Alexander C. Michels
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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 -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.
- **Software Engineer and Systems Administrator** — New Wilmington, PA
  Titan Radio and WCN 24/7 — *May 2018 - Present*
  - Responsible for the networks, 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

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 game 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

Presentations and Talks

- **"Information Extraction and Aggregation for Business Profiling"** — August 2018
  Invited Talk at Institute for Pure and Applied Mathematics — *Los Angeles, CA*
- **"Decentralizing the World with Blockchain"** — April 2018
  Undergraduate Research & Arts Celebration — *New Wilmington, PA*
- **"Strategies in Simulated Repeated Play Game Theory"** — April 2017
  MAA, Allegheny Mountain Section Meeting — *Pittsburgh, PA*
- **"Optimizing Throughput, Cost, and Safety in Toll Booth Plazas"** — February 2017
  Pi Mu Epsilon Regional Conference — *Youngstown, OH*

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.

Skills

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

Computer Science: Artificial Intelligence, Blockchain, Cognitive Computing, Parallel Programming, Robotics, Software Project Management, Systems Administration, Web Development

Data Science: Big Data, Information Extraction, Machine Learning,

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