

# Nathaniel E Ayewah

Citizenship: Nigeria

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## Research Interests

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Programming Languages, Human Computer Interaction, Software Engineering

## Education

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- 2006 – present Ph.D. Computer Science, University of Maryland, College Park, MD  
Expected in August 2010  
*Static Analysis in Practice* Advisor: William Pugh
- 2003 – 2005 M.S. Computer Science, Southern Methodist University, Dallas, TX GPA: 4.00
- 1998 – 2003 B.S. Computer Engineering, Southern Methodist University, Dallas, TX GPA: 3.97

## Research Experience

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- 2006 – present Graduate Research Assistant, University of Maryland (with Prof. William Pugh)
- Static Analysis in Practice** We investigate the usage and impact of static analysis tools for improving software quality and security. We learn through observation, interview, and survey of real users and study artifacts of the software process.
- Unit Testing Concurrent Software** We developed MultithreadedTC, a framework for testing small concurrent abstractions.
- Marmoset** A framework for testing student programming projects and collecting snapshots from the development process to support future research.
- Summer 2009 SDE Intern, Microsoft (with Dr. Jason Yang)
- ATMetrics: An Instrumentation Framework for Static Analysis Tools** Developed ATMetrics, a framework for remotely collecting metrics from static analysis tools on the developer's desktop.
- Summer 2008 Intern, IBM Research (with Dr. Marcel Rosu and Dr. Chandra Narayanaswami)
- Interactive Visualization of Audio Search Results** Audio search results are visualized on a timeline, enabling user interactions. Patent Filed.
- 2005 Research Engineer, Sipera Systems (with Krishna Kurapati)
- Identifying Unsolicited Messages** Developed framework for automatically classifying voice communications as either spam or legitimate signals. Patent Filed.
- 2003 – 2005 Graduate Research, Southern Methodist University (with Prof. Peter Seidel)
- VAMPEXplorer** Interactive visualization of proofs to verify a pipelined processor.
- Noise Reduction in Hearing Aids** Combined an implementation of a cochlea model with statistical de-noising techniques based on wavelets to achieve improved noise reduction properties at smaller computational costs.

2002 – 2003 Undergraduate Research, Southern Methodist University

**Flood Prediction** Investigated using Hidden Markov Models and other data mining techniques to predict spatial and temporal events (with Prof. Margaret Dunham)

**RSDnet** Investigated using non-expert web users to build a Romanian Semantic Dictionary (with Prof. Rada Mihalcea, University of North Texas)

## Publications

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- Refereed Journals** **N. Ayewah**, D. Hovemeyer, J. D. Morgenthaler, J. Penix, and W. Pugh (2008) “Using Static Analysis to Find Bugs”, *IEEE Software*. 25, 5 (Sep. 2008), 22-29. *Selected as one of IEEE Software’s 25th-Anniversary Top Picks.*
- N. Ayewah**, R. Mihalcea, V. Nastase, and D. Tatar. (2004) “RSDnet: A Web-based Collaborative Framework for Building Multilingual Semantic Networks.” *Studia Univ. Babeş-Bolyai Informatica*, Volume XLIX, number 1, 2004, p. 31 - 44.
- Refereed Conferences and Workshops** **N. Ayewah** and W. Pugh (2009). “Using checklists to review static analysis warnings”, In *Proceedings of the 2nd international Workshop on Defects in Large Software Systems*, DEFECTS 09. (Chicago, Illinois, July 19, 2009). ACM, New York, NY, 11-15.
- N. Ayewah** and W. Pugh (2009). “Learning from defect removals”, In *Proceedings of the 2009 6th IEEE international Working Conference on Mining Software Repositories*, MSR 09. (Vancouver, BC, May 16 - 17, 2009). IEEE Computer Society, Washington, DC, 179-182.
- N. Ayewah** and W. Pugh (2008) “A report on a survey and study of static analysis users”, In *Proceedings of the 2008 Workshop on Defects in Large Software Systems*, DEFECTS 08. (Seattle, Washington, July 20, 2008). ACM, New York, NY, 1-5.
- N. Ayewah**, W. Pugh, J. D. Morgenthaler, J. Penix and Y. Zhou. (2007) “Evaluating Static Analysis Defect Warnings On Production Software”, In *Proceedings of the 7th Workshop on Program Analysis For Software Tools and Engineering*, PASTE 07. (San Diego, California, USA, June 13 - 14, 2007). ACM, New York, NY, 1-8.
- W. Pugh and **N. Ayewah** (2007). “Unit testing concurrent software”, In *Proceedings of the Twenty-Second IEEE/ACM international Conference on Automated Software Engineering*, ASE 07. (Atlanta, Georgia, USA, November 05 - 09, 2007). ACM, New York, NY, 513-516.
- N. Ayewah**, W. Pugh, J. D. Morgenthaler, J. Penix, and Y. Zhou. (2007) “Using FindBugs on production software.” In *OOPSLA 2007 Companion*, Montreal, Canada, October 2007. ACM, New York, NY, 805-806.
- J. Spacco, W. Pugh, **N. Ayewah**, and D. Hovemeyer. (2006) “The Marmoset project: an automated snapshot, submission, and testing system.” In *OOPSLA 2006 Companion*, Portland, OR. ACM, New York, 669-670.
- N. Ayewah**, N. Kikkeri, and P.M. Seidel. (2005) “Challenges in the formal verification of complete state-of-the-art processors,” In *Proceedings of the 2005 International Conference on Computer Design*, ICCD. (October 02 - 05, 2005). IEEE Computer Society, Washington, DC, 603-608.
- N. Ayewah** and P. Seidel. (2004) “Fused Models for Noise Reduction in Speech Processing.” In *Proceedings of the 38th Asilomar Conference on Signals, Systems and Computers*, Nov 7-10, Pacific Grove, CA, pp 2315-2319.

**N. Ayewah**, R. Mihalcea, and V. Nastase. (2003) “Building Multilingual Semantic Networks with Non-Expert Contributions over the Web.” In *Proceedings of the KCAP 2003 Workshop on Distributed and Collaborative Knowledge Capture*, Sanibel Island, Florida, November 2003.

**Other Publications** **N. Ayewah**. (2005) VAMP Explorer: An Interactive Framework for Navigating a Complex Hierarchy of PVS Theorems. Master’s Thesis, Southern Methodist University, Dallas, TX, Aug 2005.

M. Dunham, **N. Ayewah**, Z. Li, J. Huang and K. Bean. (2004) “Spatial and Temporal Prediction Using Data Mining Tools.” In: Y. Manolopoulos, A. Papadopoulos, M. Vassilakopoulos (Eds.), *Spatial Databases: Technologies, Techniques and Trends*. Idea Group Inc., December 2004.

## Talks

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- 2009 “Learning from the Experiences of Static Analysis Users”, IBM Programming Language Research Day, Hawthorne NY, May 7, 2009.
- 2008 “Unit Testing Concurrent Software”, Rice University, Jan 9, 2008

## Other Employment

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- 2006 Graduate Teaching Assistant, University of Maryland, CMSC 433, Programming Language Technologies & Paradigms
- 2003 – 2005 Graduate Teaching Assistant, Southern Methodist University, CSE 2341, Principles of Computer Science II
- 2002 – 2003 Tutor, SMU Learning Enhancement Center, in Calculus, Electrical Engineering and Computer Science
- 2000 Undergraduate Intern, Nortel Networks, Assisting database and installation engineers

## Honors

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- 2009 “Using Static Analysis to Find Bugs” (2008) selected in IEEE Software’s 25th-Anniversary Top Picks, *IEEE Software*, January/February 2009.
- 2005 Verizon Graduate Fellowship, University of Maryland
- 2005 Best Research Award, Computer Science and Engineering, SMU Graduate Research Day
- 2003 Standard Bearer (Valedictorian), SMU School of Engineering
- 2003 Outstanding Senior Man Award, SMU School of Engineering
- 2002 Outstanding Undergraduate Award Honorable Mention from the Computer Research Association
- 2001 Tau Beta Pi National Engineering Honor Society
- 1998 – 2003 SMU J. Lindsay Embrey Engineering Scholar

## Leadership and Service

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2000 – 2003 Director, SMU International Mentor Program

2002 – 2003 Resident, SMU Service House

## References

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Available upon request