Joshua Varghese

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Education

University of Wisconsin-Madison

- *M.S. in Biomedical Engineering, expected May 2025*
- *B.S. in Biomedical Engineering, B.S. in Data Science, Certificate in Computer Sciences, May 2024*

Engineering Experience

R&D Translational Medicine Intern, Pearl River, NY
Pfizer Inc., May 2024 - Present

- Independently developed, trained, and tested an AI tool using spaCy, NLTK, and PyTorch to automate literary data extraction for systematic reviews, successfully reducing analysis time by 57%
- Led and took ownership of a comprehensive systematic review on predictive, non-invasive biomarkers for IBD patients, driving advancements in diagnostic methodologies and delivering strategic insights through competitor analysis of approved treatments
- Analyzed complex clinical trial data and proactively collaborated with regulatory teams to address feedback, ensuring compliance and significantly improving study quality
- Designed, built, and deployed a user-friendly data analysis application using Posit Connect and Snowflake, independently training end-users and ensuring successful adoption across teams

Team Leader for Reducing Whole-Body Vibrations on Neonatal Transport, Madison, WI
Sponsored by Dr. Ryan McAdams, August 2022 - May 2024

- Led a multidisciplinary team in designing and prototyping solutions to minimize whole-body vibrations in neonatal transport, collaborating directly with the Neonatology Division Chief at University of Wisconsin Hospitals
- Independently conducted literature reviews, developed SolidWorks models, and managed timelines while coordinating team progress through regular reports
- Fabricated a prototype using 3D-printed and machined parts, achieving a 50% reduction in neonatal physical stressors, and created focused, reproducible testing plans in mechanical engineering labs
- Presented project outcomes in a final poster presentation to academic and industry professionals

Global Technology and Engineering Biotech Data Visualization Intern, Sanford, NC
Pfizer Inc., May 2023 - August 2023

- Analyzed and optimized process workflows within the Manufacturing Sciences and Technology department, enhancing large-scale manufacturing efficiency and ensuring compliance with cGMP SOPs
- Leveraged a time-series database and Visual Basic to extract and query experimental run data from the Aveva PI System, streamlining data retrieval for process improvements
- Engineered and took ownership of a PowerBI dashboard to generate dynamic visuals and statistical tables for bio-suitability reports, reducing presentation time by 80%
- Automated qPCR data analysis in a SQL server environment, applying visualizations and statistical methods to validate standard curves and assay acceptances, driving data-informed decision-making
- Developed and implemented robust data backup procedures and led knowledge transfers, ensuring operational continuity and smooth team transitions

Undergraduate Researcher / Bioinformatician, UW-Madison
Aids Vaccine Research Lab, May 2021 - May 2024

- Developed an active noise-canceling system with Raspberry Pi, reducing motor and fan noise from large air samplers.
- Prepared and sequenced cynomolgus macaque DNA on Oxford Nanopore Technology platforms (GridION and MinION), using Bash and Shell commands on Mac and Unix systems for data analysis and visualization
- Deployed reproducible projects on high-performance computing servers at Wisconsin's Center for High Throughput Computing and developed custom Geneious Prime GUI plugins for sequence analysis, ensuring efficient workflows
- Automated the upload of 125,000+ COVID sequences to public repositories using Selenium, improving efficiency by 300% and streamlining data submission processes
- Led recruitment, training, and supervision of undergraduate researchers, ensuring effective team development
- Designed and implemented a 3D model for hybrid air cartridges to improve accessibility for low-income groups

Publications

- Karl, J., Prall, T. M., Bussan, H. E., Varghese, J. M., et. al. Complete sequencing of a cynomolgus macaque major histocompatibility complex haplotype (p. 2022.10.24.513544). bioRxiv.
- Prall, T. M., Karl, J. A., Varghese, J. M., et. al. Complete genomic assembly of Mauritian cynomolgus macaque killer immunoglobulin-like receptor and natural killer group 2 haplotypes. Genomics.

Skills

- Adobe products (InDesign, Illustrator)
- 3D Modeling Programs (Inventor, SolidWorks, AutoCAD)
- Programming Languages (Python, R, Java, SQL, HTML, MATLAB, Visual Basic, Arduino, Opentron)
- Visualization Tools (Tableau, Power BI, Microsoft Office Suite)