Susheel Varma *BEng MSc PhD MBA MACM FBCS*

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susheel.varma@gmail.com • +44 (0) 7545 399129 • +1 (206) 222 3545 • in:susheelvarma • orcid:0000-0003-1687-2754
[redacted] Cambridge [redacted] United Kingdom

Professional Experience

Sage Bionetworks — (Remote) Seattle, United States of America

Chief Data Officer - Sage Bionetworks *March '24 –*

- **Leadership and Team Management:** Manages a diverse team of director-level informatics experts, bioinformatics engineers, software developers, and technical project managers. Developed multi-petabyte scale robust infrastructure for the storage, curation and accessibility of biomedical data.
- **Strategy Execution:** Oversees a significant portfolio of scientific & infrastructure development projects funded by NIH institutes (NCI, NIA, NIMH, NHLBI, and NCATS), foundations (BMGF, CTF, RWJF, Helmsley, GFF) and research programs (Rare-X, DiME, AACR, Wellcome Leap, N-TAP), aimed at enhancing data sharing and collaboration across research communities dedicated to diseases like Cancer, Alzheimer's, Parkinson's, and Down syndrome.
- **Operational Excellence:** Spearheaded the creation of a dynamic model to fulfil the data management demands of Sage's extensive scientific portfolio. Developed standard operating procedures and common tools to streamline data management and improve project dissemination. Implemented solutions for essential infrastructure components to support large-scale, cross-institutional biomedical datasets encompassing various data types, including molecular, imaging, sensor, and medical records.
- **Strategic Partnerships:** Developed strategies for integration with external tools and infrastructure, partnered with the research ethics and governance team to integrate governance and technology, and established strategic partnerships to bolster our data infrastructure capabilities. Maintained high external visibility for Sage through meetings, conferences, committees, and publications and successfully applied for funding to support our data infrastructure initiatives.

Information Commissioner's Office — London, United Kingdom

Head of AI & Data Science - Technology, Innovation & Enterprise Directorate, ICO *May '22 – Feb '24*

- **Strategic Leadership:** Orchestrated the inception and growth of the AI & Data Science Technology Policy team, transforming it into a central hub for innovative regulatory policy development and research. Pioneered strategies that deftly balanced technological advancement with data privacy and ethical AI use, setting new standards in regulatory frameworks.
- **Policy Innovation & Research:** Spearheaded groundbreaking policy initiatives to address emerging challenges in AI and data science. Conducted deep technical research to develop robust policies, ensuring they are agile enough to adapt to fast-evolving tech & AI landscapes while safeguarding individual rights and societal values.
- **Cross-Sector Collaboration:** Engaged proactively with government bodies to shape legislation, fostering a collaborative approach across regulatory agencies and international Data Protection Authorities. Played a pivotal role in developing shared positions and creating a unified front on critical data privacy and AI cross-regulatory issues.
- **Privacy by Design Advocacy:** Championed the 'Privacy by Design' concept within the industry, providing practical guidance, resources, and customer-centric support.
- **Intervention & Assurance:** Offered targeted support for assurance and high-priority investigations, strategically intervening in priority areas of privacy risk. This role involved navigating complex data landscapes, identifying risk hotspots, and implementing effective mitigation strategies.
- **Capability Building & Roadmap Development:** Established a sustainable roadmap for the AI & Data Science team, assembling a robust foundation of skilled professionals. Focused on building technical and policy expertise, ensuring the team remains well-equipped to tackle current and future challenges in AI and data privacy.
- **Trusted Advisor on High-Priority Projects:** Recognized as a go-to expert for high-stakes healthcare data privacy projects, including TREs (Trusted Research Environments), OFH (Our Future Health), and NHS England's FDP (Federated Data Platform).

Health Data Research UK, DARE UK, Visiting Scholar EMBL-EBI — London, United Kingdom

Chief Technology Officer & Dir. of Engg - HDR UK & Technical Lead - DARE UK *Jan '19 – Jul '22*

- **Visionary Leadership in Health Data Technology:** Pioneered and executed a comprehensive data and technology strategy, transforming health data research across the UK. Championed the development and deployment of cutting-edge technologies to improve healthcare research.
- **Federated Data Ecosystem Architect:** Played a pivotal role in conceptualizing and implementing a national Trusted Research Environment network. This experience showcased my ability to work with

national and international stakeholders to ensure seamless interoperability and secure data sharing across the health sector.

• **Strategic Development of Digital Transformation:** Led the multi-vendor digital transformation through the Health Data Research Innovation Gateway. This initiative minimised barriers and fostered innovation, particularly at the data and application layers.

• **Data Governance, Cybersecurity and Data Privacy Focal Point:** Ensured the highest standards of cybersecurity and data privacy and governance in all data & technological developments. Championed the use Trusted Research Environments for responsible research, Data Use Registers for transparency, and Streamlined Data Access Request solutions to improve governance

• **Cross-Organizational Collaboration and Standards Setting:** Collaborated with key stakeholders in health and social care, technology vendors, and standards bodies. Ensured the implementation of open standards for interoperability, particularly in facilitating the free flow of data between various platforms and systems.

• **Leadership in Complex Technology Solutions:** Demonstrated expertise in managing complex technology solutions and multi-stakeholder relationships, crucial for the position. Oversaw the strategic technology and clinical informatics standards initiatives, ensuring alignment with broader organizational goals and national healthcare objectives.

• **Building and Leading High-Performance Teams:** Cultivated a team of over 200 in-house and external specialists, driving a customer-centric service delivery model. This experience is vital for the role, which requires proven leadership skills and the ability to motivate and lead multidisciplinary teams.

• **Operational Excellence and Regulatory Compliance:** Consistently achieved high performance against SLAs and KPIs, maintaining compliance with regulatory standards. This operational discipline is essential for the role, which demands high-quality strategic thinking and systemic management.

EMBL - European Bioinformatics Institute — Cambridge, United Kingdom

Global Strategic Portfolio Manager - TSI, ELIXIR, EOSC-Life, EOSC-Hub & GA4GH *Dec '17 – Jan '20*

• Championed strategic planning and management of key technology projects - EMBL-EBI TSC services (ELIXIR Cloud & AAI Analytics Platform, EBI Cloud Portal, AuthN, AuthZ & Profiles & Reference Data Set Distribution Service as part of ELIXIR, EOSC-Hub, EOSC-Life GA4GH & HDR-UK, focusing on developing API-based architectures and federated cloud resources, integral to advancing healthcare data sharing and interoperability.

• Led the €26M EOSC-Life and €33M EOSC-Hub projects, pioneering international efforts in creating scalable, secure cloud-based platforms for healthcare and lifescience research data.

• Forged strategic partnerships and co-authored the Hybrid Cloud Strategy report, laying the groundwork for innovative collaborations and advancing global health data standards.

• Represented EMBL-EBI at international forums, advocating for open science and technology standards.

Technical Coordinator - Human Genomics and Translational Data - ELIXIR *Jun '17 – Nov '17*

• Led the strategic vision and technical roadmap for Human Data Communities in ELIXIR, focusing on advancing human genomics through computational systems biology.

• Orchestrated ELIXIR's significant projects, including €19M+ ELIXIR EXCELERATE initiatives, aligning them with technical platforms to enhance genomic data interoperability.

• Advocated for FAIR principles in genomics at international forums, contributing to the global discourse on open, collaborative data-sharing in scientific research.

• Played a key role in integrating scientific inquiry with data-driven solutions, evidenced by successful grant proposals and pioneering applications of FAIR principles in pharmaceutical datasets.

University of Sheffield — Sheffield, United Kingdom

CTO - Translational Technology Officer - CISTIB, Scientific Workflows Coordinator - VPH-Share, Insigneo Institute *Jan '10 – Mar '17*

• As CTO, I spearheaded the technological vision and strategy for CISTIB, leading advancements in biomedical image processing and clinical research software. My leadership was instrumental in the architectural design and execution of a €18M hybrid cloud and HPC-enabled VPH-DARE@IT platform, enhancing research-as-a-service capabilities for over 70 multi-modal clinical datasets.

• Managed and scaled comprehensive technology projects, including the GIMIAS biomedical image processing workbench. This role involved not only technical expertise but also strategic resource planning and budget management, ensuring project alignment with long-term institutional goals.

• In my role as Scientific Workflows Coordinator, I successfully coordinated over 25 research projects, focusing on integrating and optimizing scientific workflows. This involved the development and operation of the €13.4M VPH-Share cloud platform, a testament to my ability to manage complex, distributed data storage and scientific workflow infrastructures.

• Played a pivotal role in fostering interdisciplinary collaboration, bringing together researchers, developers, and external stakeholders to create innovative solutions in computational biology and healthcare informatics.

Please refer to my Linked-in profile for a more complete list of work experiences along with recommendations.

Education

University of Milan-Bicocca — Milan, Italy

Executive MBA - Management of Research Infrastructures *2018 – 2020*

Management qualification to support successful leadership of Research Infrastructures which requires scientific, technical, political & managerial competencies, especially when working across national borders

University of Sheffield — Sheffield, United Kingdom

Doctor of Philosophy in Computational Systems Biology & Pure Mathematics *2005 – 2010*

Hybrid, Hierarchical Models of Cardiac Cells and Tissues. ORS & Departmental scholarship, WUN Travel grant. SET Poster at House of Commons. Co-developed FLAME and CHASTE Frameworks.

Master of Science (Engineering) in Advanced Software Engineering *2004 – 2005*

Distinction. Recipient of the **Fretzwell-Downing Award** for the Best Dissertation.

Pondicherry University — Pondicherry, India

Bachelor of Technology in Information Technology *2000 – 2004*

First class (86%) with Honors - Double Dissertation

Fellowships, Grants, Awards, Certifications, Board Memberships & Honours

Member of the UKRI Infrastructure Advisory Committee *2024 –*

Scientific and Industry Board Member - Genomic Data Infrastructure (1+NG) project *2024 –*

Scientific and Industry Board Member - MONARCH Initiative *2024 –*

Sponsor - Digital Regulation Cooperation Forum, BSI/ISO ART/1 Committee Member *2022 – 2024*

Fellow of the British Computer Society & Member of the Association of Computing Machinery *2021 –*

Technology Advisory Board Member - Our Future Health, NHS AI Lab Oversight Group Member *2021 –*

FitSM - Advanced Service Planning and Design & Advanced Service Operation and Control *2019 –*

Azure for Research Grant - $40,000, AWS in Education - £16,000, WANDisco - $60,000 *2013 - 2016*

Lifetime Fellow of Software Sustainability Institute & Member of the SocRSE *2015 –*

Worldwide Universities Network Travel Grant & SET for Britain Poster at House of Commons *2006*

Fretwell-Downing Award for Best MSc Dissertation, ORS & Departmental PhD Scholarship *2005*

Strategic, Programme Management and Technical Skills

Visionary technology strategist and accomplished program manager that excels in identifying and resolving complex problems, leveraging a rich background in technology strategy and consulting. Proficient in formulating and implementing pragmatic, impactful technology strategies is underpinned by a talent for innovative thinking and the ability to challenge conventional perspectives. Communication skills, both written and oral, are of the highest caliber in English, ensuring clarity and effectiveness in all forms of engagement. Demonstrable engineering leadership with a broad operational scope, complemented by well-honed interpersonal and leadership skills essential for steering diverse teams and projects across jurisdictions.

Technical expertise that spans across federated, distributed and cloud computing, with a deep understanding of software design, architecture, and implementation. Substantial experience in Agile, SCRUM, and Waterfall project management methodologies, crucial for managing cross-functional teams in dynamic environments. Career hallmark showcasing an ability to Build and lead high-performance engineering teams, supported by exceptional people skills and a track record of nurturing talent.

Extensive programming proficiency in Fortran, C, C++, Python, Go, and a working knowledge of Rust, Java (Scala), NodeJS, Ruby, along with expertise in web technologies like HTML+CSS, Javascript, REST, and SOAP. System administration and DevOps experience including proficiency in complex issue tracking systems (Confluence, JIRA, Trac), continuous integration/deployment (TravisCI, CircleCI, GitlabCI), and

configuration management tools (Chef, Puppet, Salt, Ansible). Well-versed in technologies like Docker, Terraform, AWS CloudFormation, service orchestration tools like etcd & Consul and have deep knowledge in clinical database management systems such as TranSMART, OpenClinica, and REDCap.

Strong, robust background in research and healthcare computing, encompassing work with Matlab, Mathematica, R, Apache Spark, and various bioinformatics pipelines. Significant experience with workflow management systems (Taverna, Galaxy, NiPype), high-performance and high-throughput computing technologies (CUDA, SGE, SLURM), AI Frameworks (Scikit-Learn, PyTorch, TensorFlow, Keras), and container orchestration (Kubernetes, Mesos). Certified cloud computing expert with hands-on experience with cloud platforms like AWS, Google Cloud, and Microsoft Azure, along with knowledge of distributed filesystems like iRods, ZFS and Hadoop.

Selected Publications, Book Chapters, Conferences, Invited Talks & Research Reports

- M Akhtar, [...], S Varma, [...] *Croissant: A Metadata Format for ML-Ready Datasets*, NeurIPS, 2024
- S Ignatidou, [...], S Varma, *How do we ensure fairness in AI?*, Information Commisioner's Office, May 2023
- A Pearson, [...], S Varma, *AI & Data Protection Risk Toolkit*, Information Commisioner's Office, May 2022
- S Varma, T Hubbard, D Seymour, *Building Trusted Research Environments - Principles and Best Practices; Towards TRE ecosystems* , Dec 2021
- H L Rhem, [...], S Varma, E Birney, *GA4GH: International policies and standards for data sharing across genomic research and healthcare*, Cell Genomics, 2021
- J Lawson, [...], S Varma, M Courtot, *The Data Use Ontology to streamline responsible access to human biomedical datasets*, Cell Genomics, 2021
- Keynote Speaker at joint European Commission & WHO session on FAIR Data for future pandemic preparedness, 2021 & International Data Week 2022
- HDR UK, COVID-19 HDR UK Research and Analysis reports to SAGE 2020-2021
- N Karrar, [...], S Varma, *Analysis of Data Use Registers published by health data custodians in the UK*, (Preprint)
- A Wood, [...], CVD-COVID-UK Consortium, *Linked electronic health records for research on a nationwide cohort of more than 54 million people in England: data resource*, BMJ 2021
- G Saunders, [...], S Varma, S Scollen, N Blomberg, *Leveraging European infrastructures to access one million human genomes by 2022*, Nature Reviews Genetics
- M Fiume, [...], S Varma, S Scollen, *Federated discovery and sharing of genomic data using Beacons*, Nature BioTech, 2019
- B Gruening, [...], S Varma, D Blankenberg, R C Jimenez, BioContainers Community, Y Perez-Riverol *Recommendations for the packaging and containerizing of bioinformatics software*, F1000Research, 2018
- M Cabili, [...] S Varma, Pandya R, *Library Cards: Simplifying research access to genomics and health data*, Scientific Data, 2018
- P Morris, [...], S Varma, P Lawford, R Hose, J Gunn, *Fast Virtual Fractional Flow Reserve Based Upon Steady-State Computational Fluid Dynamics (CFD) Analysis: Results from the VIRTU-fast study*, JACC: Cardiovascular Interventions, 2017
- M Kasztelnika, E Coto, M Bubaka, M Malawski, P Nowakowski, J Arenas, A Saglimbeni, D Testi, A Frangi (Acknowledgement) *Support for Taverna workflows in the VPH-Share cloud platform*, Computer Methods and Programs in Biomedicine, 2017
- L Guo, [...], S Varma, A Venneri, A Frangi, Y Ventikos, *Subject-specific multiporoelastic model for exploring the risk factors associated with the early stages of Alzheimer's Disease*, Interface Focus, Royal Society Special Issue, 2017
- M De Marco, [...], S Varma, A Frangi, A Venneri, *ApoE ε4 allele related alterations in hippocampal connectivity in early Alzheimer's disease support memory performance*, Curr. Alzheimer Research, 2017
- S Varma, VPH-DARE@IT Development Team, *The VPH-DARE@IT Platform for Translating Research to Clinical Decision Support of early and differential diagnosis of dementia*, VPH 2016
- D Warriner, A G Brown, S Varma, et al., *Closing the Loop: modelling of heart failure progression from health to end-stage using a meta-analysis of left ventricular pressure-volume loops*, PLOS-One, 2014.
- D Silva-Soto, S Varma, S Wood, R Hose *Workflows: Principles, Tools and Clinical Applications*, Book Chapter 8, Computational Biomedicine, Oxford University Press, 2014
- S Varma, [...], R Hose, *VPH-Share: Patient-Centred Multi-scale Cloud-Enabled Computational Workflows*, VPH-2014
- I M M van Leeuwen, [...], S Varma, [...], H M Byrne. *An integrative computational model for intestinal tissue renewal* Cell Prolif. 42:617-636, 2009.
- R H Clayton, [...], S Varma, [...], P Taggart, *Epicardial mapping of ventricular fibrillation in the human heart during ischaemia and reperfusion*. Computers in Cardiology 2008
- S Varma, M Holcombe *Extreme Programming: The Genesys Experience* eXtreme Programming 2005
- S Varma, M Holcombe, *Shared Code Repository: A Narrative* eXtreme Programming 2005

Open Source Software, International Standards & Policies Contributions

- 2023-2023: How do we ensure fairness in AI?
- 2021-2022: GA4GH Computational Cohort Representation
- 2020-2022: HDR UK Schemata
- 2020-2022: HDR UK Phenotype Library
- 2018-2020: GA4GH TRS, WES, TES & DRS Standards
- 2018-2020: ELIXIR TESK & WES-ELIXIR
- 2017-2020: GA4GH Beacon Network
- 2015-2017: VPH-DARE@IT Platform
- 2014-2015: VPH-HF Hypermodelling Framework
- 2006-2009: *CHASTE*
- 2022-2023: Guidance on AI & Data Protection
- 2020-2022: HDR Innovation Gateway, Github
- 2020-2022: HDR UK Datasets, Papers/Preprints
- 2020-2022: HDR UK Clinical Trials
- 2018-2020: EMBL-EBI ECP & AAP
- 2018-2020: EMBL-EBI RDSDS
- 2017-2020: Bioschemas Specification
- 2015-2017: GIMIAS Biomedical Workbench
- 2011-2017: *VPH-Share Cloud Platform*
- 2004-2010: *FLAME*