
Troy J. Nunnally, Ph.D.

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Objective: My goal is to grow tech companies with disruptive web and mobile technologies, specializing in machine learning and cybersecurity. As a result, I worked with over 90 companies from tech startups to fortune 100 companies such as AT&T, McKesson, and PBS. I possess 1 patent, published over 5 peer-reviewed publications, and contributed to over \$50 million in startup business valuations.

Education: **Ph.D. in Electrical and Computer Engineering**
Georgia Institute of Technology, Atlanta, GA
Dec 2014

M.S. in Electrical Engineering
Georgia Institute of Technology, Atlanta, GA
May 2009

B. S. in Electrical Engineering
Tuskegee University, Tuskegee, AL

Westlake High School: **Valedictorian**

Taught Courses: Intro to Machine Learning, Network Security, Advanced Telecommunication Networks, Wireless Communications, Cisco Certified Network Technician (CCENT), Wireless FCC Certification (Element 1 and 3), Fiber Optics Installer

Work Experience: *Aug 2014 - present* **Brain Rain Solutions, Inc.** Atlanta, GA
Technical Co-Founder

- Created Augmented Reality (AR) applications using computer vision techniques for television networks such as UpTV and AspireTV. These applications are used as sales collateral to increase television advertisement sales.
- Assisted in innovative technology development for high-growth startups such as Monsieur (2.1 Series A round), an automated cocktail dispensary machine. As a result, my work led to an increase of 40+ million dollars in company evaluations.
- Improved internal subpoena submission process using Salesforce portals for McKesson (projected to reach \$ 1 million in increased revenue).
- Developed online video streaming web services for PBS.
- Created with advanced NFC technologies for AT&T for the gaming industry.
- Produced a recommendation system for skin care products using computer vision and machine learning supervised learning techniques.

Aug 2017 - present **Your App Management System, Inc.** Atlanta, GA
Technical Co-Founder

- Developed fundraising technology for universities and non-profits to increase giving by gamifying the giving process and producing a fun seamless user experience. Resulted in an increase of 22% fundraising growth and raised over \$1MM for organizations over 1 year period.
- Created chatbot technologies to automate the conversations between fundraising business developer and donor.
- Built a recommendation system to suggest new campaign strategies for organization leadership teams.

Aug 2013 – October 2014 Partpic, Inc. Atlanta, GA

Technical Co-Founder

- Overseen all technical development for proprietary computer vision algorithms, Android and iOS mobile development, and web application development, which resulted in \$1.5 Seed Round.
- Researched and developed deep learning computer vision and machine learning algorithms to be included in image recognition technology for replacement parts.

June 2010 – August 2015 (part-time) Applied Professional Training Atlanta, GA

Telecommunications Instructor

- Taught associates degree courses for AT&T (fortune 500 company) employees including: Wireless telecommunication and technology, basic electronics, FCC element 1 and 3 certifications (100 pass rate), digital communication and computer literacy.
- Developed wireless technology chapters to be included in a telecommunication training manual.

January 2010- August 2014 Communications Systems Center (CSC/CAP) Atlanta, GA

Telecommunication Network Security Engineer

- Used Stereoscopic 3D technologies to enhance security awareness in for network security administrators
- Designed and implemented a web application that monitors a honeynet network while increasing security visualization, data analysis, and computer forensics using PHP, MySQL, AJAX and Javascript with Prototype Framework.
- Implemented a layer 2 network bridge and firewall for virtual machines within a honeynet
- Analyzed various honeynet technologies for collecting malware and capturing malicious users.

Jan 2012 – May 2014 Georgia Institute of Technology
Atlanta, GA

Electrical Engineering Graduate Teacher Assistant

- Taught fundamentals of Internet works, sockets programming, and TCP/IP protocol implementation using hands-on practical networking exercises for the laboratory.
- Improved curriculum for understanding Cisco routers, network test equipment, hardware as well as software traffic generators in the laboratory.
- Used Linux operating system to examine the networking portions of the operating system in order to perform modifications to the computer's TCP/IP implementation.

May 2011- Aug 2011 3M Minneapolis, MN

Software Research Engineering Intern (Electronic Applications)

- Developed new technologies in 3D stereoscopic User Interfaces (UIs) to assist in the sales of multi-touch systems.
- Created innovative algorithms in order to help reduce visual defects in multi-touch displays.

May 2008-August 2008, May 2007 – August 2007 3M Minneapolis, MN

Control Systems Engineering Intern (Medical Supplies)

- Developed Panelview human machine interface screens for PM4 HMI Upgrade Project.
- Assisted in the machine start-up and Input/Output checkout for Petrifilm machine (PCON3).

Control Systems Engineering Intern (Stationery Products)

- Assisted in the creation, start-up, and checkout of a 4.5 million dollar machine used to manufacture Post-It tabs.
- Developed Panelview human machine interface screens for Post-It tabs (CMA3).

June 2004 – August 2005 Caterpillar Inc. Peoria, IL

Remanufacturing Engineer

- Conceived designs to remanufacture water propellers for diesel engines with projected savings of approximately \$ 200,000.
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- Created an automated program for a monthly new product introduction and evaluation metric using Visual Basic and MS Excel.
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- Projects:**
- FaceMD+ Facial Recognition and Recommendation Engine** *Aug 2018*
- Led development of FaceMD+. FaceMD+ technology uses recommendation algorithms such as facial recognition and decision-tree algorithms that enables skincare brands and consultants to confidently recommends the right skincare products for their customers.
 - Website: <http://www.facemdplus.com/>
- Atlanta Police Department (APD) Training Portal** *March 2017*
- Deployed an online customized training portal to prevent police conduct. Over 2500+ officers use our training platform within one month of launching.
 - Case study: <https://brainrainsolutions.com/apd.html>
- Bennett Mill Middle School Mobile App** *August 2016*
- Launched a mobile app for Bennett's Mill Middle School (BMMS) that helps parents and students stay up-to-date with events and resources.
 - Case study: <https://brainrainsolutions.com/apd.html>
- Eboticon Emoji Applications** *Sept 2015*
- Led and built over 10 emoji apps for major influencers such as City of Atlanta, Not Karlton Banks (300,000+ social media following), and DD4L (200,000+ social media following).
 - Website: <https://www.eboticon.com/> for app store links.
- Partpic: Visual Search of Replacement Part** *Oct 2014*
- Built state-of-the-art mobile app and computer vision algorithms (e.g., Support Vector Machines and Convolutional Neural Networks) for visual search of replacement parts. As a result, this work saves time and money searching for replacement maintenance, repair and operations (MRO) parts. Acquired by Amazon.
 - Case study: <https://brainrainsolutions.com/partpic.html>
- InterSec: An Interaction System for Network Security Applications** *Feb 2014*
- Developed state-of-the-art multi-touch technologies to help network administrators detect and identify network attacks quickly. Compared to traditional mouse technologies, our tool assist in reducing response time.
 - Peer-reviewed publication: https://s3.amazonaws.com/brainrain/Research/NUI_10.pdf
- NAVSEC: An Interaction System for Network Security Applications** *June 2013*
- Developed machine learning algorithms to assist users in interacting with user interfaces and better guide novice users.
 - Peer-reviewed publication: <https://s3.amazonaws.com/brainrain/Research/NAVSEC.pdf>
- P3D: Parallel 3D Coordinate Visualization Tool** *Spring 2012*
- Developed state-of-the-art 3D technologies to help network administrators detect distributed and coordinated network scans. Compared to other 2D and 3D network security visualization tools, P3D prevents prevent information overload by adding an extra dimension and awareness in the visualization.
 - Peer-reviewed publication: <https://s3.amazonaws.com/brainrain/Research/P3D.pdf>
- 3D Stereoscopic Vulnerability Assessment Tool** *Fall 2012*
- Created a tool using 3D technologies that assist in rapid detection and correlation of attack vulnerabilities in a local area network using the enhanced perception of depth in a 3D environment. This tool helps the administrator determine vulnerable nodes on a network faster than other 2D/3D network tools.
 - Peer-reviewed publication: <https://s3.amazonaws.com/brainrain/Research/3DSVAT.pdf>
- Reducing Packet Traces Using Polynomial Piecewise Approximation** *Fall 2010*
- Analyzed ways to reduce network data by over 99 % using a technique called polynomial approximation.
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- Publication:
https://www.researchgate.net/publication/251998496_Reducing_traffic_traces_using_a_polynomial_approximation_for_traffic_classification

Simulating Network Attacks Using NS3

Fall 2010

- Created a novel simulation tool in Network Simulator 3 (NS3) that could help network administrators determine methods for mitigating network attacks and protecting assets.

Profiling an Attacker's behavior Using Network Traffic

Fall 2010

- Investigated ways to detect an attack and predict the attacker's next move using a probabilistic chart.

HonEye – a Tool for Managing Honeypots within a Honeynet

Spring 2010

- Designed and implemented a web application that monitors a network of vulnerable computers in order to learn more about an attacker.

Network Security Hacking Competition

Spring 2009-Spring

2014

- Patched and hardened computer while attempting to hack into other machines with various operating systems
- Downloaded and installed Metasploit, which is a database of code that can hack into machines once the operating system is discovered.
- Used Metasploit to gain access to competition boxes and retrieve user passwords

Autonomous Wireless Temperature Sensing in Network Applications

Spring

2007

- Used 32-bit microprocessors and 16-bit Zigbee wireless microprocessors to monitor and control the temperature of isolated rooms in an establishment via Internet.

Publications and Presentations:

[1] T. Nunnally, "Advanced Visualizations for Network Security," Ph.D. dissertation, School of ECE, Georgia Tech. Atlanta, Ga.

[2] T. Nunnally, A. S. Uluagac, and R. Beyah, "An Interaction System for Network Security Applications," in submission to *the IEEE Transactions on Visualization and Computer Graphics*. 2014.

[3] T. Nunnally, K. Abdullah, A. S. Uluagac, J. Copeland, and R. Beyah, "InterSec: An Interaction System for Network Security Applications," in submission *Proceedings of the IEEE International Conference on Communications (ICC)*. 2014.

[4] T. Nunnally, K. Abdullah, A. S. Uluagac, J. Copeland, and R. Beyah, "NAVSEC: A Recommender System for 3D Network Security Visualizations," in *Proceedings of the Workshop of Visualization Security (VizSec)*, Oct. 2013.

[5] T. Nunnally, K. Abdullah, A. S. Uluagac, J. Copeland, and R. Beyah, "P3D: A Parallel 3D Coordinate Visualization for Advanced Network Scans," in *Proceedings of the IEEE International Conference on Communications (ICC)*, June 2013.

[6] T. Nunnally, A. S. Uluagac, J. Copeland, and R. Beyah, "3DSVAT: 3D Stereoscopic Vulnerability Assessment Tool for Network Security," in *Proceedings of the 37th IEEE Conference on Local Computer Networks (LCN)*, 2012.

[7] S. Sanders, T. Nunnally, H.L. Owen, "Reducing traffic traces using a polynomial approximation for traffic classification," *Southeastcon, 2011 Proceedings of IEEE*, vol., no., pp.55-58, 17-20 March 2011

[8] T. Nunnally, K. Lind, M. Hodgson, S. Suraj. "Eagle-Eye: Machine-to-Machine Mobile

Application for Neighborhood Watch Programs.” *Convergence Innovation Competition Poster*. 1st place. April 2012.

Patents:

[1] J. Burks, J. Crain, N. Sephus, and **T. Nunnally**. “Method for Identifying Replacement Parts and Extracting Features Via Sequence of Images,” Provisional Patent Application 10/2014.

[2] V. Woods, D. Campbell, **T. Nunnally**, T. Nunnally, and A. Mims, “System and Methods for Comparative Geofencing,” Patent Number: 9119038. Issue Date: 8/25/2015.

Proficiencies and Skills:

Operating Systems: Microsoft Windows, Mac OS or Unix-based OS, Ubuntu Linux

Programming/Scripting Languages: C/C++, SQL, NoSQL Visual Basic, JavaScript, Python, Matlab, HTML, PHP, SQL, BASH Shell Scripting, Objective C, Swift

Frameworks / Software: Tensorflow/TensorflowJS, Scikit Learn, NodeJS, AngularJS (Version 1+), Angular (Version 2+), Typescript, MongoDB, MySQL

Practical: Soldering, Hardware Operation, Oscilloscope, Digital Signal Analyzer, Function Generator

Computer Applications/Software: Sketch, Adobe Photoshop, MS Excel, MS Word, MS Powerpoint

Extracurricular Activities:

Little League Flag Football Coach 2018, Tech Twins Apprenticeship Program 2015 - 2019, Opportunity Research Scholar (ORS) Mentor 2010-2011, Information Technology Chair for Black Graduate Student Association 2008-2009, Tuskegee University Baseball Team Captain 2005 – 2007, First Team All-Conference Baseball SIAC 2004-2007, National Society of Black Engineers (NSBE), Institute of Electrical and Electronic Engineers (IEEE)

Societies and Awards:

GEM Outstanding Fellow of the Year 2011-2012, Technical Presentation 1st place award recipient GEM 35th Annual Conference 2011 Student and Teacher Enhancement Partnership (STEP) Fellow 2010, GEM Fellowship recipient 2007, Kappa Alpha Psi Fraternity Incorporated Spring 2007, Tuskegee University Eminent Scholar, Honor Roll 2003-2009, Vice President Eta Kappa Nu Honor Society for Electrical Engineering 2006, All American Academic Baseball Team 2003-2007, First Place Ford Robotics Competition 2006.