Michael Frank Talley, Jr.

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EDUCATION

Morgan State University, Baltimore, MD
D. Eng. Electrical Engineering, (EGD. May 2022*)*
Concentration: *RF Communications, Digital Signal Processing, & Deep Learning*
Dissertation: *Deep Learning Approach to Emitter Classification Using Channel Propagation Features*
Advisor: *Dr. Kofi Nyarko*

North Carolina Agricultural and Technical State University, Greensboro, NC
M.S. Electrical Engineering, (Dec. 2011)
Concentration: *Communication and Signal Processing*

North Carolina Agricultural and Technical State University, Greensboro, NC
B.S. Electrical Engineering, (May 2009)

TEACHING EXPERIENCE

January 2017 – Fall 2018, Teaching Assistant, Electrical Circuit Analysis

- Assist students with homework problems, test preparation, projects, and in class assignments

- Provide feedback to students on graded assignments

- Assist with development of homework assignments and tests

- Holding office hours and study sessions.

- Teaching class as required

- Mentorship, guidance, and encouragement for students

Fall 2011, Teaching Assistant, Electrical Circuit Analysis

- Assist students with homework problems, test preparation, and in class assignments

- Provide feedback to students on graded assignments

- Holding office hours and study sessions.

August 2010 - August 2011, Center for Academic Excellence, Graduate Assistant,

- Assist students with homework problems, test preparation, and in class assignments

- Provide feedback to students on graded assignments

- Holding weekly teaching and study sessions

- Mentorship, guidance, and encouragement for students

RESEARCH EXPERIENCE

Radio Frequency Machine Learning (RFML) Researcher – KBR Inc.

- Dissertation Research with Airforce Research Lab (AFRL) NSF Grant:
  - Researching machine/deep learning algorithms for applications in RF Radar signal processing using the Anaconda IDE with different programs such as TensorFlow and Keras; while further researching the possible hardware application on software defined radio (SDR) platforms for those algorithms

RF Communications & Signal Processing Doctoral Researcher – Morgan State University

- Investigating the application of Machine Learning (ML) and Deep Learning (DL) to PHY and lower MAC layer communications, Digital Communications, and Digital Signal Processing (Spring 2017 – Present)

- ML/DL techniques for Signal Processing
- RF and Digital Communication ML/DL optimization
- IoT device design and simulation
- ML/DL for data driven techniques in embedded devices

John's Hopkins Applied Physics Laboratory (APL) ATLAS Research Program – Summer 2018

- *AT&T LTE Priority Services Project*
    - Developed a script for communication between client and server for IP network
    - Developed Multi-Generator's (MGEN) (IP network performance test program) transmitter mobility for the purpose of field test
    - Improved MGEN's in field responsiveness
    - Collected end-to-end network performance data – Throughput, Packet Loss, & Latency
- *IoT Network IQ Data Analysis Project*
    - Researched approaches to classifying IoT devices using raw IQ data signals
    - Created an SDR hardware platform using two Raspberry Pi's
    - Created NTP client and server synchronization
    - Analyzed and visualized data using Anaconda Python environment for Machine Learning algorithms

NSA (LTS)/Morgan State University Student Research Program – Summer 2017

- Third member of the Device Type/Brand Classification Team
    - Researched approaches to classifying devices using massive network traffic
    - Analyzed and cleaned network traffic data to find patterns for feature selection
    - Classified device types and brands using machine learning techniques
    - Successfully classified two distinct brands and types using Logistic Regression between 95%-100% accuracy
    - Successfully classified 175 devices and multiple brands using Random Forest between 90%-100% accuracy
    - Tuned the algorithm using the Receiver Operating Characteristic (ROC) curve, cross validation for hyperparameters, confusion matrix, validation and learning curves, and feature importance
    - Developed a three (3) step model to make algorithm autonomous

PROFESSIONAL EXPERIENCE

Dec 2019 – Present, KBR Inc. (Previously Centauri) – System Engineer

- Part of a group that supports SIGINT and EW system advancements:

- Communication system and waveform development for different applications
- OpenCPI application development using VHDL design with applications on different SDR platforms
- Board Support Package (BSP) for Ettus USRP N310 for OpenCPI applications.

- Dissertation Research with Airforce Research Lab (AFRL):
  - Researching machine/deep learning algorithms for applications in RF Radar signal processing using the Anaconda IDE with different programs such as TensorFlow and Keras; while further researching the possible hardware application on software defined radio (SDR) platforms for those algorithms.

October 2019 – Dec 2019, PreTalen, a Centauri Company – PNT Engineer

- VHDL R&D for signal processing components for the deployment on FPGA platforms
- Navigational Warfare R&D: signal analysis and waveform development using SDR platforms and technologies
- Processing digital signals using SDR platforms
- Electronic Warfare Support: Emitter detection using machine learning algorithms

January 2015 – May 2015, David Kemp Tutoring Services – Southern Methodist University Math/Electrical Engineering Tutor

- Algebra (1&2)
- Pre – Calculus
- Business Calculus
- Calculus (1-3)
- Differential Equations
- Electronics
- Electrical Circuit Analysis

RESEARCH INTEREST

Methodology: RF System Design and Analysis, Digital Signal Processing, Machine and Deep Learning Algorithms, IQ Data Collection and Analysis, Synthetic IQ Waveform Creation for analysis and research, Channel State Information (CSI) Analysis, and Channel Estimation.

Applications: Wireless communication systems, SDR Communication systems, Radar Emitter Identification, Physical (PHY) Layer Research, Public Safety Defense and Response, Signal Processing, Healthcare Signal Analysis, and IoT Technologies.

PROFESSIONAL QUALIFICATIONS

Relevant Soft Skills	Relevant Coursework Proficiencies	Relevant Computer Proficiencies
• Strategic Thinking • Leadership & Organizational Development • Management • Administrative	• Wireless Communication • Digital Signal Processing • RF Communications • Digital System Design • Machine/Deep Learning	• Python • MATLAB • Linux • GNU Radio • Keras and Anaconda • VHDL

HONORS/DISTINCTIONS

1. 2021 Intel Inc – GEM Full Fellow at Morgan State University

2. Intel Scholar Recipient, Morgan State University

3. Graduate Student Council at Morgan State University

4. IoT Fellowship – NSF Rise Scholarship Recipient

SERVICE

1. Graduate Student Council at Morgan State University (2017 – Present)

MEMBERSHIPS/LEADERSHIP POSITIONS

1. IEEE Communication Society

2. Institute of Electrical and Electronics Engineers (IEEE)

3. National Society of Black Engineers (NSBE)

PROFESSIONAL DEVELOPMENT

1. NC State Building Future Faculty (BFF) Program 2021

2. NextProf Nexus Future Faculty Program 2020

3. APLU 2019 HBCU Engineering Workshop (May 2019)

4. John's Hopkins CISS Conference – Information Sciences and Systems

5. GEM Consortium – Future Faculty and Professionals (FFP) Symposium

6. HOST – IEEE International Symposium on Hardware Oriented Security and Trust

7. NSBE Conference – Annual National Convention

PRESENTATIONS

Invited External

1. W. L. Thompson, II, **M. F. Talley, Jr.** "Deep Learning for IoT Communications", *53rd Conference on Information Sciences and Systems*, *IEEE Information Theory Society*, March 2019

Internal (Morgan State University)

1. *Morgan State University Annual Research Symposium*

   W. L. Thompson, II, **M. F. Talley, Jr.** "Deep Learning for IoT Communications"

PUBLICATIONS

Conference Proceedings

1. W. L. Thompson, II, **M. F. Talley, Jr.** "Deep Learning for IoT Communications", *53rd Conference on Information Sciences and Systems*, *IEEE Information Theory Society*, March 2019