Edgar J Fuller

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320 Armstrong Hall
Department of Mathematics
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Professional Experience

2014–Present	**Professor and Chair, Department of Mathematics** **West Virginia University** Supervise 27 research faculty, 3 teaching professors, 10 instructors, 88 graduate students; administer annual budget in excess of $6 million per year.
2008-2014	Associate Professor and Chair, Department of Mathematics, West Virginia University
2002-2008	Assistant Professor, Department of Mathematics, West Virginia University
2000-2002	Teaching Assistant Professor, Department of Mathematics, Duke University

Education

1993-1999	**PhD in Mathematics, University of Georgia, Athens, GA** Dissertation: The Geometric and Topological Properties of Holonomic Knots Advisor: Clint McCrory
1991-1993	BS in Mathematics/BS in Physics, University of Georgia

Publications

Journal Articles

2014	E. Fuller and MK Vemuri. The brylinski beta function of a surface. *Geometriae Dedicata*, page accepted
	Edgar Fuller, Jessica M Deshler, Betsy Kuhn, and Douglas Squire. Tracking the success of pre-college algebra workshop students in subsequent college mathematics classes. *PRIMUS*, 24(1):46–60, 2014
2013	Edgar Fuller and Jessica Deshler. The effect of a new placement process on student success in first semester calculus. *Creative Education*, 4(9B):18–21, 2013
	Qin Wu, Xingqin Qi, Edgar Fuller, and Cun-Quan Zhang. "Follow the Leader": A centrality guided clustering and its application to social network analysis. *Scientific World Journal*, page accepted, 2013
	Xingqin Qi, Wenliang Tang, Yezhou Wu, Guodong Guo, Eddie Fuller, and Cun-Quan Zhang. Optimal local community detection in social networks based on density drop of subgraphs. *Pattern Recognition Letters*, page accepted, 2013
	X. Qi, R.D. Duval, K. Christensen, E. Fuller, A. Spahiu, Q. Wu, Y. Wu, W. Tang, and C. Zhang. Terrorist networks, network energy and node removal: A new measure of centrality based on laplacian energy. *Social Networking*, 2:19–31, 2013

2012 M. Darrah, E. Fuller, T. Munasinghe, K. Duling, M. Gautam, and M. Wathen. Using genetic algorithms for tasking teams of raven uavs. *Journal of Intelligent & Robotic Systems*, pages 1–11, 2012

X. Qi, E. Fuller, Q. Wu, Y. Wu, and C.Q. Zhang. Laplacian centrality: A new centrality measure for weighted networks. *Information Sciences*, 194:240–253, 2012

X. Qi, E. Fuller, Q. Wu, and C.Q. Zhang. Numerical characterization of dna sequence based on dinucleotides. *The Scientific World Journal*, 2012:1–6, 2012

2011 X. Qi, Q. Wu, Y. Zhang, E. Fuller, and C.Q. Zhang. A novel model for dna sequence similarity analysis based on graph theory. *Evolutionary Bioinformatics*, 7:149–158, 2011

2010 M. Darrah, E. Fuller, and D. Miller. A comparative study of partial credit assessment and computer-based testing for mathematics. *Journal of Computers in Mathematics and Science Teaching*, 29(4):373–398, 2010

2006 Y. Liu, B. Cukic, E. Fuller, S. Yerramalla, and S. Gururajan. Monitoring techniques for an online neuro-adaptive controller. *Journal of Systems and Software*, 79(11):1527–1540, 2006

S. Yerramalla, E. Fuller, and B. Cukic. A validation approach for neural network-based online adaptive systems. *Software: Practice and Experience*, 36(11-12):1209–1225, 2006

Refereed Conference Articles

2012 E. Fuller, W. Tang, Y. Wu, and C.Q. Zhang. On the enhanced multi-membership clustering quasi-clique merger algorithm. In *2012 International Conference on Systems and Informatics (ICSAI)*, pages 244–248. IEEE, 2012

Eddie Fuller, Wenliang Tang, Yezhou Wu, and Cun-Quan Zhang. Optimal clustering selection on hierarchical system network. In *Proceedings of the 2012 International Conference on Advances in Social Networks Analysis and Mining (ASONAM 2012)*, ASONAM '12, pages 1085–1089, Washington, DC, USA, 2012. IEEE Computer Society

E. Fuller, J. Deshler, B. Kuhn, and D. Squire. Developmental student success in courses from college algebra to calculus. In *Electronic Proceedings of the 2012 International Conference on Technology in Mathematics (ICTCM)*, pages 1–10. Pearson, 2012

M. Darrah, E. Fuller, T. Munasinghe, K. Duling, M. Gautam, and M. Wathen. Using genetic algorithms for tasking teams of raven uavs. In *The Proceedings of the 2012 International Conference on Unmanned Aircraft Systems (ICUAS)*, pages 1–7, 2012

2011 Q. Wu, R. Duval, E. Fuller, X. Qi, C.Q. Zhang, A. Spahiu, and K. Christensen. Modeling network changes: Systemic centrality in foreign policy interaction analysis. In *2011 International Conference on Advances in Social Networks Analysis and Mining (ASONAM)*, pages 690–695. IEEE, 2011

2010 M. Darrah, E. Fuller, and D. Squire. Using online context-based calculus labs to motivate students in an introduction to calculus course. In *World Conference on Educational Multimedia, Hypermedia and Telecommunications*, volume 2010, pages 1658–1662, 2010

S. Yerramalla, E. Fuller, and B. Cukic. Optimal method for growth in dynamic self organizing learning systems. In *The 2010 International Joint Conference on Neural Networks (IJCNN)*, pages 1–7. IEEE, 2010

M. Darrah, E. Fuller, and D. Miller. A comparative study of partial credit assessment and computer-based testing. In *World Conference on Educational Multimedia, Hypermedia and Telecommunications*, volume 2010, pages 2335–2340, 2010

X. Qi, K. Christensen, R. Duval, E. Fuller, A. Spahiu, Q. Wu, and C.Q. Zhang. A hierarchical algorithm for clustering extremist web pages. In *2010 International Conference on Advances in Social Networks Analysis and Mining (ASONAM)*, pages 458–463. IEEE, 2010

2009 Q. Wu, E. Fuller, and C.Q. Zhang. Text document classification and pattern recognition. In *Proceedings of the International Conference on Advances in Social Network Analysis and Mining, 2009. ASONAM'09*, pages 405–410. IEEE, 2009

E. Fuller, D. Miller, and M. Darrah. Comparing partial-credit graded examinations and an end-of-semester bonus quiz for computerized examinations. In *Electronic Proceedings of the 2009 International Conference on Technology in Mathematics (ICTCM)*, pages 1–10. Pearson, 2009

2008 G. Campa, M. Mammarella, B. Cukic, Y. Gu, MR Napolitano, E. Fuller, and M. Fravolini. Calculation of bounding sets for neural network based adaptive control systems. In *AIAA Guidance Navigation and Control Conference, Honolulu*, 2008

2006 S. Yerramalla, B. Cukic, G. Campa, M. Napolitano, and E. Fuller. Stability monitoring and analysis of learning in adaptive systems. In *14th Mediterranean Conference on Control and Automation, 2006. MED'06.*, pages 1–7. IEEE, 2006

2005 Y. Liu, B. Cukic, E. Fuller, S. Gururajan, and S. Yerramalla. Novelty detection for a neural network-based online adaptive system. In *29th Annual International Computer Software and Applications Conference, 2005. COMPSAC 2005.*, volume 2, pages 117–122. IEEE, 2005

E. Fuller, S. Yerramalla, B. Cukic, and S. Gururajan. An approach to predicting non-deterministic neural network behavior. In *Proceedings of the 2005 International Joint Conference on Neural Networks, IJCNN'05.*, volume 5, pages 2921–2926. IEEE, 2005

2004 Y. Liu, S. Yerramalla, E. Fuller, B. Cukic, and S. Gururajan. Adaptive control software: can we guarantee safety? In *Proceedings of the 28th Annual International Computer Software and Applications Conference, COMPSAC 2004.*, volume 2, pages 100–103. IEEE, 2004

2003 S. Yerramalla, B. Cukic, and E. Fuller. Lyapunov stability analysis of the quantization error for dcs neural networks. In *Proceedings of the International Joint Conference on Neural Networks*, volume 3, pages 2412–2417. IEEE, 2003

S. Yerramalla, E. Fuller, M. Mladenovski, and B. Cukic. Lyapunov analysis of neural network stability in an adaptive flight control system. In *Proceedings of the Workshop on Self-Stabilizing Systems*, pages 77–92. Springer, 2003

Refereed Book Chapters

2010 S. Yerramalla, E. Fuller, and B. Cukic. Dynamic allocation in neural networks for adaptive controllers. In *Applications of Neural Networks in High Assurance Systems*, pages 111–139. Springer, 2010

2010 Q. Wu, E. Fuller, and C.Q. Zhang. Graph model for pattern recognition in text. In *Mining and Analyzing Social Networks*, pages 1–20. Springer, 2010

2006 B. Cukic, E. Fuller, M. Mladenovski, and S. Yerramalla. Run-time assessment of neural network control systems. In *Methods and Procedures for the Verification and Validation of Artificial Neural Networks*, pages 257–269. Springer, 2006

2006 E. Fuller, S. Yerramalla, and B. Cukic. Stability properties of neural networks. In *Methods and Procedures for the Verification and Validation of Artificial Neural Networks*, pages 97–108. Springer, 2006

2005 S. Yerramalla, Y. Liu, E. Fuller, B. Cukic, and S. Gururajan. An approach to v&v of embedded adaptive systems. In *Formal Approaches to Agent-Based Systems*, pages 173–188. Springer, 2005

Funded Research Projects

7/2012-6/2015 **West Virginia Mathematics and Science Partnership Program**
Project W.E.E.M.S.: West Virginia Endorsement for Elementary Math Specialists
WV Dept. of Ed., FY 2012-13 budget $200,000
Edgar Fuller, PI, total funding $600,000 over three years

West Virginia University and RESA 4 partner in this project to engage in a three-year Mathematics Science Partnership (MSP) grant proposal to increase content and pedagogical knowledge of elementary teachers at the K - 5 grade level. Content courses, standards-based instructional strategies, action research and professional learning communities are integral parts of the ongoing professional development. It is the intent to develop and implement innovative distance learning courses throughout the project. The target audience is teachers from high need schools who have made a commitment to complete all aspects of the planned activities each year of the grant. Project West Virginia Endorsement for Elementary Math Specialists (W.E.E.M.S.) will form partnerships with mathematics faculty from West Virginia University (WVU), and selected schools from Braxton, Fayette, Greenbrier, Nicholas, Webster and Pocahontas.

7/2006-6/2012 **Information Fusion Networks for Intelligence and Security**
Arun Ross, PI (total budget $1,796,212)
Edgar Fuller co-PI, Real-Time Analysis Group Lead, subtask funding $550,000 over five years
EPSCoR

This project focused on the use of adaptive software tools to analyze event data, including video, text logs, financial transactions, and event databases, in order to anticipate emergent behavior within a system. The goal of the real-time analysis group was to implement online and offline algorithms for clustering that provide autonomous feedback to experts in a variety of contexts.

2007 **Eberly College of Arts and Sciences**
Curriculum Development Grant
Developing a Two-Semester First Term Calculus
$3500 WVU internally funded

Developing the curriculum for a two-semester version of the traditional one-semester calculus class that targets at-risk students in the mainstream calculus sequence.

2007 **Eberly College of Arts and Sciences**
Curriculum Development Grant, Enhancing the Use of WebWork in First-Year Courses
$3500 WVU internally funded
Joint with H.J. Lai

7/2006-5/2007 **INFONets Research Initiation Grant**

$50000
Elaine Eschen PI

1/2003-12/2007 **Bounds Computation for Neural Networks using Lyapunov Analysis** *$96000*
NASA IV&V
Giampiero Campa PI

This project focused on the direct computation of the geometric structure of the boundary of the region in the state space of a dynamical system representing a neural network on which the given neural network can be shown to stably converge using Lyapunov's method. The resulting boundaries are used to analyze the behavior of adaptive flight control systems, specifically those used by NASA for its Intelligent Flight Control System project.

7/2006-8/2007 **WV Math and Science Partnership: Sustained Mathematics Professional Learning Communities in Rural Environments Year 3**
$189,000
PI: Edgar Fuller

7/2005-6/2006 **WV Math and Science Partnership: Sustained Mathematics Professional Learning Communities in Rural Environments Year 2**
$199,885
PI: Edgar Fuller, Co-PI: James Miller

7/2004-6/2005 **WV Math and Science Partnership: Sustained Mathematics Professional Learning Communities in Rural Environments**
$229,700
PI: Edgar Fuller, Co-PIs: Robert Mayes and James Miller

A three year Math and Science Partnership funded through the US Department of Education under the No Child Left Behind Act. This project developed learning communities in partner counties in WV that focused on building teacher content knowledge and methods for deploying new techniques in the classroom. During the three year period this project worked with approximately 30 teachers each year in a combination of on-site workshops and summer institutes. Data collection for this project has been completed and the analysis is currently underway.

EPSCoR Mini-Grant for Research Proposal Preparation *$5000, 7/1/2004*
WV EPSCoR

NASA Space Grant Consortium Research Seed Grant *$5000, 7/1/2004*
NASA/WVU

Institute for Scientific Research/NASA IV+V *One Month, Summer 2004*
Analysis and Control of Risk in the Assurance of Adaptive Control Systems (renewal)
PI: Bojan Cukic, $50100 total

Institute for Scientific Research/NASA IV+V *One Month, Summer 2003*
Analysis and Control of Risk in the Assurance of Adaptive Control Systems
PI: Bojan Cukic, $50065 total

Eberly College of Arts and Sciences *WVU, Summer 2003*
Curriculum Development Grant, $4300

Eberly College of Arts and Sciences *WVU, Summer 2003*
Grant Preparation Mini-Grant, $4000

Eberly College of Arts and Sciences *WVU, 2003*
Summer Research Support

Eberly College of Arts and Sciences *WVU, 2002*
Summer Research Support

Summer support, Project Calc *Duke University, 2001*

Teaching Experience

Graduate Teaching

- Graduate Topology (at the level of Munkres, *Topology*)
- Graduate Algebra
- Algebraic Topology (at the level of Massey, *A Basic Course in Algebraic Topology* and Hatcher, *Algebraic Toplogy*)

Undergraduate Teaching

Precalculus, Calculus, Multivariable calculus, linear algebra, differential equations

Outreach

Graduate courses for teachers including number and algebra, discrete math, probability, functions and calculus, and geometry; most offered via distance using WebCT Vista and Centra

Curriculum Development

- Developed new curriculum for two-semester version of first semester calculus targeting students with inadequate algebra and trigonometry backgrounds
- Developed new curriculum for applied calculus course
- Developed curriculum for distance learning courses for in-service teachers using NCTM standards
- Developed technology based assessments (WebWork and Blackboard based) for multiple courses

Conferences and Workshop Participation

Workshops

Enhancing the Problem Authoring Capabilities of WeBWorK, American Institute of Mathematics, Palo Alto, CA, August 2007

Verification, Validation and Testing of Learning Systems, Neural Information Systems Processing Workshop, Whistler BC, December 2004

Invited Talks

Centrality in Data Mining, Jiangnan University, Wuxi, China, July 2013

Centrality in Data Mining, Anhui University, Hefei, China, July 2013

Graph Theoretic Clustering and Data Mining, Shanghai Jiaotong University, Shanghai, China, July 2013

Centrality Guided Clustering for Social Networks, Beijing Normal University, Beijing, China, May 2012

On the Enhanced Multi-membership Clustering Quasi-Clique Merger Algorithm, International Conference on Systems and Informatics, Yantai, China, May 2012

Centrality Guided Clustering for Social Networks, Shandong University-Weihai, Weihai, China, May 2012

Topological Faults in Cognitive Network Construction: A Neural Network Based Example. Workshop on Machine Learning in Cognitive Networks: Theory, Application, and Future, World Congress on Computational Intelligence, Hong Kong, July 7, 2008

Lyapunov Methods for Monitoring of Neural Networks, NASA Software Assurance Symposium, Morgantown WV, July 2006

Assessing First Year Mathematics Courses, WV Higher Education Symposium, Huntington WV, 2006

Institutional Change in Lower Division Mathematics, 2006 First Year Experience Conference

Run-Time Stability Monitoring of Neural Networks Using Lyapunov-Like Methods, NASA Software Assurance Symposium, Morgantown WV, August 2005

An Approach To Predicting Non-Deterministic Neural Network Behavior, The International Joint Conference on Neural Networks, Montreal Canada, 2005

Using Applications to Enhance Student Learning in Business Calculus, WV Higher Education Policy Commission Meeting, Flatwoods, WV, March 2005

A Stability Monitoring System for Validating On-Line Learning, Neural Information Processing Systems, Whistler, BC, December 2004, Presenter

An Approach to V&V of Embedded Adaptive Systems, Part II, NASA IV&V Mini-Conference, Fairmont WV, February 2004, Presenter

Universal Pi, MHS Pi Day, Morgantown High School, March 2004

An Approach to V&V of Embedded Adaptive Systems, FAABS III, Goddard Space Flight Center, Greenbelt MD, April 2004

A Stability Monitoring System for Validating Online Learning, Verification, Validation and Testing of Learning Systems, Neural Information Systems Processing Workshop, Whistler BC, December 2004

Assessing Behavioral Aspects of Student Performance, Symposium on Assessment in Undergraduate Mathematics, Joint Meetings of the AMS/MAA, Phoenix 2004

Knot Theory and Applications, High School Symposium, Department of Mathematics, WVU, November 2003

Mathematics and Art, Saturday Math Series, Department of Mathematics, WVU, April 2003

A Planar Calculus for Holonomic Knots, Sectional Meeting of the AMS, University of South Carolina, May 2000

Some Properties of Holonomic Knots, Southeastern Geometry Conference, University of South Carolina, May 1999

The Curvature of Torus Knots, Colgate University, March 1997

Presentations

Poster: *Implementing an Elementary Mathematics Specialist Endorsement Program Using a Hybrid Distance Learning Model in West Virginia*, US Department of Education Math and Science Partnership Directors Meeting 2013, Washington, DC

Comparing Partial-credit Graded Examinations and an End of Semester Bonus Quiz for Computerized Examinations with M. Darrah and D. Miller, at ICTCM 2009.

Novelty Detection for A Neural Network-based Online Adaptive System, COMPSAC 2005, Edinburgh Scotland

Lyapunov Stability Analysis of the Quantization Error for DCS Neural Networks, International Joint Conference on Neural Networks, Portland OR, July 2003

Lyapunov Analysis of Neural Network Stability in an Adaptive Flight Control System, IEEE Dependable Systems and Networks Conference, San Francisco CA, June 2003

Attended

Advances in Social Network Analysis and Mining, Kaohsiung Taiwan, 2011

Advances in Social Network Analysis and Mining, Odense, Denmark, 2010

World Congress on Computational Intelligence, Barcelona, Spain July 2010

Advances in Social Network Analysis and Mining, Athens, Greece, 2009

World Congress on Computational Intelligence, Hong Kong SAR, China, July 2008

MathFest, San Jose, CA, August 2007

COMPSAC, 2005

IJCNN, 2003, 2005

Neural Information Processing Systems (NIPS), Vancouver/Whistler BC, December 2004

MAA/SAUM Workshop on Assessment in Undergraduate Mathematics, Phoenix, May 2003

Joint Meetings of the AMS/MAA, 1998, 2002, 2005, 2009, 2010, 2011, 2012

MathFest, Madison, WI, August 2001

Clifford Conference: Topology of 4-Manifolds, Tulane University, 1997

Professional activities

Coordination of Large Section Courses

Course Coordinator, Math 153, West Virginia University, Fall 2007-present, 300+ students per term

Course Coordinator, Math 150, West Virginia University, Fall 2002- Spring 2007, 1100+ students per year

Course Coordinator, Math 32L, Duke University, 2001

Projects Directed

Project Director, WVU Math and Science Partnership, 2012-present

Group Lead, Real-time Analysis Group, INFONets, 2006-present

Project Director, WVU Math and Science Partnership, 2004-2007

Committees

- Graduate Program Committee, Fall 2007- Present
- Undergraduate Program Committee, Fall 2005 - Spring 2007
- Computing Facilities, Fall 2005 - Present
  - Webwork management and development
  - MapleTA testing management
  - Online exam signup and management for large classes
- Retention Working Groups: Group III Using Technology to Enhance Retention
- Rates of Student Success Academic Affairs Subcommittee
- eCampus Advisory Council

Memberships

Member: IEEE, AMS, MAA

Member, Project NExT 2002

Students

Priyanka Rajan, MS in Mathematics, August 2012

Adam Fletcher, PhD, expected 2013

Santhosh Balla, MS in Mathematics, December 2004

Awards and Honors

Tycho Brahe Award for Outstanding Empirical Research, July 2004
NASA-IV&V OSMA Conference, with Sampath Yerramalla, Bojan Cukic, Yan Liu and Martin Mladenovski

Departmental Teaching Award, University of Georgia *May 1997*
Annual award given by the Mathematics Department to the graduate student who best demonstrates excellence in teaching.

Outstanding Teaching Assistant, University of Georgia *May 1994*
Top 3% of Teaching Assistants University-wide

Barry M. Goldwater Fellowship *1991-1993*

References

On Request

Languages

English	**native**
French	Conversational, reading
Spanish	Some