# < Alexander Christian DeRieux />

Scientist + Engineer + Developer
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## Objectives

Industry professional with research experience in software engineering, machine learning, and communications. interested in the applications of cognitive learning algorithms in their relation to smart cities, wireless communication networks, quantum communications, and quantum machine learning.

## Education

**Master of Science in Electrical Engineering** [ 1/2021 – Present ]
*Virginia Polytechnic Institute and State University, Blacksburg, Virginia*
GPA: 4.00

**Bachelor of Science in *Electrical Engineering*, Minor in *Mathematics* – *cum laud*** [ 8/2012 – 5/2016 ]
Virginia Polytechnic Institute and State University, Blacksburg, Virginia
In Major GPA: 3.437, University GPA: 3.407

**Bachelor of Science in *Computer Science* – *cum laud*** [ 8/2012 – 12/2016 ]
Virginia Polytechnic Institute and State University, Blacksburg, Virginia
In Major GPA: 3.793, University GPA: 3.456

## Employment Experience

**Graduate Research Assistant (GRA)** [ 8/2021 – Present ]
*Wireless@VT, Virginia Polytechnic Institute and State University*
Machine Learning research with applications to areas of smart cities, wireless communications, optimization, game theory, and quantum information theory.

**Graduate Teaching Assistant (GTA)** [ 1/2021 – Present ]
*Bradley Department of Electrical and Computer Engineering, Virginia Polytechnic Institute and State University*
Professional mentor and graduate administrator for the Electrical Engineering Major Design Experience (MDE) undergraduate capstone course.

**Electronics Engineer** [ 2/2017 – Present ]
*U.S. Naval Research Laboratory (NRL), Washington DC, TS/SCI clearance*
Research, design, and develop space-system technologies for the U.S. Navy in the areas of rocketry, advanced navigation satellite technology, critical communication system timing, space surveillance, precision tracking from space and ground, and Precise Time and Time Interval (PTTI) theory and techniques.

**Electrical Engineering Co-op** [ 7/2012 – 2/2017 ]
*U.S. Naval Research Laboratory (NRL), Washington DC, Secret clearance*
Created an off-the-shelf system for high altitude naval vessel tracking. Designed image processing algorithms to identify naval vessels and their location using Python and OpenCV. Wrote technical documentation and how-to guides for various projects.
Developed alternative modes of satellite propulsion using natural and induced magnetic fields. Created custom payload deployment systems for small satellites. Designed an off-the-shelf system for controlling robotic arms used in spacecraft docking and other tele-operation applications.

**Resident Advisor** [ 8/2016 – 12/2016 ]
*Virginia Polytechnic Institute and State University*
Managed a residence hall floor of 37 undergraduate students. Scheduled and coordinated weekly events among residential staff and residents of multiple hall communities. Resolved conflicts amongst residents and residential staff. Documented nightly hall inspections and important student conduct information.

**Academic Tutor** [ 1/2012 – 5/2012 ]
*Tutoring Services, Germanna Community College, Fredericksburg, VA*
Developed bookkeeping and interpersonal skills by working in a tutoring office at the community college. Tutored all academic levels in the subjects of Math, English, Physics, Chemistry, Computer Programming, French, and Economics.

## Research & Projects

**Smart Garden Alleys** [ 1/2021 – Present ]
Joint effort with Virginia Tech and University of Colorado Boulder. Developing machine learning frameworks with data fusion to bolster urban planning and grow "smart" garden alleys in Makassar City, Indonesia.

**Intelligent Stock Trading using Traditional and Deep Q-Learning** [ 10/2021 – Present ]
Research effort exploring the application of traditional and deep Q-learning Reinforcement Learning (RL) algorithms in dynamic stock trading environments. Developing both model-based and model-free Q-learning algorithms in conjunction with custom stock simulation environment in OpenAI Gym.

**LyricAI: Using LSTMs to Write Religious Music** [ 4/2021 – 5/2021 ]
Joint research effort exploring the ethical implications of AI-generated religious song lyrics. Developed two Recurrent Neural Network (RNN) architectures fusing Long Short-Term Memory (LSTM) and Encoder/Decoder models for pure next-word prediction and syllable-count next-word prediction natural language processing (NLP) tasks.

**Capstone: MITRE** [ 8/2016 – 12/2016 ]
Created 'ERIS', a wearable emergency responder information system for first responders in the field. Developed companion applications for Android mobile, Android Wear-powered Moto 360 smartwatch, and Android-powered Recon Jet heads-up display. Collaborated in a 5-person team using face-to-face and virtual meetings. Employed use of GitHub for version control. Learned ethnography and project demonstration techniques towards both technical and non-technical audiences.

**Capstone: General Motors & VTTI** [ 8/2015 – 5/2016 ]
Created a wireless off-the-shelf device for interfacing with vehicle OBDII system. Developed companion Linux and mobile application software for wireless data acquisition and interaction. Learned project management, project documentation such as request for proposal, and customer relations from instructors that have extensive backgrounds in the corporate world.

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## Research & Projects Continued

**Communication Systems** [ 1/2015 – 5/2015 ]

Developed a RTL-SDR receiver system called 'RadioPi' to process local FM transmissions. Signal processing algorithms are written in Python using GNURadio API and custom signal blocks. Design elements include the Raspberry Pi, USB RTL-SDR antenna, and breadboard circuitry for user interface.

**Mobile Application Development** [ 7/2015 – 08/2015 ]

Developed 'Velo', an Android mobile and wearable application that navigates exclusively using onboard GPS modules, thus bypassing the need for wireless data. Users can logon using Facebook and store their routes to local SQLite and online SQL databases using AWS. Crash detection is implemented using onboard gyroscope and accelerometer sensors, notifying a set of emergency contacts of your situation upon detection of the crash.

## Skills & Abilities

**Software**

- Linux
- macOS
- Windows
- iOS
- Android
- Raspberry Pi
- Arduino

**Electronics**

- Soldering
- Breadboarding
- Eagle
- Digital signal processing (DSP)
- Software-defined radio (SDR)

**Programming Languages**

- Python
- C / C++
- Javascript / Java
- Matlab
- LaTeX
- HTML
- CSS
- Rust
- Golang
- Fortran
- SQL

**Frameworks / APIs**

- PyTorch
- Numpy
- Docker
- Git / GitHub / GitLab / SVN
- React.js
- Electron.js
- Cesium.js
- Bootstrap
- OpenCV

## Honors & Awards

**Dean's List**

Virginia Tech: *Fall 2013, Spring 2014, Spring 2015*, Fall 2015, Spring 2016*, Fall 2016**
*(*) = with distinction*
Germanna Community College: *Fall 2011, Spring 2011, Spring 2012*

**Academic Honors**

Virginia Tech: Spring 2016, Fall 2016
Germanna Community College: *Fall 2010*

## Activities & Leadership

**Chi Alpha Campus Ministries** [ 2012 – Present ]

Co-lead Life Groups of eight students. Organized and coordinated meetings and events with other Life Groups within Chi Alpha.

**Virginia Tech Fencing Club** [ 2013 – 2014 ]

Trained in the Epee fencing style and competed in tournaments.

**Unicyclist** [ 2013 – Present ]

Avid sport unicyclist

**Musician** [ 2010 – Present ]

Self-taught musical knowledge of the piano.