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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
    - Minor in Computer Science
    - Honors Thesis entitled “An Exploration of the Topological and Logical Properties of Hierarchical Temporal Memory Networks” focused on A. I., Cognitive Computing, Logic, and Topology
    - All-College Honors Program, Endowment Fund, Kappa Mu Epsilon, Men’s Choir, Omicron Kappa Sigma, Pi Sigma Pi, and Secretary of Robotics Team

## Professional Experience

- **Researcher** Los Angeles, CA
  - *Institute for Pure and Applied Mathematics at UCLA / Praedicat, Inc.* June 2018 - Present
    - Selected to be a part of 2018’s Research in Industrial Projects for Students (RIPS) at UCLA.
    - Worked for Praedicat, Inc. automating information extraction 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.
- **Software Engineer and Computer Support Specialist** New Wilmington, PA
  - *Titan Radio and WCN 24/7* May 2018 - Present
    - Responsible for the servers, virtual machines, computers, and streams required to keep the radio and television station operating.
    - Wrote various software solutions including one to update the Titan Radio [weather conditions and weather forecast while no one was on the air and automatically Tweet Severe Weather Warnings](#).
- **Financial Analyst** Various
  - *Program with Moody’s Investors Service VP Ben Nelson* December 2017 - Present
    - Responsible for data science and providing macroeconomic perspective.
    - Companies we have focused on include PPG and Olin.
    - Presented a credit rating along with bond and stock recommendations to a panel of experts.
- **Fund Assistant Manager** New Wilmington, PA
  - *Westminster College Endowment Fund* January 2016 - Present
    - Lead a team of students to research investment opportunities and make decisions for \$180,000 of Westminster’s Endowment Fund.
    - Responsible for dissecting financial statements, conducting fundamental analysis, and seeking out high potential, undervalued companies.
    - Equity portfolio outperformed the S&P 500 while maintaining a beta of one during my time there.
- **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

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

- Created a positive feedback loop consisting of data management, a query formulator, a web crawler, a web scraper, classifiers, parsers, and a knowledge graph.
- Used Open Information Extraction techniques to handle unstructured data which we converted to subject-predicate-object triples and then used logic-based classification by querying our knowledge graph.

### 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.

### Minimum Square Deviance k-Chinese Postman Problems

- Worked on this variation of the k-Chinese Postman Problem with Dr. Natacha Merz. We focused on finding solutions for lattice graphs like the square grid graph.
- Although we believe we made some headway, we were unable to prove any of our results because of the intractability of the problem.

### 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.
- My team won the Best Robot in Division Prize for the Senior, Unique Division and the North America Award for Level 2.

### TrackChain

- Explored the technical details of blockchain technology including Elliptic Curve Cryptography, Network Flow Analysis, and Data Structure alternatives to a Merkle Chain
- Presented my research and decentralized application for supply chain management at Westminster's Undergraduate Research and Arts Festival

## Skills

**Languages:** Python, Java, C++, Bash, R, HTML, CSS, XML, Javascript, Solidity, Clojure

**Computer Science:** Big Data, Blockchain, Cognitive Computing, Information Extraction, Machine Learning, Parallel Programming, Robotics, Web Development

**Finance and Economics:** Corporate Credit Analysis, Econometrics, Risk Analysis