

# Nathan Holt

(317) 412-3404 | [nathanwayneholt@gmail.com](mailto:nathanwayneholt@gmail.com) | <https://www.nathanwayneholt.com/>

## EDUCATION

---

### Rochester Institute of Technology

Rochester, NY

*MS in Applied and Computational Mathematics, BS in Computational Mathematics*

2014 – 2019

- Areas of research include: dynamical systems, partial differential equations, scientific computing, cryptography, bioinformatics, and data assimilation

### Franklin Community High School

Franklin, IN

2010 – 2014

## WORK EXPERIENCE

---

### L3Harris Technologies

*Image Science Engineer*

January 2019 – Present

- Maintained an active TS/SCI clearance
- Became an Integrated Product Team leader, responsible for the technical execution of a small group of 3-5 other people
- Developed and maintained many software libraries and tools in Python, and followed DevOps best practices
- Gave regular technical and high-level briefings to government agencies and internal stakeholders
- Created new mathematical models and metrics for the creation and analysis of spatiotemporal GPS datasets, now in use by the US intelligence community
- Improved machine learning and artificial intelligence capabilities for object tracking and Markov prediction

*Software Engineering Intern*

May 2018 – August 2018

- Big data analysis using Python and R
- Applied research for synthetic data generation and analysis using tools from data science, calculus, statistical physics, and spectral graph theory

### Rochester Institute of Technology

*Research Assistant*

May 2016 – May 2018

- Studied the nonlinear dynamics of cardiac arrhythmias, and simulated the propagation of a partial differential equation model using MATLAB and Fortran
- Applied for and received funding from the National Science Foundation (NSF) for parameter estimation of cardiac models using state augmentation methods applied to the Local Ensemble Transform Kalman Filter
- Culminated in my master's thesis, "Parameter Estimation of a Cardiac Model Using the Local Ensemble Transform Kalman Filter"

## PROJECTS

---

### Chaotic Cryptography: Applications of Chaos Theory to Cryptography | *statistical analysis, Python*

- Provided a mathematical introduction to chaos theory and its novel application to cryptographic algorithms
- Created a cryptosystem and pseudo random number generator based upon a modified Logistic Map
- Performed statistical analysis on the derived cryptosystem for resistance to cryptographic attacks

### A Probabilistic Model for the Mafia Party Game | *mathematical modeling, dynamical systems, Python*

- Developed a mathematical model for the Mafia party game (also known as "Werewolf") using partial difference equations
- Generated figures to illustrate the model, and performed mathematical analysis on the model
- Successfully "cheated" at the next game night using this model for risk assessment

## TECHNICAL SKILLS

---

**Languages:** Python, SQL, R, MATLAB, HTML/CSS, C#, Java, PHP,  $\text{\LaTeX}$

**Developer Tools:** Git, BitBucket, Visual Studio, PyCharm, Spyder, RStudio, vim, Sublime Text, PHPStorm

**Libraries:** NumPy, pandas, matplotlib, lxml, SciPy, TensorFlow, PyTorch, BeautifulSoup

**Mathematical Skills:** mathematical modeling, dynamical systems, linear algebra, data science, cryptography