Degenerate Partial Differential Equations from Nonlinear Viscoelasticity, *Physica D*, 150: 177–206, 2001.

### Refereed Conference Proceedings

- J. Leta and J.P. Wilber, An Elastica Model that Describes the Buckling of the Cross-section of a Nanotube Interacting with a Rigid Ring, *Proceedings of 16th US National Congress of Theoretical and Applied Mechanics*, 2010.
- J. Gallagher, Y. Milman, S. Ryan, D.G. Golovaty, J.P. Wilber, and A. Buldum, A Buckling Problem for Graphene Sheets, *Proceedings of CMDS 11, the 11th International Symposium on Continuum Models and Discrete Systems*, 2007.
- D.D. Quinn, A. Bolden-Pudlosky, A. Buldum, C. Clemons, J.P. Wilber, and G. Young, Buckling of Coupled Beams, *Proceedings of ENOC2005, the Fifth EUROMECH Nonlinear Dynamics Conference*, 2005.
- J.P. Wilber, D.D. Quinn, A. Bolden-Pudlosky, A. Buldum, C. Clemons, and G. Young, Buckling Instabilities in Coupled Nanobeams, *Proceedings of IMECE 2005, International Mechanical Engineering Congress and Exposition*, 2005.

### External Funding

- NSF DMS-1615952 (Total Budget \$247,275, Budget for Wilber \$98,671), August 2016 to July 2019, *Grain Growth in Graphene: Novel Aspects in Two Dimensions*, PI with co-PIs D. Golovaty and M. Espanol.
- UA Community Industrial Assistantship—Award #1000002571 (\$19,608 per year), August 2014 to August 2015, Sponsored by Sherwin-Williams Company to support grad student K. Sutton. (Renewed for 2015-2016 and 2016-2017.)
- NSF DMS-1009849 (Total Budget \$186,420, Budget for Wilber \$93,210), July 2010 to June 2013, *Modeling of Nonbonded Interactions in Graphene and Carbon Nanotubes*, co-PI with D. Golovaty.
- NIH ROI GM086895-01 (Total Budget \$198,000), August 2010 to July 2011. Supplement to *Polymeric Drug Delivery Systems and Biofilms in the Lung*.
- NIH GM86895-01 (Total Budget \$975,000, 1 month summer salary for Wilber for 4 years), August 2008 to July 2012, *Polymeric Drug Delivery Systems and Biofilms in the Lung*, Senior Personnel with PI G. Young and C. Cannon, C. Clemons, D. Ely, S. Lopina, A. Milsted, W. Youngs, Y. Yun, A. Buldum, and J. Leid.
- NSF DMS-0407361-001 (Total Budget \$6,250), 2006, REU Supplement to *Modeling, Analysis, and Simulation of Bending Nanotubes*.
- Ohio Board of Regents matching grant for NSF DMS-0407361 (Total Budget \$13,221, Budget for Wilber \$6,611), July 2004 to December 2008.
- NSF DMS-0407361 (Total Budget \$267,935, 1 month summer salary for Wilber for 3 years), July 2004 to December 2008, *Modeling, Analysis, and Simulation of Bending Nanotubes*, PI with co-PIs A. Buldum, D. Golovaty, D. Quinn, and G. Young.

### Internal Grants

- UA Tiered-Mentoring program (Total Budget \$4,500, \$3000 summer salary for grad student K. Buckman, \$1500 equipment money for the biofilm group), Summer 2011.

- UA Tiered-Mentoring program (Total Budget \$4,500, \$3000 summer salary for grad student K. Miller, \$1500 equipment money for the biofilm group), Summer 2010.
- UA Tiered-Mentoring program (Total Budget \$4,500, \$3000 summer salary for grad student K. P. Robison, \$1500 equipment money for the biofilm group), Summer 2009.
- UA Faculty Academic Year Grant (Total Budget \$6,000), with C. Clemons and G. Young, 2007-08.
- UA Integrated Bioscience Collaborative Research Incentive Grant (Total Budget \$8,000), with C. Clemons, A. Milsted, and G. Young, Summer 2007.
- UA Summer Faculty Research Grant (Total Budget \$8,000), Summer 2003.

## Recent Talks

- Invited Speaker in the minisymposium “Modeling and Simulation of Nanostructures and 2D Materials”, *2017 SIAM Annual Meeting*, July 2017.
- Invited Speaker at “North East Ohio Applied Math Forum”, Cleveland State University, April 2017.
- Invited Speaker in the minisymposium “Upscaling Models of Crystalline Structures: Analysis and Simulation”, *2016 SIAM Conference on Mathematical Aspects of Materials Science*, May 2016.
- Invited Speaker in the minisymposium “Synthesis, Characterization, and Modeling of Low-Dimensional Nanomaterials”, *Society of Engineering Science, 50th Annual Technical Meeting*, July 2013.
- Contributing Speaker, *4th Canadian Conference on Nonlinear Solid Mechanics*, July 2013.
- Contributing Speaker, *2013 SIAM Dynamical Systems Conference*, May 2013.
- Contributing Speaker, *48th Annual Meeting of the Society of Engineering Science: Session on Nanoscale Mechanics*, October 2011.
- Invited Speaker, *University of Akron Third Annual Silver Center Meeting*, July 2010.
- Contributing Speaker, *SIAM Life Sciences Conferences 2010*, July 2010.
- Contributing Speaker, *USNCTAM 2010: Session on Mechanics of Carbon Nanotubes*, June 2010.
- Contributing Speaker, *The 2009 Joint ASCE-ASME-SES Conference on Mechanics and Materials: Session on Material Instabilities*, June 2009.
- Contributing Speaker, *45th Annual Meeting of the Society of Engineering Science: Session on Multiscale Modeling*, October 2008.
- Contributing Speaker, *7th International Conference on Dynamical Systems and Differential Equations: Session on Applications of Differential Equations*, May 2008.

## Graduate Research Supervised

- 3 PhD Students: Dan Rhoads (through UA Engineering-Applied Math PhD program), expected completion Summer 2018; Kaylee Sutton (through UA Engineering-Applied Math PhD program), expected completion Summer 2018; Kyle Miller (through UA Integrated Biosciences PhD Program), finished 2014.
- 21 Masters Students: Cody Woods, current; Lucas Stanek, current; Bill Clemson, current; Eliza Jacobs, finished 2016; Kaylee Sutton, finished 2016; Dan Rhoads, finished 2015; Andrew Marmaduke, finished 2015; Mona Matar, finished 2014; Tim Nixdorf, finished 2014; Ting Gao, finished 2013; Andrew Tuesday, finished 2012; Ross Bagwell, finished 2012; Fong Fong, finished 2011; Kevin Buckman, finished 2011; James Leta, finished 2011; Dan Musser, finished 2010; Pam Robinson, finished 2009; Shawn Ryan, finished 2009; Andrew Mykrantz, finished 2008; Scott Kaschner, finished 2008; Mark Roberts, finished 2007.

## Undergraduate Research Supervised

- Supervised 8 Undergraduates through NSF-funded REUs: J. Maas, Summer 2014; M. Hughs, Summer 2014; A. Marmaduke, Summer 2012; D. Povitsky, Summer 2011; B. Djoko, Summer 2011; J. Gallagher, Summer 2007; Y. Milman, Summer 2007; S. Ryan, Summer 2007.
- Supervised 4 Undergraduates through UA Tiered-Mentoring program: J. Gaone, Summer 2011; E. Elmond, Summer 2011; R. Pinheiro, Summer 2010; D. Youhon, Summer 2009.
- Supervised 3 UA Honors Theses: J. MacDonald, finished Fall 2011; D. Youhon, finished Spring 2010; K. Buckman, finished Spring 2010.

## PhD, Masters, and Honors Thesis Committees

- Served on 7 PhD Committees: H. Singh, Mechanical Engineering, 2016; A. Tabrizi, Civil Engineering, 2016; A. Moradkhany, Civil Engineering, 2015; L. Brubaker, Engineering Applied Math, 2010; M. Arichi, Engineering Applied Math, 2009; C. Childers, Engineering Applied Math, 2007; A. Khalil, Electrical Engineering, 2005.
- Served as Reader for 21 Masters Theses: A. Hashemi, Applied Mathematics, 2016; R. Richards, Applied Mathematics, 2015; M. Wranski, Applied Mathematics, 2015; S. Basco, Applied Mathematics, 2013; L. Moses, Applied Mathematics, 2012; N. Kilker, Applied Mathematics, 2012; M. Diep, Applied Mathematics, 2011; M. Lora, Applied Mathematics, 2011; R. Neubig, Applied Mathematics, 2010; S. Bissel, Applied Mathematics, 2010; G. Orem, Applied Mathematics, 2009; J. Schwartzel, Applied Mathematics, 2009; D. Nasser, Applied Mathematics, 2009; K. Groshong, Applied Mathematics, 2008; N. Raj Paudel, Physics, 2007; P. Hanson, Applied Mathematics, 2006; A. Weiss, Applied Mathematics, 2005; M. Arichi, Applied Mathematics, 2005; P. Stager, Applied Mathematics, 2005; A. Dubey, Mechanical Engineering, 2005; C. Childers, Applied Mathematics, 2004.

## Recent Departmental Service

- Formal Departmental Duties
  - Graduate Coordinator, Fall 2014 to present.
  - Calc 1 Course Coordinator, Fall 2015; Calc 3 Course Coordinator, Spring 2016; Calc 2 Course Coordinator, Fall 2016.
  - Engineering Math Qualifiers Coordinator, Fall 2011 to present.
  - Math Qualifiers Coordinator, Fall 2013 to present.
- Departmental Committees
  - Chair, Department Assessment Committee, Fall 2015 to present.
  - Chair, Tenure and Promotion Committee, Fall 2015.
  - Secretary, Tenure and Promotion Committee, Fall 2011, Fall 2012, Fall 2013.
  - Member, Math Department Chair Search Committee, Spring 2013.
  - Member, Math Department Chair Review Committee, Spring 2010.
  - Chair, Nontenure-track Search Committee, Spring 12.
  - Member, Tenure-track Search Committee, 2011-12.
  - Member, Nontenure-track Search Committee, Spring 10.
  - Calculus Textbook Committee, Spring 2011; Differential Equations TextBook Committee, Spring 2009.
- Other Departmental Service
  - Wrote Real Analysis Qualifiers, Winter 2009, Summer 2009, Winter 2010.
  - Participated in Major Mosaic, Round-up Day, Senior Visit Day, and Fall Visit Day numerous times.
  - Represented Department at Commencement numerous times.

## Recent College and University Service

- Member, Integrated Bioscience PhD Program Admissions Committee, 2008-present.
- Member, Faculty Research Grant Committee, 2010-11, 2011-12, 2012-13.
- Faculty Interviewer, Admissions to UA BS/MD Program, Spring 2014.
- Faculty Interviewer, UA Honors College Scholarship Program, 6 times between 2011-13.
- Member, CAS 'Improve Research' Committee, 2011.
- Moderator, UA CUGSR Session on Applied Mathematics, Spring 2010.
- Judge, IB/Tiered Mentoring Poster Session, Fall 2009.

## Recent Reviewing Activities

- Recent review work for *Journal of Nonlinear Analysis*, *Journal of Differential Equations*, *Journal of Physics: Condensed Matter*, *Computational Material Science*, *ASME Journal of Computational and Nonlinear Dynamics*, *International Journal of Nonlinear Mechanics*, *Physica E*, *Journal of Applied Physics*, *Journal of Theoretical Biology*, *Math Reviews*.