Susheel Varma *BEng MSc PhD MBA MACM FBCS*

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Professional Summary

As a visionary technology leader, I bring a rich tapestry of spearheading transformative digital strategies in healthcare, academia, and the public sector. Recognised for pioneering advancements in federated data ecosystems and API-based cloud architectures, my career is marked by significant contributions to healthcare and life science metadata standards. My approach blends strategic foresight with hands-on leadership, skillfully navigating complex technology landscapes and managing large-scale, international projects.

I am deeply passionate about leveraging technology to revolutionise healthcare. Combining a strong record in cross-sector collaboration and ethical technology development, my aim is to create impactful changes in patient care and research. I aspire to use my expertise to transform healthcare technology, ensuring it not only supports but profoundly enhances patient outcomes and the effectiveness of healthcare research.

Relevant Professional Experience

Information Commissioner's Office — Wilmslow, United Kingdom

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

- **Strategic Leadership:** Steered the inception and growth of the AI & Data Science Technology Policy team, transforming it into a pioneering force for innovative regulatory policy development and research. Pioneered strategies that skillfully balanced technological advancement with critical considerations in data privacy and ethical AI use, setting new benchmarks in regulatory frameworks.
- **Policy Innovation & Research:** Orchestrated groundbreaking policy initiatives to address emerging challenges in AI and data science. Conducted deep technical research to develop robust & dynamic policies, ensuring adaptability to rapidly technology & AI landscapes while safeguarding individual rights and societal values.
- **Cross-Sector Collaboration:** Proactively engaged with government bodies to shape critical legislation, fostering a collaborative approach across regulatory agencies and international Data Protection Authorities. Contributed significantly to developing shared positions and creating a unified front on critical data privacy and AI cross-regulatory issues.
- **Data Protection by Design & Default Advocacy:** Championed the 'Data Protection by Design and Default' concept within the industry, and providing additional practical guidance on AI, resources, and award-winning customer-focused quick-turn-around support.
- **Intervention & Assurance:** Actively involved and provided 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 identifying effective recourse strategies.
- **Capability Building & Roadmap Development:** Established a comphrehensive and 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:** Recognised 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:** Executive leadership of the Digital, Data, Analysis & Technology (DDAT) strategy and operational delivery of its objectives within the changing international health technology landscape. 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 such as Health Data Research Innovation Gateway and the National Cohort Discovery Service.
- **Federated Data Ecosystem Architect:** Played a pioneering role in conceptualising and fostering a national Trusted Research Environment network, during a pandemic. This experience directly influenced NHS England's vision to establish a federated data ecosystem, ensuring seamless interoperability and secure data sharing across the health and research sector.
- **Strategic Development of Digital Transformation:** Led the multi-vendor digital transformation

through the Health Data Research Innovation Gateway. I led the definition enterprise architecture to minimise barriers and foster innovation, particularly at the data and application layers. Ensured the highest standards of cybersecurity and data privacy are embedded by default in all technological developments.

• **Cross-Organisational Collaboration and Standards Setting:** Collaborated with key stakeholders in health and social care, technology vendors, and standards bodies. Ensuring the implementation of open standards for interoperability directly helped facilitate the free flow of data between various platforms and systems. This also increased trust, collaboration and sustainability of the platform.

• **Leadership in Complex Technology Solutions:** Demonstrated expertise in managing complex technology solutions and multi-stakeholder relationships. Oversaw the strategic technology and clinical informatics standards initiatives, ensuring alignment with broader organisational 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. I have proven leadership skills and the ability to motivate and lead multidisciplinary teams, both in and out of a pandemic.

• **Operational Excellence and Regulatory Compliance:** Consistently achieved high performance against SLAs and KPIs, maintaining compliance with regulatory standards. This operational discipline 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 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 optimising 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.

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

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

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 –*

Amazon Web Services Cloud Solution Architect - Associate *2017 – 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

- 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
- M Bubak, [...], S Varma, *Evaluation of Cloud Providers for VPH Applications* CCGRID 2013: 200-2013
- 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*