

# Vishweshwar Tyagi

## Curriculum Vitae

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500 Riverside Dr.  
New York, NY 10027  
USA  
+1 (917) 293 4910  
vt2353@columbia.edu  
vishu.ai/

### Education

2021–2022	<b>MS in Data Science</b> , <i>Columbia University</i> , USA	3.97/4
2019–2021	<b>MS in Mathematics</b> , <i>IIT Kanpur</i> , India	9.0/10
2016–2019	<b>BS in Mathematics</b> , <i>University of Delhi</i> , India	9.4/10

### Research Interests

hierarchical Bayesian models, probabilistic programming, Monte Carlo methods  
statistical machine learning, stochastic processes

### Experience

#### Research Experience

- 2023–  
Present
- Data Scientist**, *Department of Neurology, Columbia University*, New York, USA
- Developed hierarchical Bayesian models to estimate motor recruitment curves from sparse neurophysiological data of brain and spinal cord stimulation
  - Implemented mixture models to detect and down-weight outlier observations, improving robustness of inference
  - Applied Bayesian mixed effects models in intervention studies to detect change in motor threshold with fewer participants compared to frequentist tests
  - Released open-source Python package hbMEP, which formed basis of funded NIH grant on real-time adaptive stimulation and supported preliminary analyses for \$1.25M CDMRP grant optimizing stimulation parameters in human and rodent studies

#### Industry Experience

- Summer  
2022
- Data Science Intern**, *Quartet Health*, New York, NY
- Improved identification of high-risk patients for mental health conditions by fine-tuning large language model BERT on clinical notes using transfer learning in PyTorch, increased F2-score by 13% over XGBoost baseline
  - Built end-to-end pipeline on Amazon Redshift using dbt and SQL to automate transformation of medical claims data and added unit tests to validate pipeline output
  - Leveraged pipeline to evaluate insurance network quality, reduced claim denial rates by 7% through outlier detection, and identified network gaps, saving \$20K in referral costs

### Publications

- 2025 **Tyagi, V.**, Murray, L. M., Asan, A. S., Mandigo, C., Virk, M. S., Harel, N. Y., Carmel, J. B., McIntosh, J. R. (2025). *Hierarchical Bayesian estimation of motor-evoked potential recruitment curves yields accurate and robust estimates*. Brain Stimulation, accepted.

## Under Review

- 2025 Pascual-Leone, A.<sup>\*</sup>, **Tyagi, V.<sup>\*</sup>**, Asan, A.S.<sup>\*</sup>, Rocha-Flores, P.E., Rodriguez-Lopez, O., Voit, W.E., McIntosh, J.R.<sup>†</sup>, Carmel, J.B.<sup>†</sup> (2025). *Electrode position, size, and orientation determine efficacy of cervical epidural stimulation to recruit forelimb muscles in rats*. bioRxiv.

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## Software

Maintainer hbMEP ([hbmeep.github.io/hbmeep/](https://hbmeep.github.io/hbmeep/))

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## Teaching

### Teaching Assistant, Columbia University

- Fall 2022 Applied Deep Learning (COMS W4995)  
Spring 2022 Applied Machine Learning (COMS W4995)  
Spring 2022 Analysis and Optimization (MATH V2500)  
Fall 2021 Reinforcement Learning (ELEN E6885)  
Fall 2021 Calculus I (MATH UN1101)

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## Conferences

- 2024 **Tyagi, V.**, Murray, L. M., Asan, A. S., Mandigo, C., Virk, M. S., Harel, N. Y., Carmel, J. B., McIntosh, J. R. (2024). *Hierarchical Bayesian estimation of motor-evoked potential recruitment curves yields accurate and robust estimates*. Society for Neuroscience (SfN) Nanosymposium on Analytical Computational Tools, October 2024, Chicago, Illinois.

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## Technical Skills

- Programming Python, C++, R, SQL  
Bayesian Pyro, NumPyro, Stan  
ML scikit-learn, PyTorch, Hugging Face, XGBoost, OpenAI  
Tools Git, Docker, Bash, Linux, SSH  
Data dbt, PostgreSQL, BigQuery, Redshift, MySQL