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Mathematician and Computer Scientist
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## Education

- **Westminster College** — New Wilmington, PA
  *Bachelor of Science in Mathematics and Financial Economics* — *August 2015 - Present*
  - 3.7 GPA; Minor in Computer Science
  - Honors Thesis in Hierarchical Temporal Memory focused on A. I. and Fuzzy Logic
  - Endowment Fund,Honors Program, Kappa Mu Epsilon, Men's Choir, Omicron Kappa Sigma, Pi Sigma Pi, and Secretary of Robotics Team

## Professional Experience

- **Software Engineer and Systems Administrator** — New Wilmington, PA
  *Titan Radio and WCN 24/7* — *May 2018 - Present*
  - Responsible for the hardware and software required to keep the radio and television station operating.
  - Wrote software to automate work and improve user experience including a program to automatically update the weather conditions on air and automatically Tweet Severe Weather Warnings.
- **Information Technology Intern** — New Castle, PA
  *Treloar & Heisel* — *September 2018 - Present*
  - Responsible for data science and automation necessary for building, maintaining, and utilizing databases including data validation, database normalization, and automated report generation.
  - Developed a variety of applications for company use in Java, Python, and Visual Basic.
- **Researcher** — Los Angeles, CA
  *Institute for Pure and Applied Mathematics at UCLA / Praedicat, Inc.* — *June 2018 -August 2018*
  - Selected to be a part of 2018's Research in Industrial Projects for Students (RIPS) at UCLA.
  - Worked for Praedicat, Inc. automating information extraction, classification, and aggregation from unstructured web data for business profiling of over 52,600 companies and corporate entities.
  - Used big data, deep neural networks, knowledge graphs, parallel programming, RDFs, and many other techniques to provide Praedicat, Inc. with a new tool for automatically finding information.
- **Financial Analyst** — Various
  *Program with Moody's Investors Service VP Ben Nelson* — *December 2017 - June 2018*
  - Responsible for data science and econometrics.
  - Presented a credit ratings and bond and stock recommendations to a panel of experts.
- **Teaching Assistant and Tutor** — New Wilmington, PA
  *Westminster College* — *August 2015 - Present*
  - Selected during my first year to tutor students and serve as a teaching assistant in mathematics and computer science courses.
  - Assisted professors in grading, working with students individually, and developing curriculum for classes covering coursework in Calculus, Computer Science, and Operations Research.
- **Research Assistant** — New Wilmington, PA
  *Dr. Charles Shaffer* — *January 2017 - May 2018*
  - Integrated cryptocurrency trading into Dr. Shaffer's algorithmic currency trading application.
  - We explored inefficiencies between exchanges and backtested technical strategies such as Donchian Channels and Bollinger Bands on Bitcoin, Ethereum, and Litecoin.

## Research

**Computational Fact-Checking through Relational Similarity based Path Mining**

- Developed an algorithm in Python and Cython for computational fact-checking on knowledge networks called *RelPredPath* based on network flow, relational similarity, and discriminative path mining
- Presented our work at IPAM and continually optimizing the algorithm's Graph Theory algorithm implementations in the hopes of presenting at conferences and publishing

**An Exploration of the Topological and Logical Properties of Hierarchical Temporal Memory Networks**

- Ongoing research in artificial intelligence modeled after the neocortex.
- Working to improve the encoding and decoding mechanisms of Hierarchical Temporal Memory through topology and attempting to use fuzzy logic to improve the performance or forecasting ability.

**Information Extraction and Aggregation from Unstructured Web Data for Business Profiling**

- Proposed and implemented an architecture to perform information extraction, classification, and aggregation at scale. My work focused on Natural Language Processing, Classification, and Big Data.
- Produced high quality structured data at scale for business applications, designed a classification scheme that vastly outperforms TF-IDF, and worked with Knowledge Graphs for Computational Fact-Checking.

**Algorithmic Game Theory**

- Developed simple machine learning algorithms in Java to play repeated-play simultaneous games such as Chicken and the Colonel Blotto Game.
- Presented my results at Westminster's 2017 Undergraduate Research and Arts Celebration and the Mathematical Association of America's Allegheny Mountain Section 2017 Spring Meeting.

**Optimizing Throughput, Cost, and Safety in Toll Booth Plazas**

- Lead a team of mathematicians over a single weekend in COMAP's International Mathematical Modeling Competition to produce a 20-page research paper.
- Received Honorable Mention for our solution, placing us in the top 13 in the United States and presented our results at 2017 Pi Mu Epsilon Regional Conference

## Projects

**Trinity Firefighting Contest**

- Built and programmed an autonomous robot to tackle various challenges at the Trinity Firefighting Contest including putting out candles, navigating a maze, and rescuing a baby doll.
- Won Best Robot in Division Prize for Senior, Unique Division and the North America Award for Level 2.

## Skills

**Languages:** Python (and Cython), Java, C++, Bash, R, HTML, CSS, XML, Javascript, Visual Basic

**Computer Science:** Blockchain, Parallel Programming, Robotics, Software Project Management, System Administration, Web Development

**AI and Data Science:** Artificial Intelligence, Big Data, Cognitive Computing, Information Extraction, Machine Learning (esp. Deep NN and Recurrent NN)

**Finance and Economics:** Algorithmic Trading, Corporate Credit Analysis, GAAP, Risk Analysis