

Kasthuri Kannan, PhD

Professor of Data Science, The US Army War College (USAWC)

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PROFILE

A seasoned data scientist with nearly two decades of experience driving impactful insights through advanced data analysis and modeling. Proven ability to lead complex, large-scale projects, demonstrated by quality publications and successful biomarker discoveries. Expertise in integrating data, spatial modeling, and leveraging graph databases (RDFs and LPGs) and Graph Neural Networks for network-based directed insights. Passionate about applying data science to solve critical problems and translating findings into actionable recommendations.

PROFESSIONAL EXPERIENCE

The US Army War College

07/2025 – Present | Carlisle, PA

Professor of Data Science

- Responsibilities include assisting faculty in integrating data science into curricula, developing faculty skills through targeted training, and enhancing student data literacy to support senior-level decision-making, while serving as an expert in data analytics, AI, and business intelligence.

MD Anderson Cancer Center

02/2020 – 07/2025 | Houston, TX

Associate Professor

- Graph database development (Neo4j) for multi-omics data integration & identifying critical biomarkers.
- Established spatial modeling in pathology - lead to several publications and deeper understanding of the spatial architecture of tumor tissues. Spearheaded spatial transcriptomics efforts in glioblastoma.

New York University

11/2013 – 08/2019 | New York, NY

Assistant Professor

- Implemented bioinformatics pipelines, streamlining data processing and analysis workflows, cutting down the time from data collection to actionable insights. Made significant cancer genomics discoveries.
- Directed data science courses, cultivating a talent pool equipped with cutting-edge skills in data science and quantitative biology - enhancing NYU's capabilities in data-driven decision-making and innovation.

Memorial Sloan-Kettering Cancer Center

04/2011 – 10/2013 | New York, NY

Research Fellow/Associate

- Established mutation pipeline for Brain, Head & Neck cancers resulting in improved understanding of cancer genetics and tumor heterogeneity. Provided directed insights in various cancer studies.
- Discovered ATRX mutations in lower grade gliomas, establishing clinical diagnosis of astrocytoma and contributing to a better understanding of glioma biology. Resulted in subsequent cutting-edge findings.

Pennsylvania State University

10/2010 – 03/2011 | State College, PA

Research Associate

- Offered bioinformatics consultation to researchers, resulting in the appropriate use of computational tools and statistics to inform actionable insights and managed NGS sequencing tasks.

Stowers Institute for Medical Research

01/2008 – 09/2010 | Kansas City, MO

Research Specialist

- Developed image processing methods for worm/fly tracking leading to publications (*Cell*, *PLoS Genetics*).
- Implemented an automated workflow to process cell images, reducing image acquisition times five-fold.

- Delivered data-driven insights for aircraft movement operations - improved the efficiency and effectiveness of land based air traffic control management at the Tinker Air Force Base, OK.
- Proposed cost and time-saving measures for managing Air Force logistics and identified opportunities to optimize logistics operations. This resulted in significant cost savings and improved resource utilization.

DATA SCIENCE PROJECTS (CANCER RESEARCH)

Geospatial modeling — Spatial point processes are robust statistical tools for analyzing point patterns. By representing cells as points and annotating their measurements (e.g., single-cell gene expression), we can effectively model cell-cell interactions. We leverage the R package *spatstat* to model these interactions to gain insights into cancer from immuno-oncology standpoint.

Biomarker discovery using graph database — Graph databases efficiently represent complex biological networks, facilitating biomarker identification. They enable powerful queries and community detection algorithms, making it easier to explore relationships between multiple genes. Neo4j, a property graph database, along with its Graph Data Science Library, is used to derive insights and propose actionable biological targets.

Biomarker validation using Graph Neural Networks (GNNs) — Insilico biomarker validation is vital for identifying actionable targets for experiments and prognosis. Using GNNs we validate biomarkers from graph databases by leveraging biological network structures like gene-gene interactions. GNNs aggregate neighbor information to learn meaningful representations, capturing local and global patterns for improved gene-disease relationship predictions.

DATA SCIENCE EDUCATION

Developed and taught Programming for Data Analysis, Machine Learning & AI, and Methods in Quantitative Biology courses. Please refer <https://kannan-kasthuri.github.io/#about> for details.

SKILLS

Leadership ● ● ● ● ●
Managing data science and bioinformatics projects

Software (Representative) ● ● ● ● ●
Python, R, Java, Cypher, SQL, Bioinformatics tools, Unix/HPC/Bash, Neo4j, MySQL, PostgreSQL, HTML, Javascript, Pytorch, Tensorflow, LangChain

Data Science/Machine Learning/AI ● ● ● ● ●
Math, CS, Statistics, Programming, GenAI, LLMs, Embeddings, RAG/GraphRAG, Ethical hacking

Bioinformatics & Image Processing ● ● ● ● ●
Pipeline development and data engineering
Geospatial analysis

EDUCATION

Doctor of Philosophy (PhD), Computer Science 2002 – 2008 | College Station, Texas
Texas A&M University

Master of Science (MS), Mathematics 2000 – 2002 | College Station, Texas
Texas A&M University

Master of Science (MSc), Mathematics 1998 – 2000 | Chennai, India
Indian Institute of Technology, Madras

Bachelor of Science (BSc), Mathematics 1995 – 1998 | Chennai, India
University of Madras

INVITED TALKS (REPRESENTATIVE)

US Army War College (2024), Mayo Clinic (2023), National University of Singapore (2022), Texas A&M University (2021), Courant Institute of Mathematical Sciences (2019), Institute of Mathematical Sciences, w/ honorarium (2018)

PUBLICATIONS

Authored/co-authored 33 peer reviewed articles, that includes very high-impact journals.
Please refer <https://kannan-kasthuri.github.io/publications/publications.html> 