

Professional Experience

Health Data Research UK, Visiting Scholar EMBL-EBI

LONDON, UNITED KINGDOM

Director of Engineering - HDR UK & Technical Lead - DARE UK

Jan '19 (secondment) – Jan '20 –

- Core contributor to COVID-19 HDR UK Research and Analysis reports to SAGE
- Technology & engineering leadership of the Innovation Gateway with a team of 20+ engineers & wider HDR UK technology projects
- Strategic and technical lead for the National Cohort Discovery Service
- Technology leadership & coordination without authority of a federated network of international Trusted Research Environments for health data research
- Lead on the development of national and international metadata and computing services standards
- Thought leadership to align national health data custodians and trusted research environments around a streamlined health data access management framework
- Created and reinforced human pathways between internal & external technology/engineering teams and the national & international health data research ecosystem
- Deputise for the CTO to manage the day-to-day engineering tasks and tackling technology problems
- Provided proactive technology leadership to cross-functional projects across Uniting, Improving and Using remits of HDR UK
- Provided strategic and technology advisory to strategic partners - International COVID-19 Data Alliance, ELIXIR, EMBL-EBI, GA4GH
- Technical strategy leadership and implementation of Data and Connectivity National Core Study - SAFE People (Researcher Accreditation), SAFE Projects (Data Access Request integration), SAFE Data (Metadata on-boarding with linkage opportunities), SAFE Settings (Federated Access) and SAFE Outputs (Airlock - Ingress & Egress)
- Co-developed multiple national grants aligned with HDR UK priority areas of work
- Provided advisory and digital transformation support for multiple internal HDR UK IT systems
- Represented HDR UK at various national and international forums to champion open science
- Line and matrix management of the HDR UK data engineering team
- Continuous improvement and optimise policies and processes

EMBL - European Bioinformatics Institute

CAMBRIDGE, UNITED KINGDOM

Global Strategic Portfolio Manager - TSI, ELIXIR, EOSC-Life, EOSC-Hub & GA4GH

Dec '17 – Jan '20

- Strategic planning, product management and service delivery of 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).
- Strategic planning, project management and delivery of technical ELIXIR services (RDSDS, ELIXIR AAI, Cloud Costing & Access Models, EOSC Code of Conduct) as part of EOSC-Hub.
- Product/ management, technical and team management (2) and delivery of Reference Data Set Distribution Service service within ELIXIR and EOSC-Hub.
- Product lead, technical and internal/external team management (16) and delivery of ELIXIR Cloud & AAI Analytics Platform within ELIXIR, EOSC-Life, GA4GH & HDR UK.
- Project management and delivery of the EBI Cloud Portal and AuthN, AuthZ & Profiles service for numerous internal EMBL-EBI teams (5) and external projects (BioExcel & PhenoMeNal).
- Project management and delivery of ELIXIR Compute Platform strategic implementation studies with alignment to GA4GH, EOSC-Life & EOSC-Hub.
- Co-authored EMBL-EBI's Hybrid Cloud Strategy report and developed a Strategic/Technology partnership RFP with cloud providers.
- Identify & develop TSI project portfolio with international partners as part of EC & RCUK grants.
- Co-wrote and contributed to 9 EC and RCUK funded grant proposals.

Technical Coordinator - Human Genomics and Translational Data - ELIXIR

Jun '17 – Nov '17

- Coordinated and created a consolidated strategic vision and technical road-map for Human Data Communities for ELIXIR's 2019-2023 work programme.
- Project managed and coordinated delivery of 2017 Human Data implementation studies' (3) and managed the selection process for 2018 Human data implementation studies (4).
- Administered and coordinated two ELIXIR EXCELERATE Rare Disease and Human Data work packages, including developing and driving alignment with ELIXIR Technical Platforms.

- Product Leadership of the **Beacon Network** project in alignment with **GA4GH** and **ELIXIR**.
- Provided technical leadership within ELIXIR's Human Data portfolio of projects (e.g. **Beacon Network**, **Local EGA**, **RD-Connect**, **TraIT** & **OcoTrack**).
- Globally represent and promoted ELIXIR Human Data Communities (Rare Diseases, Beacon Network & Human Data) at multiple international conferences and workshops.
- Created the central concept on applying FAIR principles to Pharma datasets and co-wrote two work packages for a successful **IMI** grant proposal application - **FAIRPlus**.

University of Sheffield - Electronic & Electrical Engineering SHEFFIELD, UNITED KINGDOM
CTO - Translational Technology Officer - CISTIB, Insigneo Institute Jun '15 – Mar '17

- Spearheaded the Scientific Software Development (SSD) team (6-7) to co-develop and operate 2 product suites in clinical research.
- Responsible for the overall technical vision, strategy and execution of software development & operations, including recruitment, budget management, resource/capacity planning and applying for international competitive grants.
- Conducted a detailed technical project portfolio to consolidate and formulated a technical road-map for CISTIB products and services.
- Responsible for the overall product strategy and execution of the **GIMIAS** biomedical image processing workbench and clinical domain-specific product suites.
- Architected a distributed hybrid cloud (AWS, GCP, Azure, & OpenStack) & HPC enabled **VPH-DARE@IT** Research-As-A-Service platform to deliver over 70 multi-modal clinical datasets, 230 scientific tools, 80 workflows and 3230 services for more than 75 daily active users.
- Managed and operated the **VPH-Share** and **VPH-DARE@IT** project platform for over 4 years, including managing planned technology modernisation, DC migrations, incident management and DR.
- Responsible for team recruitment, supervision and training/coaching of software developers/engineers and mentoring of junior developers.
- Invited keynote speaker and promoted the need for distributed research infrastructure to accelerate translation of clinical research to bedside.

University of Sheffield - Cardiovascular Science SHEFFIELD, UNITED KINGDOM
Scientific Workflows Coordinator - VPH-Share, Insigneo Institute Sep '11 – May '15

- Coordinated a disperse team of research scientists and developers to deliver over 25 projects.
- Co-architected, developed and operated the **VPH-Share** cloud platform and achieved good or excellent commendations in all EC project reviews.
- Proactively developed relationships with commercial cloud providers and external clinical research use cases as part of the **VPH-Share** project.
- Hand-built 2 clusters for internal staging/test cloud & HPC workloads for clinical workflows.
- Co-supervised postgraduate students to develop clinical research applications.

Multiscale Modelling Infrastructure Technical Officer - Insigneo Institute Jan '14 – May '15

- Designed, developed and deployed of scientific/technical solutions for Insigneo members and on-going projects (**VPH-DARE@IT**, **MySpine**, **CHIC-VPH** & **MultiSim**).
- Provided consultancy on application migration and integration of **VPH-Share** scientific tools and platform technologies for Insigneo and University of Sheffield.

Post-Doctoral Research Associate - VPH-NoE Jan '10 – Sep '11

- Evaluated and deployed of a range of distributed data storage and scientific workflow infrastructures for enabling cloud computing services for the pan European **Virtual Physiological Human(VPH)** project.
- Developed a strategic initiative for scientific data and compute federation across the **VPH**.

University of Sheffield - Computer Science SHEFFIELD, UNITED KINGDOM
Research Associate - Epitheliome May '06 – Dec '09

- Involved in a multi-disciplinary research project modelling epithelial cells; providing advanced research and software design.
- Co-architected **FLAME**, a high-performance agent-based modelling framework.

Software Consultant - epiGenesys Ltd. Oct '05 – Dec '09

- Software consultancy for R&D software to **epiGenesys Ltd.**

Research & Development Officer - Genesys Solutions Sep '04 – Sep '05

- Developed and tested various eXtreme Programming plug-ins for the Eclipse IDE, funded by IBM.
- Conducted Quality Assurance audits for various internal teams.

Education

University of Milan-Bicocca	MILAN, ITALY
Executive MBA - Management of Research Infrastructures	2018 – 2020
Management qualification to support successful leadership of Research Infrastructures requires a complex collection of scientific and managerial competencies, especially for those working across national borders	
University of Sheffield	SHEFFIELD, UNITED KINGDOM
Doctor of Philosophy in Computational Systems Biology	2005 – 2010
Title: 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%) Missed distinction due to loss of semester (ill health)	

Fellowships, Grants, Awards, Certifications & Honours

Fellow of the British Computer Society	2021 –
Member of the Association of Computing Machinery	2021 –
FitSM Advanced Service Planning and Design and Advanced Service Operation and Control	2019 –
Amazon Web Services Cloud Solution Architect - Associate	2017 – 2019
WANDisco Research Collaboration Grant - \$60,000	2016
Software Sustainability Institute Fellowship (Lifetime)	2015
Microsoft Azure for Research Grant - \$40,000	2014
Amazon Webservices in Education Grant - £6,000 (2013), £10,000 (2014)	2013, 2014
Worldwide Universities Network Travel Grant	2006
Overseas Research PhD Scholarship	2005
Science, Engineering and Technology for Britain Poster at House of Commons	2005
Fretzwell-Downing Award for Best MSc Dissertation	2005

Strategic, Programme Management and Technical Skills

Excellent problem solving skills (Issue Identification Analysis and Solving), Proven consulting experience or relevant Technology Strategy background, with **experience of strategy formulation**. **Excellent written and oral communication skills** in English. **Proven experience in defining and delivering impactful, effective and pragmatic technology strategies**. **Intellectual skills** to think outside of the box and challenge clients and colleagues in their thinking. **Demonstrated engineering leadership experience** as a first level hands-on manager or senior-level technical team lead. Well-developed communication and leadership skills.

Distributed Computing, Cloud Computing, Research Software Design, Architecture & Implementation. Substantial experience of **Agile (XP, SCRUM)**, Waterfall & **Cross-functional project management** methodologies. **Exceptional people skills** and a proven-track record for building high-performance software engineering teams. **Strong verbal and written skills**. with extensive project deliverable and grant writing experience (over 25 EC & RCUK grants).

Strong knowledge of Fortran, C, C++, Python, Go and working knowledge of Java (Scala), NodeJS, Ruby **Programming Languages, Version Control Systems** (Git, Subversion), **Web Technologies** HTML+CSS, Javascript, REST, SOAP and working knowledge of jQuery, XML+XSLT, RDF+SPARQL, & **Web Servers** Apache Webserver, NGINX. **Extensive SysAdmin & DevOps** experience with complex **Issue Tracking Systems**: Confluence, JIRA & Trac; **Continuous Integration/Deployment**: TravisCI, CircleCI & GitlabCI; Working knowledge of **Configuration Management**: Chef, Puppet, Salt, Ansible; **Infrastructure Automation**: Docker, Packer, Vagrant, Terraform, AWS CloudFormation; **Clinical Database Management**: TranSMART, OpenClinica, REDCap, MySQL, PostgreSQL, XNAT, MongoDB, Elastic & Neo4j; **Service Orchestration**: etcd & Consul.

In-depth Research and Healthcare Computing & Research Software Engineering experience and knowledge in developing and support for Matlab, Mathematica, R, Apache Spark, bioinformatics pipelines, **Workflow Management Systems:** Taverna, Galaxy, Arvados, NiPype, Nextflow, CWL; **High-Performance & High-Throughput Computing** technologies: MPICH2, OpenMP, CUDA, SGE & SLURM; **Container Orchestration:** Docker Swarm, Amazon ECS, Mesosphere Marathon, Kubernetes & Mesos; **Cloud Computing:** AWS (AWS Cloud Solution Architect), Google Cloud Platform, Microsoft Azure, **Openstack**, VMWare, bhyve/xhyve, KVM & Xen; & **Distributed Filesystems:** ZFS, Lustre, GlusterFS, iRODS & Hadoop.

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

- 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 Research Software & Standards Contributions

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| • 2020-: HDR UK Innovation Gateway - API, Web | • 2020-: HDR UK Schemata |
| • 2020-: HDR UK Datasets | • 2020-: HDR UK Papers/Preprints |
| • 2020-: HDR UK Phenotype Library | • 2020-: HDR UK Clinical Trials |
| • 2018-: GA4GH TRS, WES, TES & DRS Standards | • 2018-2020: ECP & AAP |
| • 2018-2020: TESK & WES-ELIXIR | • 2018-2020: RDSDS |
| • 2017-2020: GA4GH Beacon Network | • 2017-2020: Bioschemas Specification |
| • 2015-2017: VPH-DARE@IT Platform | • 2015-2017: GIMIAS Biomedical Workbench |
| • 2014-2015: VPH-HF Hypermodelling Framework | • 2011-2017: VPH-Share Cloud Platform |
| • 2006-2009: CHASTE | • 2004-2010: FLAME |