Benjamin S. Harvey
Curriculum Vitae

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Education

2015	D.Sc. in Computer Science, Bowie State University, Bowie, MD

2015   D.Sc. in Computer Science, Bowie State University, Bowie, MD
            Dissertation title: *Cloud-Scale Genomic Signal Processing for Robust Microarray Data Analysis*
            (Adviser: Dr. Soo-Yeon Ji)

2011   Master of Science, Bowie State University, Bowie, MD
            Major: Computer Science
            (Adviser: Dr. Manohar Mareboyana)

2011   Computer Science Certificate, University of Maryland Baltimore County, Baltimore, MD and Naval Post Graduate School, Monterey, CA
            Majors: Cryptology and Computer Security
            (Adviser: Dr. Claudia Pearce)

2008   Bachelor of Science, Mississippi Valley State University
            Majors: Computer Science
            (Adviser: Dr. Joseph Anderson)

Professional Positions

10/2009-Present   *Computer Scientist*, National Security Agency, Ft. Meade, MD
                   (Advisers: Mr. Eric Hagemann and Dr. Theodore Kircher)
                   Office of the Chief Architect, Executive Staff Officer
                   - Developing tools and techniques to document and mange the NSA/CSS enterprise and IT architectures as well as ensuring the reliability, resiliency, and robustness of the architecture.
                   Office of the Director, Lead Data Scientist
                   - Developed a suite of data science tools and techniques using Machine Learning, Signal Processing, and Cloud Analytics for the analysis of intelligence data.
                   Information Assurance Directorate (IAD), Blue/Hunt Cloud Lead
                   - Conducted operational network and computer system vulnerability evaluations and provided mitigations techniques to customers.
                   - Identified security threats and risks under the Windows and UNIX environments, analyzing the network / computer systems environment and its current state of security readiness through cloud analytics.
                   - Led efforts to develop cloud analytics using information assurance data, in order to utilize cloud analysis for cloud assessments, as well as characterizing, transforming, and migrating all information assurance data to the cloud.

Technology Directorate (TD), Cryptologic Computer Scientist
- Developed cloud infrastructural components and subsequent distributed analytics for intelligence analysis using distributed processing, parallelization, and scalability within a framework that included Hadoop, MapReduce, Accumulo, etc.

1/2009- Present   *Graduate Researcher*, Biomedical and Signal Processing Lab, Bowie State University
(Adviser: Dr. Soo-Yeon Ji)
- Implemented a hybrid Cloud-Scale Distributed Parallel (CSDP) environment for Genomic Signal Processing (GSP)
- Designed of a novel GSP application for parallelization, distribution and scalability during the analysis of microarray data.
- Developed a data integration strategy that utilized Microarray expression, drug activity and methylation data.
- Developed a method to integrate Cancer Cell Line Encyclopedia (CCLE) Gene Expression and Drug Interaction Data for thresholding
- Developed a method to integrate The Cancer Genome Atlas (TCGA) Gene Expression and Methylation Data for thresholding
- Developed a proposal for a wavelet transformation for Genomic Signal Processing (GSP) in gene expression microarrays that utilized:
    - Cloud-Scale Traditional 2D Wavelet Decomposition
    - Novel CSDP Separable 1D Wavelet Decomposition
- Proposed a Cloud-Scale GSP wavelet threshold for Large-Scale Cancer Genomic (LSCG) microarrays
- Statistically evaluated denoised data sets by utilization of a "Tipping Point" gauge (TPG) for threshold optimization
- Developed a CSDP GSP wavelet-based machine learning and cloud-based parameterization for LSCG data sets
- Developed a Machine Learning Survey using *(*Support Vector Machines (SVM), Neural Networks (NNets), and *k* Nearest Neighbor *(k-nn)* - Global Cancer Map (GCM) data
- Established a Wavelet-Based Threshold for Neural Networks (WTNN) using Cancer Cell Line Encyclopedia (CCLE) integration data
- Designed and implemented a Wavelet-Based Support Vector Machines (WSVM) for The Cancer Genomic Atlas (TCGA) integration data

3/2009-9/2009   *Research Fellow*, National Institutes of Health, Department of Clinical Research Informatics (DCRI) at the NIH Clinical Center, Bethesda, MD
(Adviser: Dr. Jim DeLeo)
- Conducted biomedical research, which enabled the development of applications that used machine learning and artificial intelligence algorithms to find patterns in biomedical data sets.
- Implemented a Star Glyph computer patient analysis and visualization solution to assist NIH physicians in identifying statistically significant patient data, which facilitated identification of patients who were at risk based upon selected parameters in genotype and phenotype.

- Implemented a Parallel Coordinates computer solution to assist NIH physicians in elimination of outlier's in patient data.   It was used as a way of visualizing highly dimensional geometric variations and analyzing multivariate patient data.

8/2008-1/2009	*Post-Baccalaureate*, Brigham and Women Hospital – Harvard Medical School, Boston, MA

(Advisor: Dr. Adam Davis and Dr. Vincent Carey)
- Conducted research on *"Interactive Analysis of Expression Genetics Experiments with Semantic Outputs."*
- Utilized R and Bioconductor to develop an interactive User-Web Interface for comparative analysis of expression genetics by Harvard Medical School scientist for the Human Genome Project.
- Developed and installed data analysis tools through Bioconductor in order to assist in the analysis of genetics and genomics data. Assisted Harvard scientists with the statistical and biological analysis which led to various publications within Harvard's i2b2 and the Children's Hospital Informatics Program (CHIP).

5/2008-9/2008	*Bioinformatics Research Intern*, Harvard-MIT Health and Science Technology, Cambridge, MA

(Advisor: Dr. Adam Davis and Dr. Vincent Carey)
- Conducted research on a *"Enlargement of GGexplorer Population Data Resources and Improved Interface to HapMap SNP/Expression Data For Comparative Analyses"*
- Implemented four new R/Bioconductor package programs for gene comparative analysis through GGtools and GGdata.
- Developed and installed R/Bioconductor packages for i2b2 Children's Hospital (Boston) Informatics Program (CHIP) analysis.
- Enlarged the capabilities of GGexplorer, expanding the user web interface to encompass inter and intra genomic analysis by encompassing multiple International HapMap datasets.

4/2008-5/2008	*Computational Science Intern*, Elizabeth City State University – Environmental Protection Agency, Elizabeth City, NC

(Supervisor: Dr. Constance Bland)
- Conducted research on a *"A Study of the Correlation Between Air Quality and Visitation Disparities at the Great Smokey Mountains National Park "*
- Utilized machine learning algorithms to forecast the air quality utilizing field data features of carbon monoxide, sulfur oxides, nitrogen oxides, and lead samples from the U.S. DoE between 1990 through 2007.
- Applied SVM, and Neural Networks to predict 2009 air quality for the five "criteria pollutants" in North Carolina, and to forecast 2009 NPS visitation data using statistical forecast techniques.

5/2007-8/2007	*Environmental Engineering Intern*, The University of Tennessee Knoxville – Environmental Protection Agency, Knoxville, TN

(Supervisor: Dr. Joshua Wu)

- Conducted research on a *"Hybrid AutoRegressive Integrated Moving Average (ARIMA) & Structured Vector Machines to Forecast Environmental Sustainability Development"*
- Created a Prototype Java/C++ program for the aforementioned hybrid that was submitted to the EPA, mentor Dr. Joshua Fu.
- Prepared and conducted demonstrations of the prototype for department personel within the University of Tennessee Knoxville Department of Environmental Engineering.

Extramural Grants and Fellowships

2009-2015	Graduate Fellowship, Historically Black Graduate Institutions (HBGI), ~$50,000
2010	National Institute of Health Summer Research Grant, Clinical Center, $5,000
2009	MIT-Harvard Research Grant, Health and Science Technology (HST), $5,500
2008	National Association of Mathematicians Summer Research Grant, ECSU, $2,500
2007	Ronald McNair Post-Baccalaureate Program Grant, University of Tennessee, $5,000
2006-2008	National Science Foundation (NSF) Undergraduate Research Fellowship, $21,500

Honors and Awards

2016	Office of the Director National Intelligence (ODNI) Award for Human Capital
2015	Bowie State University Dissertation of the Year Award
2015	Bowie State University Computer Science Chair's Award Dissertation of the Year
2013	Bowie State University HGBI Doctoral Fellowship
2011	NSA/CSS Cryptologic Computer Science Development Program
2009	National Institute of Health Clinical Center Research Fellow
2009	Harvard Medical School-Brigham and Women's Hospital Post-Baccalaureate
2008	Harvard-MIT Health & Science Technology (HST) Internship Program
2007	University of Tennessee Ronald McNair Post-Baccalaureate Achievement Scholar
2006	National Science Foundation (NSF) HBCU-UP Computer Science Scholarship

Publications

B. Harvey; S. Y. Ji, "Cloud-Scale Genomic Signals Processing for Robust Large-Scale Cancer Genomic Microarray Data Analysis," in *IEEE Journal of Biomedical and Health Informatics* , vol.PP, no.99, pp.1-1, November 2015

Harvey, B., Ji, S., "Cloud-Scale Genomic Signal Processing Classification Analysis for Gene Expression Microarray Data," *Engineering in Medicine and Biology Society (EMBC), 2014 36th Annual International Conference of the IEEE* , vol., no., pp.7152,7155, 26-30 August 2014

Kato Mivule, **Benjamin Harvey**, Crystal Cobb, and Hoda El Sayed, "A Review of CUDA, MapReduce, and Pthreads Parallel Computing Models", IJISET - International Journal of Innovative Science, Engineering & Technology, Vol. 1 Issue 8, October 2014,Pages 208-217.

Teaching Experience

Guest Lecturer, Bowie State University University
2015, 2014   Graduate lecture on "Cloud Security" for Computer Security Course.
2008   Undergraduate lecture on "Database Management" for Computer Science course.

Student mentoring

Graduate student mentored (1):
Bowie State University: Crystal Cobb, Kola Onguala

Undergraduate students mentored (14):
Bowie State University: D. Harvey, C. Hobson

Invited Talks

Only unclassified presentations / talks listed

B. Harvey, Dissertation of the Year Award Ceremony, *Bowie State University*. Bowie, MD. May 2015.

Professional Presentations and Posters

Only first-authored presentations and posters listed

B. Harvey, "Cloud-Scale Genomic Signal Processing for Robust Microarray Data Analysis", Doctoral Dissertation Defense, Computer Science Dept., Bowie State University, May, 4th 2015, Bowie, MD, USA.

B. Harvey, "Cloud-Scale Genomic Signal Processing for Robust Microarray Data Analysis", Doctoral Proposal Defense, Computer Science Dept., Bowie State University, December, 2th 2014, Bowie, MD, USA.

B. Harvey and Soo-Yeon Ji, "Cloud-Scale Genomic Signal Processing Classification Analysis for Gene Expression Microarray Data", *Engineering in Medicine and Biology Society (EMBC), 2014 36th Annual International Conference of the IEEE*, 26-30 August 2014

B. Harvey, "Cloud-Scale Genomic Signal Processing Classification Analysis for Gene Expression Microarray Data", Fall 2014 Seminar Series - Bowie State University Computer Science Department, October 23rd 2014, Bowie, MD, 2013.

B. Harvey and Soo-Yeon Ji, "Cloud-Scale Genomic Signal Processing for Robust Microarray Data Analysis", Award for Best Graduate Student Poster Presentation, 2014 7th Annual Bowie State University Grants Expo and Research Day, Bowie State University, Bowie, Maryland, USA, April 22, 2014.

B. Harvey and Soo-Yeon Ji, "Cloud-Scale Genomic Signal Processing Classification Analysis for Gene Expression Microarray Data", Poster Presentation, 2013 6th Annual Bowie State University Grants Expo and Research Day, Bowie State University, Bowie, Maryland, USA, April 10, 2013.

Reviews

Reviewed manuscripts for (1):
IEEE Engineering in Medicine and Biology Conference (EMBC): Student Associate Editor

Educational Outreach

2014   *Let's Move! Educational and Sports Activity Booth*, Knoxville, TN
                Founder of a local non-profit for economically disadvantaged, underrepresented minorities called Chearch Inc.
                Established an educational and sports activity booth for children at a *Let's Move!* event in Knoxville, TN. *Lets Move!* is a comprehensive initiative, launched by the First Lady, dedicated to solving the challenge of childhood obesity within a generation, so that children born today will grow up healthier and able to pursue their dreams.

Community Outreach to the Public

2015   *Public presentation*, Non-Profit Fund Development
                Gave a talk entitled "Fund Development Opportunities within your Community" for a monthly group within Mt. Ennon Baptist Church in Clinton, Maryland.

Professional Societies

Association of Computing Machinery (ACM)
Institute of Electrical and Electronics Engineers (IEEE)
        Engineering Medicine and Biology Society (EMBS)
Minority Association of Pre-Medical Students (MAPS)

Special Certifications/Skills

Cryptologic Computer Science Certification,
    Naval Post Graduate School - UMBC
Statistical packages/languages:
    SAS, MATLAB, R, Unix/Shell, Java,
    C/C++/C#, Visual Basic