

Tobias Rubel

842 Park Ave, UNIT 7
Maryland, United States, 21201

Phone: 503-593-9330
Email: trubel@umd.edu
Website: tobiasrubel.com
GitHub: github.com/TobiasRubel

Research Interests: Information Retrieval, Vector Search, Parallel Algorithms, Graph Algorithms, Performance Engineering, Computational Biology

Education

Sep 2021 - Present **PhD Candidate, Computer Science** University of Maryland, College Park, MD.
Advisor: Laxman Dhulipala
Planned Graduation: May 2027

Dec. 2019 **B.A. Philosophy**, Reed College, Portland, OR.
Thesis: *Fundamentality and Friends*.
Thesis Advisor: Paul Hovda

Employment

April 2026 - Present **Student Researcher**, Google Research, College Park, MD.
Aug 2023 - Present **NSF Graduate Research Fellow**, University of Maryland, College Park, MD.
Jun 2022 - Aug 2023 **Research Assistant**, Molloy Lab at University of Maryland, College Park, MD.
Sep 2021 - Jun 2022 **Teaching Assistant**, University of Maryland, College Park, MD.
May 2018 - Aug 2021 **Research Assistant**, Reed College Center for Advanced Computing, Portland, OR.
Jan 2020 - Aug 2021 **Research Assistant**, Reed College Computational Biology Lab, Portland, OR.

Publications and Talks

Manuscripts in Submission

Tobias Rubel, Richard Wen, Guy Blelloch, Laxman Dhulipala, Lars Gottesbüren, Jakub Łącki, and Vahab Mirrokni.
Turbocharging PiPNN for Proximity and k -NN Graph Building. Full version. Under submission.

Peer-Reviewed Publications

Tobias Rubel, Richard Wen, Guy Blelloch, Laxman Dhulipala, Lars Gottesbüren, Jakub Łącki, and Vahab Mirrokni.
Fast k -NN Graph Building with Quantized PiPNN and Filtering. *Similarity Search and Applications (SISAP)* 2026, Springer LNCS. To appear. **First place, Task 1 of the SISAP 2026 Indexing Challenge.**
[\[Code\]](#)

Tobias Rubel, Richard Wen, Guy Blelloch, Laxman Dhulipala, Lars Gottesbüren, Jakub Łącki, and Vahab Mirrokni.
Turbocharging PiPNN for Proximity and k -NN Graph Building. *2nd Workshop on Vector Databases (VecDB) at VLDB* 2026. **Best Paper Award.** [\[OpenReview\]](#)

Tobias Rubel, Richard Wen, Laxman Dhulipala, Lars Gottesbüren, Rajesh Jayaram, and Jakub Łacki. **PiPNN: A Framework for Ultra-Scalable Graph-Based Nearest Neighbor Indexing.** *32nd ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)* 2026. **Best Paper Award, Research Track.** [ACM] [arXiv]

Jamshed Khan, Tobias Rubel, Erin Molloy, Laxman Dhulipala, and Rob Patro. **Fast, parallel, and cache-friendly suffix array construction.** *Algorithms for Molecular Biology* 2024. [AMB]

Junyan Dai, Tobias Rubel, Yunheng Han, and Erin K Molloy. **Leveraging Constraints plus dynamic programming for the large dollo parsimony problem.** *23rd International Workshop on Algorithms in Bioinformatics* 2023. [WABI]

Tobias Rubel*, Ananthan Nambiar*, James McCaull, Jon deVries, and Mark Bedau. **Dropping diversity of products of large US firms: Models and measures.** *Plos One* 2022. [PLOS]

Tobias Rubel*, Pramesh Singh*, and Anna Ritz. **Reconciling signaling pathway databases with network topologies.** *Pacific Symposium on Biocomputing 2022* 2022. [PSB]

Heyuan Zeng, Jinbiao Zhang, Gabriel A Preising, Tobias Rubel, Pramesh Singh, and Anna Ritz. **Graphery: interactive tutorials for biological network algorithms.** *Nucleic Acids Research* 2021. [NAR]

Tobias Rubel, Anna Ritz. **Augmenting Signaling Pathway Reconstructions.** *11th ACM Conference on Bioinformatics, Computational Biology, and Health Informatics (ACM-BCB)* 2020. [ACM]

Mark A. Bedau, Nicholas Gigliotti, Tobias (Rubel) Janssen, Alec Kosik, Ananthan Nambiar, and Norman Packard. **Open-Ended Technological Innovation.** *Artificial Life* 2019. [MIT Press]

Talks

- | | |
|----------|--|
| Sep 2026 | Ultra-Scalable Graph-Based Nearest Neighbor Indexing with PiPNN. <i>Meta, FAISS team.</i> Invited technical talk. |
| Sep 2026 | Turbocharging PiPNN for Proximity and k -NN Graph Building. <i>2nd Workshop on Vector Databases (VecDB) at VLDB 2026</i> , Boston, MA. |
| Aug 2026 | Ultra-Scalable Graph-Based Nearest Neighbor Indexing with PiPNN. <i>KDD 2026</i> , Jeju Island, Republic of Korea. |
| Jul 2026 | Ultra-Scalable Graph-Based Nearest Neighbor Indexing with PiPNN. <i>Microsoft, DiskANN team.</i> Invited technical talk. |
| Nov 2020 | Computationally Reconstructing Cellular Signaling Pathways. <i>Murdock College Science Research Conference 2020</i> , virtual. |
| Oct 2020 | A Higher-Order Approach to Pathway Reconstruction. <i>Reed College Computer Science Colloquium</i> , virtual. |
| Sep 2020 | Augmenting Signaling Pathway Reconstructions. <i>ACM Conference on Bioinformatics, Computational Biology, and Health Informatics 2020</i> , virtual. |

Posters

- | | |
|----------|---|
| Jun 2022 | Multi-locus species tree estimation with TREE-TMC. <i>Evolution</i> 2022. |
|----------|---|

* Equal Author Contribution.

Software

[PiPNN](#)

The parallel C++ implementation of PiPNN, the graph-based nearest neighbor index construction framework from our KDD 2026 paper.

[CaPS-SA](#)

The repository of the parallel suffix array algorithm developed jointly by Jamshed Khan, myself, Erin Molloy, Laxman Dhulipala, and Rob Patro.

Awards and Funding

Sep 2026	Best Paper Award, 2nd Workshop on Vector Databases (VecDB) at VLDB 2026.
Aug 2026	First Place, Task 1 (k -NN Graph Construction), SISAP 2026 Indexing Challenge.
Aug 2026	Best Paper Award, Research Track, KDD 2026.
Aug 2023	NSF Graduate Research Fellowship. \$159,000
Jun 2022	Rita Colwell Travel Fellowship. \$800
Jan 2022	PSB Travel Fellowship. \$1,500 (declined due to Covid)
Aug 2021	Leidos Fellowship. \$10,000