

# NICHOLAS TAPP - HUGHES

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**Full-Stack Engineer** focused on building high-quality, scalable, and trustworthy web and data applications that meet stakeholder needs. Experienced working directly with end users on ambiguous problems to deliver solutions.

## EXPERIENCE

### Software Developer

*Epic Systems Corp., July 2023–July 2025*

- Improved screening follow-up workflows for 80+ hospital systems (driven by customer feature requests) by architecting a configurable system that enables automatic follow-up care suggestions based on screening insights.
- Drove 20% performance gain (measured by realistic experimentation) and UX improvements in 2 application components by migrating them from Visual Basic to .NET/C# and React.
- Wrote 2 technical designs, presented to customers, and collected user feedback for an LLM-extracted insights project which resulted in earlier diagnosis for 70% of lung cancer cases at The Christ Hospital.
- Shipped 62 bug fixes to 500+ healthcare systems by tracing logs and diagnosing issues across the full stack.
- Collected feedback/pain points, built trust, and facilitated installs during 20 days spent on-site with end users.
- Ensured reliability and maintainability by using test suites, analyzing performance, and favoring simple design.
- Built front-end React applications that are accessible to non-sighted users and available in 9+ languages.

### Graduate Student Researcher

*UNC Computer Science, Aug 2021–May 2023*

- Published a 22% improvement in autism classification accuracy on a 3D mesh hippocampus dataset by developing new methods for extracting interpretable statistical features of 3D objects (Journal of Math. Imaging and Vision).
- Boosted research lab productivity by maintaining our open-source Python/C++ repo, developing scripts for orchestrating experimentation, cleaning datasets, and introducing visualization tools.

### Graduate Research Assistant

*UNC Gillings School of Global Public Health, Aug 2021–Jun 2025*

- Improved policymakers' understanding of smoking behavior in the US adult population by building a microsimulation model that predicts year-over-year smoking behavior at the individual level.
- Accelerated the project team's productivity and synchronization by maintaining the codebase, building robust data pipelines, sharing regular results, recommending technologies, and onboarding new people.

### Software Engineering R&D Intern

*Sila Nanotechnologies Inc., Jun 2022–Aug 2022*

- Improved physical measurement accuracy in chemical R&D processes by enhancing a proprietary computer vision pipeline, writing documentation, and advising future development strategy.

## PROJECTS & SYSTEMS BUILT

### Evolutionary Skeletal Representations Algorithm

An algorithmic pipeline for determining salient statistical features of 3D mesh objects using skeletal representations and differential geometric processing. Implemented with Python, C++, and shell scripts; released as open-source.

### Smoking Behavior Microsimulation Model

A simulation of individual lifetime smoking behavior, for the entire US adult population, built with Python. Based on a 2<sup>nd</sup>-order Markov chain multinomial logistic regression model. Predicts smoking behavior, mortality, and incidence of disease based on individual and societal factors. Accompanied by large-scale data analysis.

### Nick Tapp-Hughes's Blog

A personal website and blog built using React and hosted on AWS/Cloudflare. Uses an Amplify/DynamoDB/Lambda/SES cloud stack + Python/Bash scripting to support verified subscribers, automatically convert Google Docs to HTML blog posts, and mitigate security risks such as email enumeration or DoS.

## SELECTED PUBLICATIONS

- Pizer, S. M., Liu, Z., Zhao, J., **Tapp-Hughes, N.**, Damon, J., Zhang, M., Marron, J. S., Taheri, M., Vicory, J., *Interior Object Geometry via Fitted Frames*, Journal of Mathematical Imaging and Vision. Available: <https://rdcu.be/eFX0G>.
- Mills, S. D., **Tapp-Hughes, N.**, Zhang, Y., Ribisl, K. M., Wiesen, C. A., et. al., *Development and Validation of the TwIST Model*, PLoS One. Available: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0342083>.

## SKILLS

**Languages:** Python, TypeScript, C++, Java, C#, SQL, Rust

**Frameworks & Tooling:** AWS, .NET, React, SQL Server, Testing, Debugging, Build Systems, Containerization, uv, neovim

**Other:** Machine Learning Research, Software Development Lifecycle, Linux, System Design, LLMs, Agile, Open Source

## EDUCATION

### University of North Carolina at Chapel Hill

*B.S. Applied Mathematics, B.S. Computer Science*

*Aug 2017–May 2021*

- Cumulative GPA: 3.92/4, Math GPA: 3.87/4, CS GPA: 3.97/4

*M.S. Computer Science*

*Aug 2021–May 2023*