SANDEEP KUMAR SINGH, PHD

As a genetic epidemiologist and data scientist, I study genetic variants underlying complex diseases, focusing on psychiatric genomics, cancer genetics, and immune disorders. My expertise in GWAS, statistical genetics, and bioinformatics helps uncover gene-environment interactions and modifiers like age, sex, and ancestry. By integrating machine learning and functional annotation, I aim to advance precision medicine and translate genetic insights into clinical applications.

WORK EXPERIENCE

Present | 2024 (Sep)

Freelancer

Lucknow — Lucknow, UP, India

- Training working professionals in data sciene and bioinformatics field
- Creating pipe lines to perform post-GWAS approaches

2024 (July) | 2023 (Aug)

Postdoctoral Fellow

Aarhus University — Aarhus, Denmark

- Conducted large-scale cross-disorder GWAS using iPSYCH samples to investigate shared genetic architecture between ASD and depression.
- Developed and optimized bioinformatics pipelines for GWAS, functional annotation, heritability estimation, genetic correlation and polygenic risk score analyses
- Mentored medical students in medical genetics through study cafe sessions.

2023 (July) | 2021 (Aug)

Associate Product Manager (Faculty)

OdinSchool — Hyderabad, TL, India

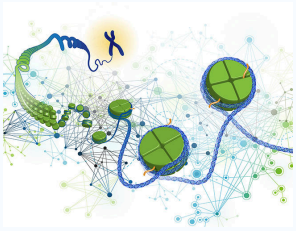
- Trained professionals in data science, machine learning, and bioinformatics, teaching Python, R, statistics, EDA, Plotly DASH, Git, and GitHub.
- Developed curriculum, projects, and assessments, integrating real-world datasets.
- Conducted live coding sessions and hands-on workshops, mentoring students in statistical and computational techniques.

2021 (July) | 2018 (June)

Research Scientist

GenTox Research and Development — Lucknow, UP, India

- Applied computational approaches to assess the functional relevance of disease-associated genetic markers in cervical cancer and rheumatoid arthritis.
- Supervised medical research theses, focusing on statistical analysis in clinical studies.
- Taught Bioinformatics, Immunology, Genetics, Statistics, and R, integrating research-driven insights into education.



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CONTACT

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LANGUAGE SKILLS

- R
- RMarkdown
- R Shiny
- Python
- UNIX
- Git
- Plotly DASH
- AWK

2018 (April) | 2017 (May)

Postdoctoral Researcher

The Ohio State University — Columbus, OH, USA

- Conducted a survival GWAS on leukemia patients post blood and marrow transplantation, identifying genetic variants influencing treatment outcomes.
- Led multiple projects, including MHC region GWAS, analysis of soluble ST2 levels in acute graft-versus-host disease.
- Established a protocol for X chromosome to conduct survival GWAS

2016 (Dec) | 2015 (May)

Postdoctoral Associate

Florida International University — Miami, FL, USA

- Conducted functional genomics analysis of HLA region polymorphisms associated with disease susceptibility as a volunteer on OPT.
- Performed both wet and dry lab research, including cell culture, RNA extraction, and gene expression analysis.
- Functionally annotated ~283,000 polymorphisms in the HLA region using R, ANNOVAR, and HaploReg.

2014 (July) | 2010 (Aug)

Graduate Assistant

Florida International University — Miami, FL, USA

- Led a PhD research project investigating gender- and age-specific risk factors for childhood acute lymphoblastic leukemia (ALL) using a case-only study design.
- Conducted genetic association studies on lung and breast cancer, focusing on the HLA region through a candidate gene approach.

EDUCATION

2015 | 2010

PhD, Public Health

Florida International University — Miami, FL, USA

- Dissertation: A Case-only Genome-wide Association Study of Gender- and Age-Specific Risk Markers for Childhood Leukemia (View Thesis)

2009 | 2007

MPH,

Western Kentucky University — Bowling Green, KY, USA

2005 | 2003

MSc, Biotechnology

Sam Higginbottom University of Agriculture, Technology and Science — Allahabad, UP, India

2003 | 2000

BSc, Biology

Lucknow Christian College, Affiliated by University of Lucknow — Lucknow, UP, India

Genomic Data Analysis:
GWAS, RNA-Seq, ChIP-seq

Tools and Software:
PLINK, RICOPILI, LDSC, GCTA, ASSET, LDAK, MiXer, MAGMA, FUMA, bcftools, samtools, bedtools, GATK, VEP, ANNOVAR, IGV, Enrichr, Github, etc.

Bioinformatics/Biostatistics:
Hypothesis Testing, Correlation, Linear and Logistic Regression, Survival Analysis, Cluster Analysis, Multivariate Analysis, Linear Mixed Models, Exploratory Data Analysis, Machine Learning, Deep Learning, GenAI (Basics), Epidemiology

PUBLICATIONS

2022 **Singh SK**. The analysis of a subset of HLA region associations in type 1 diabetes and multiple sclerosis suggests the involvement mechanisms other than antigen presentation in the pathogenesis
Informatics in Medicine Unlocked (LINK)

2021 Dixit A, Singh AV, Singh CV, Yadav R, **Singh SK**. Knowledge and Attitude towards COVID-19 among Healthcare Workers of A Tertiary Care Hospital in India
International Journal of Pharmaceuticals Sciences Review and Research (LINK)

2021 Singh CV, Gautam AK, Dixit A, Singh AV, **Singh SK**. A randomized prospective study to compare the efficacy and safety of budesonide plus formoterol and tiotropium plus formoterol in patients having mild to moderate chronic obstructive pulmonary disease
International Journal of Basic & Clinical Pharmacology (LINK)

2019 **Singh SK** and Singh S. Breast Cancer: Current Knowledge and Future Perspective (Short Communication)
Acta Scientific Womens Health (LINK)

2017 **Singh SK** and Dorak MT. Cancer Immunoprevention and Public Health
Front Public Health (LINK)

2016 **Singh SK**, Lupo PJ, Scheurer ME, et.al. A childhood acute lymphoblastic leukemia genome-wide association study identifies novel sex-specific risk variants
Medicine (Baltimore) (LINK)

2014 **Singh SK**. Re: Association of polymorphism in cytochrome P450 2C9 with susceptibility to head and neck cancer and treatment outcome; Pragmatic use of Hardy-Weinberg equilibrium and statistical interaction analysis
Applied & Translational Genomics (LINK)

2012 Kennedy AE, **Singh SK**, Dorak MT. Re: Genome-wide association study of classical Hodgkin lymphoma and Epstein - Barr virus status-defined subgroups (Scientific correspondence)
Journal of National Cancer Institue (LINK)

Singh SK, Singh Schidanand, Singh Atul. Post GWAS approaches: Making sense of statistical associations.
Working paper

Github Notes/projects

Genomics

GWAS protocol

Statistics

Mendelian Randomization

T1D-MS project

Singh SK. Unraveling the Role of Regulatory Elements in Genomic Architecture and Disease Susceptibility
Working paper

Singh SK. Role of CYP2C19 Genetic Variation in Clopidogrel Response Among Indian Patients with Acute Coronary Syndrome (ACS): A Comprehensive Review.
Working paper

GRANTS AND AWARDS

2021 — **Employee of the Month award for October 2021**
OdinSchool — Hyderabad, TL, India

2019 — **Personal bursary from the European Federation of Immunogenetics (Euro 800)**

2019 — **Awarded first prize for Poster Presentation in a genomics research**
Neemrana, Rajasthan, India

2015 | 2014 — **Dissertation Year Fellowship from University Graduate School Florida International University ($8,300/term)**
Miami, FL, USA

2013 — **Summer research award from MBRS RISE Biomedical Research Initiative for proposed grant on X chromosome polymorphisms in acute lymphoblastic leukemia risk and male disadvantage ($3000)**
Miami, FL, USA

2012 — **Summer research award from MBRS RISE Biomedical Research Initiative for proposed grant on DDX3X gene polymorphisms and Genetic susceptibility to disadvantage childhood leukemia ($3000)**
Miami, FL, USA

TEACHING EXPERIENCE

Present | Aug, 2024 — **Freelancer**
Lucknow — Lucknow, UP, India
- Training working professionals in data sciene field
- Teaching Statistics, Python, R and Machine Learning

July, 2024 | Aug, 2023 — **Postdoctoral Fellow**
Aarhus University — Aarhus, Denmark
- Part of study cafe group guided students to complete their assignments.
- Teaching genetic disorders and their inheritance pattern.

I am passionate about education and believe that no topic is too complex when taught with empathy and innovative approaches. An effective teacher adapts to diverse learning styles, making even the most challenging concepts accessible and engaging.

July, 2023 | Aug, 2021

Associate Product Manager (Faculty)

OdinSchool — Hyderabad, TL, India

- Training working professionals in data sciene field
- Teaching Python, R, Statisitcs, EDA, SQL, Machine learning, Plotly DASH and Git and GitHub
- Preparing products such as assignments, blogs, projects.exams and interview questions

July, 2021 | May, 2018

Research Scientist

GenTox Research and Development — Lucknow, UP, India

- Guided several thesis specifically statistical analysis in medical research
- Supervised uundergraduate and graduate students in their projects
- Taught Bioinformatics, Genetics, Immunology, Molecular Biology, PCR

PRESENTATIONS

2019 — **Singh SK**, Dorak MT. Longevity associated HLA class II region variants map to the B-cell-specific Super-enhancer XL9 at the 33rd European Immunogenetic and Histocompatibility Conference. Lisbon, Portugal

2019 — **Singh SK**, Singh S, Kumar P. Functional annotation of Rheumatoid Arthritis associated loci identified by genome-wide association studies at the First BiOmics Conference. Neemrana, RJ, India

2018 — **Singh SK**, Dapprich J, Dorak MT, Functional annotation of the cluster of schizophrenia risk markers in the extended HLA class I region at the 32nd European Immunogenetic and Histocompatibility Conference. Venice, Italy

2018 — **Singh SK**, McCauley JL, Dorak MT. Expression QTLs with opposing effects on HLA-DR and -DQ genes are associated with autoimmune disorders: Evidence for mixed isotype heterodimer formation at the 32nd European Immunogenetic and Histocompatibility Conference. Venice, Italy

2018 — Ozbek U, **Singh SK**, Kennedy AE, et al. Exploration of very long-range linkage disequilibrium within the extended HLA region at the 32nd European Immunogenetic and Histocompatibility Conference. Venice, Italy

2018 Sucheston-Campbell LE, **Singh SK**, Karaesman E, et al. Donor SNPs in IL1RL1, Strongly Correlated with Serum sST2 Concentration, Significantly Associate with Risk of Acute GvHD: Implications for Donor Selection at the BMT Tandem meeting.

Salt Lake City, Utah, USA

2018 Rizvi A, Karaesman E, Preus L, McCarthy PL, Pasquini M, Singh S, **Singh SK**, et al. Novel genetic associations with day +100 transplant related mortality after HLA-matched unrelated donor blood and marrow transplantation (DISCOVeRY-BMT) at the BMT Tandem meeting.

Salt Lake City, Utah, USA

2018 Karaesman E, Rizvi A, Preus L, McCarthy PL, Pasquini M, Singh S, **Singh SK**, et al. Genome-Wide significant donor genetic associations with death due to disease in AML and MDS patients in the first 1 year after BMT are not modified by Conditioning intensity or TBI at the BMT Tandem meeting.

Salt Lake City, Utah, USA

2017 Singh S, **Singh SK**, Rizvi A, Karaesmen E, et al. Genetic variation in the MHC region increases risk of death to graft versus host disease in leukemia patients treated with an HLA-matched unrelated donor transplant at the 2nd Annual Divison of Pharmaceutics Scientific Retreat 2017.

Columbus, OH, USA

2017 **Singh SK**, Kennedy AE, Dorak MT. Genetic Evidence for Cancer Immune Surveillance at the 31st European Immunogenetics and Histocompatibility Conference.

Heidelberg/Mannheim, Germany

2017 Ozbek U, Kennedy AE, **Singh SK**, et al. SNPs correlating with Functional HLA region Epitopes and Supertypes Offer Insight into GWAS Associations at the 31st European Immunogenetics and Histocompatibility Conference.

Heidelberg/Mannheim, Germany

2016 **Singh SK**, Lupo PJ, Scheurer ME, et al. Making Sense of Genetic Associations with Childhood Leukaemia Risk at the Childhood Cancer Conference 2016.

London, UK

2016 **Singh SK**, Chentoufi AA, McCauley JL, Dorak MT. Insights into type 1 diabetes and multiple sclerosis pathogenesis from common genetic associations at the 30th European Immunogenetics and Histocompatibility Conference.

Kos Island, Greece

2016 **Singh SK**, Huang Y, Caobi A, Barbieri MA, Dorak MT. Functional annotations of common disease markers in immune regulatory genes at the 30th European Immunogenetics and Histocompatibility Conference.

Kos Island, Greece

2015 Kennedy AE, Mustafi S, **Singh SK**, et al. A catalog of HLA region SNPs with functional annotations, disease associations and correlations with HLA types at the 41st Annual Meeting of the American Society for Histocompatibility and Immunogenetics Society.

Savannah, GA, USA

2015 **Singh SK**, Lupo PJ, Scheurer ME, et al. Genome-wide association study of childhood acute lymphoblastic leukaemia risk with gender-specificity at the European Society for Human Genetics.

Glasgow, Scotland, United Kingdom

2015 Stasik I, Kennedy AE, **Singh SK**, Dorak MT. HLA region Contains Multiple Lung Cancer Susceptibility Genes at the European Society for Human Genetics.

Glasgow, Scotland, United Kingdom

2015 **Singh SK**, Lupo PJ, Scheurer ME, et al. HLA region contributes to the gender differential in childhood leukaemia risk at the 29th European Immunogenetics and Histocompatibility Conference.

Geneva, Switzerland

2015 Kekik C, **Singh SK**, Yavuz C, Oguz FS, Dorak MT. HLA and childhood acute myeloid leukemia at the 29th European Immunogenetics and Histocompatibility Conference.

Geneva, Switzerland

2014 **Singh SK** and Dorak MT. Alternative Explanations for HLA and Disease Associations at the 28th European Immunogenetics and Histocompatibility Conference.

Stockholm, Sweden

2014 **Singh SK**, Ben Taleb Z, Kennedy AE, Dorak MT. X-Linked Immune Regulatory Genes Polymorphisms, Childhood Acute Lymphoblastic Leukemia Risk and Male Disadvantage at the 16th Annual Biomedical & Comparative Immunology Symposium.

Miami, FL, USA

2014 Oguz FS, Kekik C, **Singh SK**, et al. HLA and age-of-onset in childhood acute lymphoblastic leukaemia at the 28th European Immunogenetics and Histocompatibility Conference.

Stockholm, Sweden

2013 Kennedy AE, **Singh SK**, Villalba K, Dorak MT. Analysis of HLA region polymorphisms associated with cancer at the 39th Annual Meeting of the American Society for Histocompatibility and Immunogenetics.

Chicago, IL, USA

2013 **Singh SK**, Ben Taleb Z, Kennedy AE, et al. Further exploration of HLA region associations with lung cancer risk at the 39th Annual Meeting of the American Society for Histocompatibility and Immunogenetics.

Chicago, IL, USA

2013 **Singh SK**, Kennedy AE, Dorak MT. DDX3X gene polymorphisms and childhood acute lymphoblastic leukemia risk at the 15th Annual Biomedical & Comparative Immunology Symposium.

Miami, FL, USA

2013 Villalba K, Kennedy AE, **Singh SK**, Dorak MT. Investigation of molecular mechanism of diverse disease associations with HLA-DRB4 lineage at the 15th Annual Biomedical & Comparative Immunology Symposium.

Miami, FL, USA

2012 Guyton D, Caobi A, **Singh SK**, Peyser M, Dorak MT. HLA region and lung cancer susceptibility: confirmation of BAT3/BAG6 association and functional replication at the 38th Annual Meeting of the American Society for Histocompatibility and Immunogenetics.

San Juan, PR

2012 **Singh SK**, Saxena A, Das S, Dorak MT. NOTCH4 polymorphisms, functional assessment and associations with breast cancer susceptibility at the 38th Annual Meeting of the American Society for Histocompatibility and Immunogenetics.

San Juan, PR

2012 Kennedy AE, **Singh SK**, Scheurer ME, Okcu MF, Dorak MT. Association of HLA-linked lymphoma risk markers with childhood acute lymphoblastic leukemia at the 38th Annual Meeting of the American Society for Histocompatibility and Immunogenetics.

San Juan, PR

2012 Peyser M, **Singh SK**, Dorak MT. Examination of HLA-B, -DRA and -DQA1 expression levels in B-lymphoblastoid cell lines homozygous for conserved extended haplotypes (CEH) at the 38th Annual Meeting of the American Society for Histocompatibility and Immunogenetics.

San Juan, PR

2012 Luaces K, **Singh SK**, Peyser M, Dorak MT. MICA and MICB: analysis of disease-associated alleles and gene expression levels at the 38th Annual Meeting of the American Society for Histocompatibility and Immunogenetics.

San Juan, PR

2012 **Singh SK**, Saxena A, Das S, Dorak MT. A Critical Assessment of NOTCH4 Polymorphisms at the 14th Annual Biomedical & Comparative Immunology Symposium.

Miami, FL, USA

2012 Caobi A, **Singh SK**, Dorak MT. ABO Blood Group Gene Association with Breast Cancer Risk at the 14th Annual Biomedical & Comparative Immunology Symposium.

Miami, FL, USA

2011 Kennedy AE, **Singh SK**, Samikkannu M, Dorak MT. Correlations of complex disease-associated HLA region SNPs with HLA alleles at the 37th Annual Meeting of the American Society for Histocompatibility and Immunogenetics.

New Orleans, LA, USA

2011 Alvarez K, **Singh SK**, Kennedy AE, Dorak MT. Lymphoid malignancies and HLA complex associations at the 2nd Annual Florida International University & TERRA Environmental Research Institute Summer Research Internship Biomedical Mini-symposium.

Miami, FL, USA

2011 Martinez S, **Singh SK**, Kennedy AE, Dorak MT. Nature of the recently identified HLA region associations with lung cancer at the 2nd Annual Florida International University & TERRA Environmental Research Institute Summer Research Internship Biomedical Mini-symposium.

Miami, FL, USA

2011 Torres M, **Singh SK**, Kennedy AE, Dorak MTDetection of C4A and C4B deletion by quantitative real-time PCR at the Florida International University & University of Puerto Rico at Arecibo Summer Research Program, Biomedical Mini-symposium.

Miami, FL, USA

DATA SCIENCE WRITING

2020 **Implementing an Artificial Neural Network: A Step-by-Step Guide (LINK)**

2020 **Beautifulsoup: A step-by-step guide to Data Scraping with Python (LINK)**

2020 **Top 20 questions asked during an interview for a data analyst position (LINK)**

2020 **Top 10 libraries of Python for Data Science (LINK)**

WEBINARS PRESENTED

2020 **Supervised Machine Learning-Classification Approaches**

Lucknow, UP, India

2020 **Supervised Machine Learning**
Lucknow, UP, India

2020 **Can people with non-IT backgrounds build a career in Data Science?**
Lucknow, UP, India

WORKSHOP CONDUCTED

2019 **Python for Biologists**
Lucknow, UP, India

2019 **R for Biotechnology**
Lucknow, UP, India

WORKSHOP ATTENDED

2022 **10 days Faculty Development Program on NGS (online)**
Lucknow, UP, India

2017 **Genomic data science by Bioconductor**
Columbus, OH, USA

2014 **NCBI Human Genome Work shop**
Miami, FL, USA