

Oliver Alvarado Rodriguez

Ph.D. Candidate
Department of Computer Science
Ying Wu College of Computing
New Jersey Institute of Technology
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EDUCATIONAL BACKGROUND

| Degree | University | Field | Year |
|------------------------------|------------------------------------|---|-------|
| Ph.D. | New Jersey Institute of Technology | Computer Science | 2024* |
| B.S., <i>Summa Cum Laude</i> | William Paterson University | Major: Computer Science Minor: Mathematics | 2020 |

* *Expected.*

EMPLOYMENT HISTORY

| | | |
|--------------------|------------------------------------|-------------------|
| Research Assistant | New Jersey Institute of Technology | 05/2021 - Present |
|--------------------|------------------------------------|-------------------|

Designed, implemented, and analyzed algorithms for high performance graph and data analytics. Explored the research process from literature review through algorithm design, implementation, and performance optimization. Published algorithms and results in various conferences and journals such as IEEE's High Performance Extreme Computing conference and MDPI's Algorithms journal. A full list of publications can be found starting on page 4.

| | | |
|--|------------------------------------|-------------------|
| Teaching Assistant / Substitute Lecturer | New Jersey Institute of Technology | 09/2020 - 05/2021 |
|--|------------------------------------|-------------------|

Served as a substitute lecturer planning and delivering lessons for the course "CS103 Python for Business Problems". Instructed lab sessions for 50+ students to demonstrate the practicability of topics learned in lecture. Provided extra tutoring for 20+ students who struggled with the material presented in both lab and lecture. Assisted professor with grading all lab and homework assignments. Reviewed exam and lab results with students.

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|---------------------|-----------------|-------------------|
| Data Science Intern | Chubb Insurance | 06/2020 - 08/2020 |
|---------------------|-----------------|-------------------|

Researched machine learning classification algorithms best suited for text data. Became comfortable with multiple Python libraries such as sci-kit learn, pandas, numpy, requests, and others. Created an API that pulled pertinent information from databases, predicted sex given at birth for insurance leads, and returned a new table for their sales team. Managed project through Chubb's enterprise GitHub and worked on an Agile software development schedule. Presented progress weekly to supervisor and larger data science team.

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|--|-----------------------------|-------------------|
| Research Assistant in Machine Learning | William Paterson University | 09/2019 - 06/2020 |
|--|-----------------------------|-------------------|

Utilized machine learning algorithms such as min-max normalization, k-means, k-nearest neighbors (knn), and linear regression for software performance prediction in digital signal processors. Converted machine learning techniques from Excel spreadsheets and R to Python. Implemented the SciKit and Pandas libraries in Python to preprocess data via min-max normalization and then perform

statistical analysis on the data with k-means, knn, and linear regression. Exported data to files and compared with previous iterations of results from Excel and R to confirm or reject the data. Managed SharePoint site for research communication and file sharing. Combined, reviewed, and refined out-of-date data files.

Computer Science Tutor

William Paterson University

09/2019 - 05/2020

Tutored 6+ students weekly on subjects such as Computer Science 1 & 2, Data Structures, Hardware Fundamentals, Digital Logic, Networking, and Cloud Computing. Advised students regarding class registration, time management, and completing assignments. Taught students studying techniques to better their understanding of computer science concepts. Provided the tutor supervisor, Dr. Erh-Wen Hu, with feedback to aid students who required extra guidance. Gathered feedback from students and other tutors to better tutoring experiences and provide better service.

Web Development Intern

William Paterson University

06/2019 - 05/2020

Accessed databases through the Toad for Oracle SQL application to create new tables and run queries in OracleSQL and utilized OracleDB. Maintained university enterprise applications through testing and monitoring user traffic. Developed enterprise web applications including a new search page that queries the university databases and utilizes Google's custom search engine to return specific web pages and a custom Google search. Programmed in HTML, CSS, JavaScript, jQuery, Adobe's ColdFusion, and SQL. Utilized web development frameworks such as Bootstrap 3 and 4. Collaborated with different departments at WPU such as Marketing and Public Relations to create responsive web applications that met student and staff standards. Learned new skills and techniques constantly to better the quality of web applications created. Assisted with the rollout of a new student interface for 10,000+ students, faculty, and staff through the university's homegrown WPCconnect central communication hub. Trained 5+ clients to use the Qualtrics Survey Research Suite.

Research Assistant in Cryptography

William Paterson University

09/2018 - 05/2019

Researched academic papers to gather information on the properties of feedback carry shift registers (FCSRs) and background information on cryptography and stream ciphers. Calculated the periods of AND-FCSR stream ciphers; those that utilize an AND gate to combine an initial sequence a with a coefficient q . Developed a C++ program to calculate the period of an XOR-FCSR stream cipher via brute forcefully finding the initial sequence a in a bitstream and finding the number of bits until the sequence a was repeated. Installed the NIST pseudorandom number generator statistical test suite in a UNIX environment. Analyzed bitstream files by utilizing the NIST suite and compiled generated data (p-values) into an Excel sheet for further visual analysis via graphs and tables. Presented positive findings at the 2019 Explorations Conference at WPU.

Technology Assistant/Supervisor/Student Manager

William Paterson University

01/2017 - 06/2019

Supported 5+ faculty, staff, and students with Qualtrics surveys monthly for research experiments, human resource trainings, and miscellaneous survey builds. Presented and taught Qualtrics Survey Suite to students, faculty, and staff. Created a presentation for first year students and coordinated presentation times with multiple Pioneer Success Seminar professors. Assisted with rolling out Duo Mobile Multifactor Authentication to 1,000+ faculty/staff. Aided 7-10 clients daily with technological questions via answering Help Desk calls and documenting tickets on the SolarWinds Help Desk system. Oversaw 20+ technology assistants and shift supervisors to provide a technical knowledge resource. Trained 10+ newly hired technology assistants and promoted shift supervisors every academic year to answer Help Desk calls, complete Help Desk tickets, and provide exceptional customer service. Updated and maintained documentation consistently to provide accurate information to both end users and internal staff. Utilized Active Directory and Microsoft System Center Configuration Manager to manage computers on campus. Assisted with the reimaging of computers and subsequent deployment. Managed SharePoint site for intradepartmental communication.

SERVICE AND LEADERSHIP

| Service or Leadership | Institution | Dates |
|--|-----------------------------|-----------------|
| Information Technology Advisory Committee | William Paterson University | 06/2019-05/2020 |
| Middle States Commission on Higher Education Committee 2022 | William Paterson University | 06/2019-05/2020 |
| | William Paterson University | 08/2017-05/2020 |

HONORS AND AWARDS

| Honor or Award | Institution | Description | Years |
|--|--|---|--------------|
| SC22 Student Travel Award Recipient | IEEE's Technical Community on High Performance Computing (TCHPC) | Travel award given to a graduate or undergraduate student to attend SC22. Acceptance rate of $\approx 5\%$. | 2022 |
| Mathematics Research Community Participant | American Mathematical Society | Week-long workshop solving problem(s) related to hypergraphs. Acceptance rate of $\approx 50\%$. | 2022 |
| Omicron Omega Excellency in Computer Science | William Paterson University | Awarded to the highest-GPA graduating senior in computer science. | 2020 |
| Upsilon Pi Epsilon International Honor Society | William Paterson University | Admittance to computer science students who maintain at least a B average in all courses. | 2019 |
| Dean's List of the College of Science and Health | William Paterson University | To be added students needed to achieve a 3.5 GPA for each semester. Maintained semesterly until graduation in 2020. | 2016 |
| Honors College Scholar | William Paterson University | Students who achieved a stellar SAT score and GPA during high school were placed into the Honors College. Maintained status until graduation in 2020. | 2016 |

TEACHING

| Course | Institution | Number Students | Semester |
|---|------------------------------------|------------------------|-----------------|
| Computer Science with Business Problems | New Jersey Institute of Technology | ~50 | F2020 |
| Roadmap to Computing | New Jersey Institute of Technology | ~50 | S2021 |
| Computer Science with Business Problems | New Jersey Institute of Technology | ~25 | S2021 |

RESEARCH

PUBLISHED JOURNAL PAPERS

1. Zhihui Du, Oliver Alvarado Rodriguez, Joseph Patchett, and David A. Bader. Interactive graph stream analytics in Arkouda. *Algorithms*, 14(8), 2021.

PUBLISHED BOOKS AND PARTS OF BOOKS

2. Zhihui Du, Oliver Alvarado Rodriguez, Joseph Patchett, and David A Bader. Interactive graph analytics in Arkouda. In David Bader, editor, *Massive Graph Analytics*, chapter 21, pages 549–589. Chapman and Hall/CRC, 2022.

PRESENTATIONS

CONFERENCE PRESENTATIONS

3. Oliver Alvarado Rodriguez, Zhihui Du, Joseph T. Patchett, Fuhuan Li, and David A. Bader. Arachne: An Arkouda package for large-scale graph analytics. In *2022 IEEE High Performance Extreme Computing Conference (HPEC)*, 2022.
4. Zhihui Du, Oliver Alvarado Rodriguez, and David A. Bader. Enabling exploratory large scale graph analytics through arkouda. In *2021 IEEE High Performance Extreme Computing Conference (HPEC)*, pages 1–7, 2021.
5. Zhihui Du, Oliver Alvarado Rodriguez, and David A. Bader. Large scale string analytics in arkouda. In *2021 IEEE High Performance Extreme Computing Conference (HPEC)*, pages 1–7, 2021.
6. Zhihui Du, Oliver Alvarado Rodriguez, David A. Bader, Michael Merrill, and William Reus. Exploratory large scale graph analytics in Arkouda. In *The 8th Annual Chapel Implementers and Users Workshop (CHI UW)*, June 2021.
7. Oliver Alvarado Rodriguez, Dev Dave, Weihua Liu, and Bogong Su. A study of machine learning inference benchmarks. ICAIP 2020, page 167–171, New York, NY, USA, 2020. Association for Computing Machinery.

KEYNOTE PRESENTATIONS

8. Oliver Alvarado Rodriguez. Enabling exploratory large scale graph analytics through Arkouda. Academic Data Science Alliance Annual Meeting, March 2022.

OTHER RESEARCH PRESENTATIONS

9. Oliver Alvarado Rodriguez. Large-scale graph analytics in Arkouda. New Jersey Big Data Alliance Symposium, March 2021.
10. Oliver Alvarado Rodriguez, Oliver Nuñez, Dev Dave, and Kiho Lim. A comparative study on machine learning techniques for weather prediction. WPUNJ Explorations Conference, May 2020.
11. Oliver Alvarado Rodriguez, Jeffrey Albanese, and Weihua Liu. The statistical properties of xor-fcsrs. WPUNJ Explorations Conference, May 2019.

PERSONAL INFORMATION

LinkedIn: [linkedin.com/in/oliver-alvarado-rod](https://www.linkedin.com/in/oliver-alvarado-rod)

ResearchGate: [researchgate.net/profile/Oliver-Alvarado-Rodriguez](https://www.researchgate.net/profile/Oliver-Alvarado-Rodriguez)

Google Scholar: scholar.google.com/citations?user=dV5vV3gAAAAJ&hl=en

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