CURRICULUM VITÆ (September 2007)

Name:

Curtis B. Clemons, Professor of Applied Mathematics

Present Rank:

Department of Theoretical and Applied Mathematics
The University of Akron
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Educational Data:

Ashland University	Mathematics & Chemistry	B.S. 1982
Miami University	Mathematics	M.A. 1984
University of Maryland	Mathematics	Ph.D. 1990

Professional Experience:

8/07 to present	Professor Applied Mathematics Biomolecular Engineering, University of Akron
9/99 to 8/07	Associate Professor Applied Mathematics, University of Akron
9/90 to 9/99	Assistant Professor Applied Mathematics, University of Akron
9/85 to 9/90	Graduate Assistant, University of Maryland
9/84 to 12/84	Instructor, Miami University

Research Program:

While formally trained in dynamical systems, over the past five years my research has been interdisciplinary, working with scientists and engineers on projects in mechanics, population dynamics, solidification, chemical, physical and plasma enhanced vapor deposition, nanoscale systems, geological systems and mathematics of finance. In each of these areas the systems are modeled and asymptotic analysis is used to either find approximate analytical solutions or reduce the system to a tractable numerical simulation.

Journal Publications

1. J. Li, **C.B. Clemons**, G.W. Young and J. Zhu, *Solutions of Two-Factor Models With Variable Interest Rates*, Journal of Applied Mathmematics and Computations, (expected print date May 2008).

2. S. Djurkovic, **C.B. Clemons**, D. Golovaty and G.W. Young, *Effects of the Electric Field Shape on Nano-Scale Oxidation*, Surface Science (in print).

3. D.D. Quinn, J.P. Wilber, **C.B. Clemons**, G.W. Young and A. Buldum, *Buckling Instabilities in Coupled Nanol-layers*, International Journal of Non-Linear Mechanics, Vol. 42, No. 4, (2007), 681-689.

4. K. Moore, **C.B. Clemons**, K.L. Kreider and G.W. Young, *Modeling and Simulation of Axisymmetric Coating Growth on Nanofibers*, Journal of Applied Physics, Vol. 101, No. 6, (March 2007),

5. J.P. Wilber, A. Buldum, **C.B. Clemons** , D.D Quinn, G.W. Young, *Continuum and Atomistic Modeling of Interacting Graphene Layers*, Phys. Rev. B, Vol. 75, (2007), 045418-1–045418-10.

6. A. Orians, **C.B. Clemons**, D. Golovaty and G.W. Young, *One-Dimensional Dynamics of Nano-Scale Oxidation*, Surface Science, Vol. 600, No. 6, (2006), 3297-3312.

7. K. Kupchella, **C.B. Clemons**, D. Golovaty, and G.W. Young, *An Asymptotic Analysis for Directional Solidification of a Diffusion-Dominated Binary System*, Journal of Crystal, Vol. 292, No. 1, (2006), 111-124.

8. **C.B. Clemons**, D. Golovaty, and G.W. Young, *Asymptotic Solutions for an Axisymmetric, Stagnant Film Model of Directional Solidification*, Journal of Crystal Growth, Vol. 289, No.2, (2006), 715-726.

9. J. Bonfiglio, J. McHood, **C.B. Clemons**, D. Golovaty, and G.W. Young, *Asymptotic Solutions for a Time-Dependent, Axisymmetric Directional Solidification System*, Journal of Crystal Growth, Vol. 285, No. 3, (2005), 415-426.

10. L.D. Nelson, J.A. Heminger, **C.B. Clemons**, G.W. Young, and S.I. Hariharan, *Simulation of a One-Dimensional Phase-Field Model for Solidification*, International Journal of Applied Mathematical Sciences, Vol 2, No. 1, (2205), 81-96.

11. A. Buldum, I. Busuladzic, **C.B. Clemons**, L.H. Dill, K.L. Kreider, G.W. Young, E.A. Evans, G. Zhang, S.I. Hariharan, and W. Kiefer, *Multiscale Modeling, Simulation and Experiments of Coating Growth on Nanofibers. Part I. Sputtering*, Journal of Applied Physics, Vol. 98, No. (4), (2005), Art. No. 044303.

12. A. Buldum, **C.B. Clemons**, L.H. Dill, K.L. Kreider, G.W. Young, E.A. Evans, G. Zhang, G. Zheng, and S.I. Hariharan, *Multiscale Modeling, Simulation, and Experiments of Coating Growth of Nanofibers. Part II. Deposition*, Journal of Applied Physics, Vol. 98, No. 4, (2005), Art. No. 044304.

13. T. Marinov, A. Buldum, **C.B. Clemons**, K.L. Kreider, G.W. Young and S.I. Hariharan, *Field Emission from Coated Nanowires*, Journal of Applied Physics, Vol. 98, No. 4, (2005), Art. No. 044314.

14. R..M Ralich, **C.B. Clemons**, R.D. Ramsier and G.W. Young, *Squeezed-state Eigenfunctions of the Schrödinger Equation and an Effective Hamiltonian*, International Journal of Applied Mathematical Science, Vol. 2, No. 1, (2005), 105-120.

15. R.M. Ralich, R.D. Ramsier, D.D. Quinn, **C.B. Clemons**, and G.W. Young, *Measuring and Modeling Thermal Fluctuations at Nanometer Length Scales,* Phys. Rev. E, Vol. 65, No. 5, Part 2, May, (2002) , Art. No. -057601.

16. **C.B. Clemons**, S.I. Hariharan and G.W. Young, *Asymptotic Solutions of a Phase-Field Model for Alloy Solidification*, SIAM Journal of Applied Mathematics, Vol. 82 (2002), 1952-1972.

17. **C.B. Clemons**, D.D. Quinn and S.I. Hariharan, *Amplitude Equations for Time-dependent Solutions of the McKendrick Equations,* SIAM Journal of Applied Mathematics, Vol 62, No. 2, (2001) 684-705.

18. **C.B. Clemons**, K. Dempsey, D.D. Quinn, *On the SO(2) Symmetry Deformation of Rotating Rings with Shear Deformation*, International Journal of Non-Linear Mechanics 35 (2000) 79-93.

19. **C.B. Clemons**, *An Existence and uniqueness Result for Symmetric Vortices for the Ginsberg-landau Equations of Superconductivity*, Journal of Differential Equations, Vol. 157, No. 1, Sept, (1999), 150-162.

20. **C.B. Clemons**, *On Existence of Vortex Solutions of Some Semilinear Elliptic Equations*, J. Dynam. Differential Equations Vol. 9 No.1 (1997) , 53-67.

21. **C.B. Clemons** and C.K.R.T. Jones, *A Geometrical Proof of the Kwong–McLeod Uniqueness Result*, SIAM Journal of Mathematical Analysis, Vol.24, March, (1993) 436-443.

Submitted Papers

1. M.W. Roberts, **C.B. Clemons**, J.P. Wilber, G.W. Young, A. Buldum and D.D. Quinn, *Continuum and Atomistic Modeling to find the Bending Stiffness of a Graphene Sheet*, submitted to Phys. Rev. B.

2. **C.B. Clemons**, P. Hamrick, J. Hemiger, K.L. Kreider, G.W. Young, A. Buldum, E. Evans, G. Zheng, *Modeling, Simulation and Experiments of Coating Growth on Nanofibers*, submitted to Phys. Rev. B.

Papers in Preparation

1. B. Justice, **C.B. Clemons**. I.D. Sasowsky, E. Wright and G.W. Young, *Modeling of Calcium Casbonate Precipitation in Natural Karst Environments Under Hydrodynamic and Chemical Kinetic Control*, to be submitted to Chemical Geology.

Current Research Projects

1. Jared Hicks (undergraduate), C.B. Clemons and G.W. Young, Modeling ThermoPhotoVoltaic (TPV) Devices, N.I.R.T.

2. Andy Mycrantz, A. Buldum, C.B. Clemons, D.D. Quinn, J.P. Wilber and G.W. Young, Comparing Continuum Beam and Sheet Models to Molecular Dynamic Results, Nanobending.

3. Brandon Reed (masters student), C.B. Clemons, J. Wilder, K. Kreider, T. Norfolk, P. Yi and G.W. Young, Continuum Modeling of Traffic Flow Through a Simple Intersection.

4. Jeff Coast, C.B. Clemons, D. Golovaty and G.W. Young, Asymptotic Solutions for a Time-Dependent, Axisymmetric Directional Solidification System Including Concentration, Fluid Flow, Slip Boundary Conditions and Surface Free Energy for a Nonsymetric Heater.

5. Joe Tucker, C.B. Clemons, Kate Sheppard and G.W. Young, Modeling and Optimizing Mozambique's economy.

6. Kim Groshong, Gary Orum, Brad Justice, C.B. Clemons and G.W. Young, Modeling Rimstone Dams

7. Dave Nassar, Andrew Stine, C.B. Clemons and G.W. Young. Modeling a biofilms and a drug delivery system.

Conference Proceedings

1. A. Buldum, **C.B. Clemons**, A. Pudloski, D. Dane Quinn, J. Patrick Wilber and G.W. Young, *Buckling Instabilities in Coupled Nanoscale Structures*, Proceedings of IMECE2005, 2005 ASME International Mechanical Engineering Congress and Exposition, Nov. 5-11, Orlando, Florida.

2. A. Buldum, **C.B. Clemons**, A. Pudloski, D. Dane Quinn, J. Patrick Wilber and G.W. Young, *Buckling Instabilities in Coupled Nanobeams*,ENOC-2005, Eidhoven, Neatherlands, 7-12, August 2005.

3. **C. B. Clemons**, *On Existence and Uniqueness of Positive and Radially Symmetric Solutions of Some Semilinear Elliptic Equations*, Proceedings of the Sixth International Conference on Differential Equations Conference, Plovdiv, Bulgaria, Vol. 1, 113-122.

4. **C. B. Clemons**, K. Dempsey, D.D. Quinn, *The Singular Nature of Rotating Rings with Symmetry*, In Anil K. Bajaj and Michael P. Païdoussis, editors, DE-Vol. 53-1: 4th International Symposium on Fluid-structure Interactions, Aeroelasticity, Flow-induced Vibrations and Noise—Nonlinear Dynamics, 299-306.

Courses Taught

Linear Programming, Precalculus (co-ordinator), Precalculus with graphing calculator, Linear Algebra, Advanced Linear Algebra, Partial Differential Equations, Systems of Ordinary Differential Equations, Dynamical Systems and Chaos, Calculus of Variations, Calculus I, II & III, Ordinary Differential Equations, Advanced Calculus I, Concepts of Calculus, Advanced Engineering Mathematics I & II, Business Calculus, Math Models, Complex Variables.

Curriculum Development

1. Graphing calculator approach to Precalculus.

2. Algebra with Business Applications - New Course.

3. Calculus with Business Applications - New Course.

4. 1998 & 1999 Department of Mathematics and Computer Science General Education Committee Chair: Discussed general education offerings with other department chairs, Readjusted syllabi in College Algebra and Prepmath, Evaluated mathematics general education offering relative to departmental guideline goals, Developed and implemented Historical Files for general education, Aided chair in writing reports to the Provost's General Education Committee.

5. Research Tools - New Course.

6. 2003-2006 Honors Calculus Learning Community.

Grants

1. NSF Division of Mathematical Sciences - " Modeling, Simulation, and Analysis of Bending Nanotubes" - NSF Grant No. DMS-04-07361, Senior Research Scientist (2004-2007): $267,983 .

2. NSF DMI - "NIRT: Nanofiber Manufacturing for Energy Conservation and Utilization" (Senior Research Scientist)- NSF Grant No. DMI-0403835, Senior Research Scientist (2004-2008): $1,300,000.

3. NASA Glenn Cooperative Agreement for Theory, Modeling, Software and Hardware Development in Computational Materials Science -NASA Grant No. NNC04GB27G (2004-2007) $305,636.

4. NSF Division of Mathematical Sciences - "Multi-Scale Analysis and Simulation of Nanofiber Coatings: Growth and Applications" NSF Grant No. DMS-03-05580, (2003-2004) $106,250.

5. NSF Division of Mathematical Sciences - "Modeling and Analysis of an Electrochemical Nanocell" NSF Grant No. DMS-03-05577, (2003-2004) $100,000.

6. Ohio Board of Regents Research Challenge - July 2003 - July 2004, $7,354.

7. NASA Glenn Cooperative Agreement for Theory, Modeling, Software and Hardware Development in Computational Materials Science -NASA Grant No. NCC 3-1094, (2003-2004) $64,000.

8. 1997 Excellence in Teaching Summer Grant, awarded by The University of Akron's Provost. Curriculum development and course proposals were written for Algebra with Business Applications and Calculus with Business Applications.

9. 1992 & 1993 Summer ASEE Faculty Fellowship at NASA, Lewis.

10. 1991 Summer Faculty Research Grant, awarded by The University of Akron's Research (Faculty Projects) Board.

Pending Proposals

1. 2007 NSF DMS/NIH, Polymeric Drug Delivery Ssstems and Biofilms in the Lungs, $1,440,000.

Synergistic Activities

1. Since 1996 I have acted as manager of the Applied Mathematics Research Laboratory systems administrators. This research network provides computational support for The University of Akron's Applied Mathematics Faculty and their collaborators, *www.amrl.uakron.edu.*

2. Since 2000 I have worked dillegently in conjunction with our Applied Mathematics Division cooordinator, Dr. G.W. Young, to develop the Applied Mathematics Division as a hub of interdisciplinary research on The University of Akron's campus, as evidenced by our Applied Mathematics Division's grant and publication record. This success has provided an enriched classroom environment whereby current examples of our students disciplines are used to motivate the study of mathematics Moreover,the interdisicplinary research teams provid an enriched graduate student training environment, similar to which they will be employed.

AWARDS

1. 2003 Buchtel College Chair's Award for research.
2. 2004 Inducted into Golden Key Honor Society

Students

1. Honors Projects: Kevin Moore, Ines Busuladzic, Aaron Orions, Kevin Kupchella, Alex Klepacz, and Andrew Bernat.
2. Masters Students: Brad Justice, Jinglu Li, Kevin Moore, Lance Nelson, Sandra Djurkovic, Jason McHood, Aaron Orians, Michael Ralich.
3. Current Students: Brandon Reed (masters), Jared Hicks (undergraduate), Joe Tucker (maters), Kim Groshong (masters), Gary Orum (masters), Dave Nassar (masters), Andrew Stine (undergraduate).