ANTON ALYAKIN

alyakin314@gmail.com ⋄ alyakin314.github.io

EDUCATION

Washington University in St. Louis *[Aug 2021, May 2026]*
Doctor of Medicine *(Expected)*
One-Year Research without Degree Program (MD5)

Johns Hopkins University *[Jan 2019, Dec 2019]*
Master of Science in Engineering
Applied Mathematics & Statistics

Johns Hopkins University *[Aug 2015, May 2019]*
Bachelor of Science
Computer Science
Applied Mathematics & Statistics

RESEARCH

New York University *[Mar 2024, present]*
Visitng Medical Student Researcher
Department of Neurosurgery / OLAB
Faculty Supervisor: Eric K. Oermann

Washington University in Saint Louis *[Mar 2023, present]*
Medical Student Researcher
Department of Neurosurgery / Leuthardt Lab
Faculty Supervisor: Eric Leuthardt

Johns Hopkins University *[Jan 2020, Mar 2021]*
Assistant Research Engineer
Department of Applied Mathematics & Statistics / Neruodata Lab
Faculty Supervisors: Carey E. Priebe & Joshua T. Vogelstein

Johns Hopkins University *[Jun 2019, Dec 2019]*
Graduate Research Assistant
Department of Applied Mathematics & Statistics
Faculty Supervisor: Carey E. Priebe

Johns Hopkins University *[May 2017, May 2019]*
Undergraduate Research Assistant
Department of Computer Science
Faculty Supervisor: Suchi Saria

DISSERTATIONS

1. **A. Alyakin**, *Robust Hypothesis Testing of Location Parameters using Lq-Likelihood-Ratio-Type Test in Python*, a thesis submitted to The Johns Hopkins University in conformity with the requirements for the degree of Master of Science in Engineering, 2019. [arXiv] [library] [code]

2. **A. Alyakin**, *Motif Discovery in the Irregulary Sampled Time Series Data*, a thesis submitted to The Johns Hopkins University in conformity with the requirements for Senior Honors Thesis in Computer Science, 2019. [pdf]

PUBLICATIONS

1. D. A. Alber, Z. Yang, **A. Alyakin**, E. Yang, J. Zhang, S. Rai, A. A. Valliani, G. R. Rosenbaum, A. K. Amend-Thomas, D. B. Kurland, C. M. Kremer, A. Eremiev, B. Negash, D. D. Wiggan, M. A. Nakatsuka, K. L. Sangwon, S. Neifert, H. A. Khan, A. V. Save, A. Palla, E. A. Grin, M. Hedman, M. Nasir-Moin, C. X. Liu, L. Y. Jiang, M. A. Mankowski, D. L. Segev, Y. Aphinyanaphongs, H. A. Riina, J. G. Golfinos, D. A. Orringer, D. Kondziolka, E. K. Oermann, *Medical large language models are vulnerable to attack*, Nature Medicine, to appear, 2024.

2. **A. Alyakin**, D. Kurland, D. Alber, K. Sangwon, D. Li, A. Tsirigos, E. Leuthardt, D. Kondziolka, E. Oermann, *CNS-CLIP: Transforming a Neurosurgical Journal into a Multimodal Medical Model*, Neurosurgery, to appear, 2024.

3. R. Guennoun†, **A.Alyakin**†, H. Higushi, S. Demehri, *Commensal HPVs Have Evolved to Be More Immunogenic Compared with High-Risk α-HPVs*, Vaccines, 2024. [journal]

4. J. Lee, M. A. Ruiz-Cardozo, R. P. Patel, S. Javeed, R. S. Lavandi, C. Newsom-Stewart, **A. Alyakin**, C. A. Molina, N. Agarwal, W. Z. Ray, M. Santacatterina, B. H. Pennicooke, *Clinical Prediction for Surgical versus Nonsurgical Interventions in Patients with Vertebral Osteomyelitis and Discitis*, Journal of Spine Surgery, 2024. [journal]

5. **A. A. Alyakin**, J. Agterberg, H. S. Helm, and C. E. Priebe, *Correcting a Nonparametric Two-sample Graph Hypothesis Test for Graphs with Different Numbers of Vertices with Applications to Connectomics*, Applied Network Science, 2024. [journal] [arXiv] [code]

6. M. Powell, C. Clark, **A. Alyakin**, J. T. Vogelstein, B. Hart, *Exploration of Residual Confounding in Analyses of Associations of Metformin Use and Outcomes in Adults With Type 2 Diabetes*, JAMA Network Open, 2022. [journal] [arXiv]

7. F. Rahman, N. Finkelstein, **A. Alyakin**, N. A Gilotra, J. Trost, S. P. Schulman, S. Saria, *Using Machine Learning for Early Prediction of Cardiogenic Shock in Patients with Acute Heart Failure*, Journal of the Society for Cardiovascular Angiography & Interventions, 2022. [journal] [arXiv]

8. J. Chung†, B. Varjavand†, J. Arroyo, **A. Alyakin**, J. Agterberg, M. Tang, J. T. Vogelstein, C. E. Priebe, *Valid Two-Sample Graph Testing via Optimal Transport Procrustes and Multiscale Graph Correlation with Applications in Connectomics*, Stat, 2021. [journal] [arXiv] [code]

9. K. Marchisio, Y. Park, A. Saad-Eldin, **A. Alyakin**, K. Duh, C. Priebe, P. Koehn, *An Analysis of Euclidean vs. Graph-Based Framing for Bilingual Lexicon Induction from Word Embedding Spaces*, Findings of the Association for Computational Linguistics: EMNLP 2021. [journal] [arXiv] [code]

ABSTRACTS

1. K. L. Sangwon, D. Kurland, **A. Alyakin**, D. Kondziolka, E. K. Oermann, *Seven Decades Of Change: Tracing The Evolution Of Neurosurgery Through Lexical Analysis Of Neurosurgery Publications Of The CNS (1955-2024)*, Digital Abstract at the 2024 Annual CNS Meeting, 2024.

2. K. L. Sangwon, **A. Alyakin**, D. Kurland, E. Leuthardt, D. Kondziolka, E. K. Oermann, *A Generalizable Pipeline for Building an Extensive Domain-Specific Dataset from a Medical Journal - Neurosurgery Edition*, Oral Presentation at the 2024 Annual CNS Meeting, 2024.

3. **A. Alyakin**, D. Kurland, D. Alber, K. Sangwon, D. Li, A. Tsirigos, E. Leuthardt, D. Kondziolka, E. Oermann, *CNS-CLIP: Transforming a Neurosurgical Journal into a Multimodal Medical Model*, Oral Presentation at the 2024 Annual CNS Meeting, 2024.

† signifies equal contribution. author order preserved as in manuscript.

PREPRINTS

1. K. Vishwanath, J. Stryker, **A. Alaykin**, D. A. Alber, Eric K. Oermann, *Mobile-sized language models demonstrate expert-level clinical capabilities*, submitted, 2024.
2. C. Hang, R. Deng, L. Y. Jiang, Z. Yang, D. A. Alber, **A. Alyakin**, E. K. Oermann, *BPQA Dataset: Evaluating How Well Language Models Leverage Blood Pressures to Answer Biomedical Questions*, submitted, 2024.
3. **A. Alyakin**, Y. Qin, and C. E. Priebe, *LqRT: Robust Hypothesis Testing of Location Parameters using Lq-Likelihood-Ratio-Type Test in Python*, 2019. [arXiv] [code]

TEACHING

Johns Hopkins University
Teaching Assistant

580.475 Biomedical Data Science	*Fall 2019*
553.430/630 Introduction to Statistics	*Spring 2019*
553.436/636 Data Mining	*Fall 2018*

AWARDS

Johns Hopkins University

Applied Mathematics & Statistics Prize for Outstanding Master's Research	*2020*
Applied Mathematics & Statistics Achievement Award	*2019*
Undergraduate General Honors	*2019*
Undergraduate Departmental Honors with Thesis, Computer Science	*2019*
Undergraduate Departmental Honors, Applied Mathematics & Statistics	*2019*
Whitening School of Engineering Dean's List (8/8 Semesters)	*2015-2019*

REVIEW

Neurosurgery
Reviewer *[2024, present]*

SKILLS

Languages (in order of proficiency):
Python, English, Russian, R, Matlab, Java, C++.

Python skills:
PyTorch[LightningFabric, HuggingFaceAccelerate, PyTorchLightning, DeepSpeed], Tensorflow.

Other skills:
LaTeX, Git, SLURM, API[OpenAI, Anthropic, AWS Bedrock], Prompt Engineering, Databases[PostgreSQL, BigQuery], Lead climbing (6b/5.10), Bouldering (7a/V6 indoor; V2 outdoor).