

# Nashlie H. Sephus

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## OBJECTIVE

Seeking technical consulting opportunities, specializing in machine learning, data mining in digital signal processing, and computer/software engineering.

## EDUCATION

**Ph.D. Candidate, Electrical & Computer Engineering, Georgia Institute of Technology** Expected Graduation Date: May 2014, GPA: 3.50

**M. S. Electrical & Computer Engineering, Georgia Institute of Technology**  
Graduation Date: May 2010, GPA: 3.36

**B. S. Computer Engineering, Mississippi State University**  
Graduation Date: December 2007, GPA: 3.54, *Cum Laude*

## GRADUATE COURSES

Advanced Computer Architecture • Autonomous Controls for Robotic Systems • Game Theory and Multi-Agent Systems • Fundamentals of Digital Signal Processing • Random Processes • Pattern Recognition • Digital Proc. of Speech Signals • HCI • Harmonic Analysis

## EXPERIENCE

### **PartPic App – Image Recognition Algorithm, Lead**

*August 2013-Present*

*PartPic, Atlanta, GA*

- Designed and implemented image recognition algorithm for startup company PartPic, which does visual search for replacement parts via a smartphone app or web interface
  - Implemented feature extraction using various data sets for training
  - Performed classification and other data mining methods
- Integrated OpenCV/C++ code, scripting, MySQL database, and front-end web/app
- Designed experiments and performed cross-fold testing for technical report while advising team members on future work
- Drafted and filed a provisional patent for methodology

### **GridIQ Smart Grid as a Service (SaaS) Team – Part-time Intern**

*September 2011-May 2012*

*GE Energy, Atlanta, GA*

- Designed and implemented data analysis, validation, and estimation for meter systems
- Programmed unit tests in Java for GridIQ SaaS system adapters
- Developed use cases and flow charts for GridIQ SaaS system functionality
- Implemented simulation environment for web services and asynchronous communication

### **Real-time Embedded Systems Lab Intern**

*May 2011-August 2011*

*GE Global Research Center, Niskayuna, NY*

- Designed and implemented backend firmware and human computer interface software to extract Electric Vehicle data from charging stations to database for data logging, trending, and analysis of FedEx electric fleet vehicles
- Designed models for Nissan Electric Vehicle integration with residential buildings for energy modeling and simulations

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## **Software Engineering Intern**

*January 2008-July 2008*

*Delphi Electronics & Safety, Kokomo, IN*

- Designed HMI with flowcharts
- Implemented HMI for the 2010 Toyota Bluetooth Hands-free Radio using 200C assembly
- Performed verification for the Bluetooth radio's HMI
- Performed tests for voice recognition, hands-free system, and Bluetooth interoperability

## **Extreme Blue Internship-Systems Architect**

*May 2007-August 2007*

*IBM Corporation, Research Triangle Park, NC*

- Designed and implemented a web-based wizard to instantly create a virtual career-fair
  - Programmed web wizard via PHP and XML scripts
  - Programmed virtual world scripts using Second Life as a platform
- Researched tools for social computing and project collaboration
- Chosen as team leader amongst remote team members
- Presented final work at IBM executive headquarters in Armonk, NY

## **Summer Undergraduate Program in Engineering Research at Berkeley (SUPERB)**

*June 2006-August 2006*

*University of California, Berkeley, CA*

- Programmed an autopilot for a fixed-wing, unmanned aerial vehicle (UAV)
  - Autopilot accepted three waypoints at a time verses the usual one waypoint
  - Designed an algorithm to search for local optimal trajectories and converted MATLAB test code to C code
- Tested software via hardware-in-the-loop simulation
- Presented research paper and poster for faculty (posted on SUPERB-CHESS website)

## **Information Technology Services (Cooperative Education Student)**

*August 2004-December 2006*

*Miller Transporters, Inc., Jackson, MS*

- Network engineer, administrator, and technical support for company servers

## **RELATED SKILLS**

- |                    |        |        |                |
|--------------------|--------|--------|----------------|
| ➤MATLAB            | ➤C/C++ | ➤Java  | ➤MIPS Assembly |
| ➤HMM Toolkit (HTK) | ➤PHP   | ➤MySQL | ➤Labview       |

## **RESEARCH/ PROJECTS**

### **Sound Separation using Modulation Spectral Features** *Fall 2010-Present*

- Exploiting long-term features of joint acoustic and modulation frequency
- Performing sound separation amongst simultaneous speakers
- Utilizing the machine learning techniques to retrieve information from audio signals

### **Audio-based, Video Tagging**

*Spring 2010*

- Trained statistical models for speaker ID for tagging and annotating news videos
- Programmed via MATLAB, C, and Hidden Markov Models Tool Kit (HTK)
- Evaluated accuracy via confusion matrices and ROC graphs

### **Onset Detection in Audio Signals**

*Fall 2009*

- Hand-labeled points in time of audio signals where onsets occur

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- Implemented short-time energy with Mel-frequency Cepstral Coefficients (MFCC)
- Implemented negative log-likelihood with Gaussian Mixture Models

## **Musical Instrument Identification**

*Fall 2009*

- Built database of single-note, polyphonic music signals of various instruments
- Trained statistical models in MATLAB using STFT and MFCC feature extraction

## **PRESENTATIONS/PUBLICATIONS**

- “Modulation Spectral Features: In Pursuit of Invariant Representations of Music with Application to Unsupervised Source Identification,” (N. H. Sephus, A. D. Lanterman, and D. V. Anderson). Journal of New Music Research, To appear in Special Issue on Music Rhythm, Fall 2014.
- “Application of Modulation Spectrum for iEEG Seizure Analysis,” (O. L. Smart, N. H. Sephus, and R. E. Gross). in 2014 IEEE Conference on Computational Intelligence in Bioinformatics and Computational Biology, To appear in proceedings in May 2014.
- “Enhancing Online Music Lessons with Applications in Automating Self-Learning Tutorials and Performance Assessment,” (N. Sephus, T. Olubanjo, and D. Anderson). 12th IEEE International Conference on Machine Learning and Applications. Miami, FL. Upcoming Dec. 7, 2013.
- “Exploring Frequency Modulation Features and Resolution in the Modulation Spectrum,” (N. Sephus, A. Lanterman, and D. Anderson). 2013 IEEE Digital Signal Processing Workshop. Napa, California. Aug. 13, 2013.
- “The Adaptive Ear,” (N. Sephus). Top 10 Finalist Presentations, 2012 Georgia Tech Research & Innovation Conference (GTRIC). Venture Lab, Atlanta, Georgia. Feb. 27, 2012. Patent pending.
- “On Project-Based Learning through the Vertically-Integrated Projects Program,” (VIP lab). The IEEE 2011 International Conference on Frontiers in Education, 2011.
- “Audio-Based Video Tagging Using Speaker Modeling: A Preliminary Model,” (N. Sephus, C. Lee). Women in Machine Learning, co-located with 2010 Neural Information Processing Systems (NIPS) Conference. Vancouver, B.C., Canada. Dec. 6, 2010.

## **HONORS**

- Sam Nunn Security Fellowship Program in Public Policy-Ivan Allen College (2011-2012)
- CETL’s Student Teacher Enrichment Program (STEP) Fellowship (2010-2011)
- GEM Master's Fellowship (2008-2010)
- Student Hall of Fame Award -Bagley College of Engineering (2008)
- Outstanding Student Award-Louis Stokes Alliance for Minority Participation (2008)

## **ACTIVITIES**

- GT Center for Women, Science, & Technology- Graduate Assistantship (2010-Present)
- GT School of ECE Opportunity Research Scholars (ORS) Program Mentor (2010-Present)
- Northeastern University NSF ADVANCE sponsored Future Faculty Workshop (2012)
- GT School of ECE- Graduate Teaching Assistantship (2008-2009)
- Global Leadership Program- Kwangwoon University, Seoul, South Korea (2007)
- European Study on Engineering Practices, France (2006)