

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]
Visiting 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 Irregularly 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. **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, 2025. [journal]
2. 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 Data-poisoning Attacks*, Nature Medicine, 2025. [journal]
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. G. R. Rosenbaum, L. Y. Jiang, I. Sheth, J. Stryker, **A. Alyakin**, D. A. Alber, N. K. Goff, Y. J. F. Kwon, J. E. Markert, M. Nasir-Moin, J. M. Niehues, K. L. Sangwon, E. Yang, E. K. Oermann, *MedG-KRP: Medical Graph Knowledge Representation Probing*, Findings of the 4th Machine Learning for Health symposium (ML4H), 2024. [arXiv]
2. 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.

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

3. 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.
4. **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.

PREPRINTS

1. **A. Alyakin**, J. Stryker, D. A. Alber, K. L. Sangwon, B. Duderstadt, A. Save, D. Kurland, S. Frome, S. Singh, J. Zhang, E. Yang, K. Y. Park, C. Orillac, A. Valliani, S. Neifert, A. Liu, A. Patel, C. Livia, D. Lau, I. Laufer, P. A. Rozman, E. T. Hidalgo, H. Riina, R. Feng, T. Hollon, Y. Aphinyanaphongs, J. G. Golfinos, L. Snyder, E. Leuthardt, D. Kondziolka, E. K. Oermann, *Repurposing the scientific literature with vision-language models*, submitted, 2025.
2. Y. Lan, **A. Alyakin**, E. K. Oermann, *Gateformer: Advancing Multivariate Time Series Forecasting through Temporal and Variate-Wise Attention with Gated Representations*, submitted, 2025.
3. X. Han[†], **A. Alyakin**[†], S. Ciprut, C. Lapierre, J. Stryker, A. Lowe, J. Golfinos, D. Kondziolka, E. K. Oermann, *Neuro Data Hubs: Clinical Research Data Services for Neurosurgical Departments*, submitted, 2024.
4. S. Singh, **A. Alyakin**, D. A. Alber, J. Stryker, A. P. S Tong, M. de la Paz, M. Hernandez-Rovira, F. Pat, P. Cruz, K. Y. Park, D. Kondziolka, E. K. Oermann, *Multiple choice questions are poor assessments of medical knowledge for humans and generative AI*, 2024.
5. A. Save, **A. Alyakin**, J. Stryker, D. A. Alber, J. Zhang, G. Rosenbaum, S. Singh, E. Leuthardt, D. Kondziolka, E. K. Oermann, *A Platform for Serving Large Language Models for Neurosurgical Diagnostic Support*, submitted, 2024.
6. K. Vishwanath, J. Stryker, **A. Alyakin**, D. A. Alber, E. K. Oermann, *MedMobile: A mobile-sized language model with expert-level clinical capabilities*, submitted, 2024. [arXiv]
7. 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.
8. K. L. Sangwon, X. Han, A. Becker, Y. Zhang, R. Ni, J. Zhang, D. A. Alber, **A. Alyakin**, M. Nakatsuka, N. Fabbri, Y. Aphinyanaphongs, J. Yang, A. Chachoua, D. Kondziolka, I. Laufer, E. K. Oermann, *Automating the referral of bone metastases patients with and without the use of large language models*, submitted, 2024.
9. **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]

AWARDS

Johns Hopkins University

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| 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 |

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

TEACHING

Congress of Neurological Surgeons

Teaching Assistant

CNS 2024 Data Science Course

Sep 2024

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

MENTORING

NYU OLAB

Undergraduate Intern Supervisor

Shrutika Singh

[2024, Present]

Krithik Vishwanath

[2024, Present]

High School Intern Supervisor

Gabriel Rosenbaum

[2024, Present]

REVIEW

Quantitative Imaging in Medicine and Surgery

Reviewer

[2025, present]

Neurosurgery

Reviewer

[2024, present]

SKILLS

Languages (in order of proficiency):

Python, English, Russian, R, Matlab, Java, C++.

Python skills:

PyTorch[DDP, FSDP, DeepSpeed, PyTorchLightning, LightningFabric, HuggingFaceAccelerate],
Tensorflow.

Other skills:

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