



Data Science Team Personas: case study from The Alan Turing Institute

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The Alan Turing Institute, the UK's National Institute for Data Science and AI, was founded in 2015 with a clear mission: 'To make great leaps in the development and use of data science and artificial intelligence (AI) in order to change the world for the better'¹. The Turing's goals are to advance world-class research and apply it to national and global challenges, build skills for the future, and drive an informed public conversation. Since its inception, the Turing has engaged with data science and AI research across a wide range of domains and collaborated with external stakeholders from across different sectors including academia, government, the third sector, and industry.

One of the institute's principles¹ is "collaborate and convene", which has led to a broad range of interdisciplinary research projects and collaborations aimed at addressing real-world challenges with data science and AI. The need for collaborations across various sectors and disciplines arises from the complexity of societal and technical challenges we face, as well as the roles diverse stakeholders can play in addressing them through innovative, data-informed solutions. The Turing Institute facilitates such collaborations by convening cross-sector partners, combining their skills, expertise, and perspectives to pose questions and explore effective solutions together. The scale, intricacies and interdisciplinary nature of these projects require that different specialist roles are involved alongside specific domain expertise and supported to combine their skills, knowledge and leadership across areas such as data science, engineering, community engagement and project management. To enable this, projects at the Turing apply team-based approaches, adjusting team composition to respond to specific questions, objectives, intended outcomes, and real-world impacts of data science and AI.

¹ The Alan Turing Institute, 2023. Our Strategy.
<https://web.archive.org/web/20240614160034/https://www.turing.ac.uk/about-us/our-strategy>



Core Capability Teams at The Alan Turing Institute

The Turing Institute has invested in establishing specialist roles and supporting them in strengthening their professional identity as part of “core capability teams”. Members of these core capability teams join data science projects to combine their specialist skills with the domain expertise drawn from various research and infrastructure programmes at the institute.

The core capability teams at the Turing include:

- **Tools Practices and Systems programme (TPS)** that includes teams of Research Community Managers, Research Application Managers, and Public engagement, Citizen Science, Participatory scientists.
- **Research Engineering Group (REG)** includes a team of Research Data Scientists, Research Software Engineers and Research Computing Engineers.
- **Data for Research** is a team that specialises in data wrangling.
- **Ethics and responsible innovation** team, which are part of the Public Policy programme and includes Applied AI and Research Ethicists.
- **Programme Management Unit** consists of Research Project and Programme Managers.

The Turing’s Project teams

At the Turing, each project is represented by a multidisciplinary team that is made up of domain experts from research and infrastructure programmes, collaborators from partner organisations, specialists from our core capability teams (who can also bring domain knowledge to projects), and senior members who provide leadership and project directions. Each specialist may not be involved for the entire duration of the project or exclusively working on one project, however, they contribute their expertise and collaborate with other specialists as needed to achieve the project’s goals and objectives. Taking leadership in their specialist areas of work, they deliver on specific pieces of work, such as through pre-defined work packages, provide advisory support or addressing newly identified questions in collaboration with other specialists in other areas of work.

Specific roles of team members vary depending on the exact nature and deliverables defined in the project. However, specialist roles often bring overlapping sets of skills. Therefore, depending on the goals, priorities and resourcing, specific project teams may have representation from specific core capability team or programme. Specialists from one core capability team may have some overlap in skills and responsibilities with those from other teams. When working together, they collaborate on shared goals. If working independently, these goals may be adapted to be achieved by a single specialist with overlapping skills. For example, stakeholders mapping and engagement is a primary task of



a Research Community Manager (RCM) but also in the skillset of other roles, such as Research Application Managers (RAMs), who can independently carry out this work when an RCM is not allocated on a research project, or collaboratively with an RCM when they are part of their team.

Job security, such as through permanent contracts and appropriate compensation allow organisations to retain top talents and foster institutional knowledge, therefore, providing a more effective way to onboard, upskill and support employees. Although not all research and specialist roles at the Turing are created as permanent positions, teams that receive long-term investment have been able to refine, standardise and document their working models, methodology and operating processes. Specifically, core capability teams with long-term investment have been able to develop greater experience, institutional knowledge and operational strategies. These teams have also been able to define career pathways to allow professional growth for the employees from junior to senior or leadership positions. For example, REG is the most established core capability team due to its existence since the beginning of the institute. The recruitment pipeline, onboarding process and career progress for the members of REG is, therefore, more developed than in other specialist teams. REG has built on both the insights gained from 12 years of the RSE movement², and the extensive experience collaborating with the Turing's research community over the years. When joining REG, a member has flexibility to select their job title from the three defined roles - Research Data Scientist, Research Software Engineer and Research Computing and Infrastructure Engineer. Individuals in the REG Team may select one job title based on their preferred career direction, but they often work flexibly across the three defined roles or personas (as we describe below) in their team. They can take responsibilities in projects outside of that defined persona based on the requirements in the project as well as the individual's skills and personal interests. As a more established team, REG provides a good reference for other core capability teams to develop their resources, processes and professional identity.

Research Project Managers (RPM) or Programme Managers, although not described as a core capability team, are crucial to support the project team in close association with the institute's business and legal teams. They work with the project teams regularly or in an ad-hoc manner to accomplish goals such as the acquisition of funding, data protection and data sharing processes, event organisation, institute level communications, partnership development and ethics reviews.

In this document, we have synthesised these roles at the Turing into personas and developed case studies on each of them. This document should serve as an example for diversifying and professionalising data science roles crucial for carrying out research and

² Hettrick, S, 2016. A not-so-brief history of Research Software Engineers.
<https://web.archive.org/web/20240614160812/https://www.software.ac.uk/blog/not-so-brief-history-research-software-engineers-0>



innovation in data science and AI. Specifically, we demonstrate how a group of domain experts and specialist roles collaborate within large interdisciplinary teams to effectively address complex scientific challenges and research inquiries in a way that is time and resource-efficient.

However, it's important to recognise that the Turing is just one among many organisations that can offer examples of how research teams, institutions and communities can diversify professional roles within data science projects. Our objective is to encourage other data science-focused entities to share examples from their team compositions and operational frameworks. These case studies showcasing a range of approaches can offer valuable insights and guidance for organisations taking their first steps into interdisciplinary data science research.

Overarching Persona: Data Science and AI Professionals

We start by providing an overarching persona of a Data Science and AI Professional that broadly defines all the responsibilities that are ideally shared by members of a Data Science Team. This persona is based on the AI Professionals persona described in the '[AI Skills for Business Competency Framework](#)'³.

Data Science and AI professionals are individuals who specialise in the field of data science and/or Artificial Intelligence (AI). Their responsibilities within an organisation concern design, development, management and deployment of data and AI technologies.

- Data Science and AI Professionals will possess competency in the design, creation, deployment and maintenance of responsible data and AI-based systems.
- They will possess specialist knowledge in one or more subdiscipline(s) of Data Science and Artificial Intelligence, e.g. Computer Science, Statistics, Modelling, Machine Learning and Robotics.
- They possess a strong awareness of legal, ethical, regulatory and compliance considerations and know how to translate these into their roles.
- They are conversant in operating in settings of technical complexity and uncertainty.
- They will be aware of the risks of AI technology and will know the steps required to mitigate these within their role. They will be able to work with other specialists to understand and mitigate these risks.
- They can interface effectively with AI Leaders to communicate the correctness of their technical solutions, as well as frame new data science and AI-based opportunities appropriately to inform the decision-making in their organisation.

³ Forshaw, M. The Alan Turing Institute, Alliance for Data Science Professionals, 2023. AI Skills for Business Competency Framework - Draft framework for public consultation.
https://iuk.ktn-uk.org/wp-content/uploads/2023/11/Final_BridgeAI_Framework.pdf



At the Turing, Data Science and AI specialists take different kinds of roles such as Research Software Engineers, Data Wranglers, AI Ethicists, Research Community Managers, Research Application Managers, Data Scientists and researchers with domain expertise. We recognise all of these roles as research roles and as such all these roles possess an awareness of and often expert knowledge in research methods to conduct literature reviews, data handling, analyses and communication of findings for academic as well as broader research audiences such as via scientific articles, data and code sharing, technical workshops and conference talks.

All of these roles constitute the Turing's data science project teams that collectively bring data science and AI expertise as listed above.

Each researcher must engage with and understand their duty to maintain research integrity and quality, enable transparency and sustainability of their research, foster an interdisciplinary way of working, and embed equity, diversity, inclusion and accessibility (EDIA) practices needed in data science research. Therefore, all team members will possess expertise and awareness of:

- Open source, open science and research reproducibility practices.
- Interdisciplinary collaboration expertise, interfacing with others in the team and external stakeholders.
- Data Science and AI Ethics and Responsible Research and Innovation (RRI) approach.
- EDIA practices and considerations in Data science and AI technology.

Data Science Team Personas

Below, we define specific roles at The Alan Turing Institute that can be deployed in our Data Science Teams. These personas follow the format of persona used above (following Forshaw 2023³). Personas have been co-created through interviews and in collaboration with respective core capability teams.

The Turing Data Science Team personas include the following roles:

1. Data Science Domain experts
2. Data Science Leaders
3. Cross-cutting Research Infrastructure Specialists
 - Research Data Scientists
 - Research Software Engineers
 - Research Computing and Infrastructure Engineers
 - Research Community Managers
 - Research Application Managers
 - Data Wranglers
 - Research and AI Ethicists



- Public Engagement Practitioners
- Project/Programme Managers (currently defined as a business role at Turing)

Persona: Data Science Domain Experts

Domain experts in data science and AI are team members whose core responsibilities are bringing domain-specific knowledge or methodological skills to address research questions.

These domain-specific roles map to traditional research roles at universities and other research institutes such as Professors, Lecturers, Postdoctoral Associates / Researchers, Research Fellows and PhD students, to name just a few. There is often a range of career stages of domain experts on Turing data science teams including early career researchers, mid-career researchers and senior academics.

***Definition:** Data Science Domain Experts input domain knowledge and/or methodological skills to address research questions and communicate their findings to a range of academic audiences.*

- Domain experts will possess competency in a research domain such as in Health, Environment & Sustainability, Defense and Security, Data Centric Engineering, Digital Twin and Arts & Humanities.
- They will possess specialist knowledge in one or more subdiscipline(s) of Data Science and Artificial Intelligence, for example, Computational Research, Computer Science, Statistics, Modelling, Machine Learning, Computer Vision and Robotics.
- They possess expertise in research methods to conduct literature reviews, data handling, analyses and communication of findings for academic as well as broader research audiences such as via scientific articles, data and code sharing, and conference talks.
- They can interface effectively and collaborate with specialists and non-specialists in their team, as well as external collaborators from different sectors, integrating their domain knowledge into the data science research project.
- They possess an awareness of legal, ethical, regulatory and compliance considerations and apply the institutional procedures to their work with the support of other experts as required.
- They will be aware of open, inclusive and reproducible practices and work with specialists to embed these in the research project.

Domain experts that are Early Career Researchers (ECRs) in Turing data science teams include Research Assistants, Research Associates, Postdoctoral researchers, doctoral and other postgraduate or undergraduate students.



They work with research infrastructure specialists and are often responsible for tasks such as:

- Data collection
- Data processing
- Data analysis
- Research publication
- Research dissemination such as conference talks and posters

*At the Turing, these members are appointed under a **Turing research programme (equivalent to university departments)**, core capability teams and external organisations partnering on the project.*

Persona: Data Science Leaders (Domain Experts and Specialists)

Senior team members including domain experts, such as Principal Investigators and Senior Research Associate, and Senior Research Infrastructure Specialists take leadership responsibilities in data science projects.

Named roles include:

- Principal Investigators - can be from Turing programme teams, specialist teams or partner organisations
- Team Leads/Theme Leads/Programme Leads
- Senior Postdoctoral Research Associates
- Research Fellows
- Senior Researchers

As well as fulfilling their domain or research infrastructure specialist persona core responsibilities, they are responsible for project scoping and planning, funding acquisition, line management and leadership of a specific area or whole of a project.

***Definition:** Data Science leaders scope and plan projects, find and apply for funding sources, manage people and teams, and advocate for their teams' work to external stakeholders.*

- Leadership roles possess competency in project design such as generating ideas, scoping and planning.
- They possess specialist knowledge of scoping project proposals and navigating funding acquisition processes including advocating for internal funding or applying to external grant opportunities.
- They have expert knowledge and are supported to fulfil their responsibility to mentor, upskills and manage their teams (of different sizes).
- They can interface effectively with different audiences, particularly senior leaders within the institute and from external organisations, to represent, advocate and



promote their group's work, disseminating findings and/or proposing new streams of work and collaborations.

*At the Turing, these members are appointed under a **Turing research programme (equivalent to university departments)**, core capability teams and external organisations partnering on the project.*

Cross-cutting research infrastructure specialists

Persona: Research Data Scientists

Research Data Scientists⁴ are data science team members who are generalists with broad skills and whose core responsibilities are working with data and specialist researchers across domains to address research questions with data science approaches.

***Definition:** Research Data Scientists organise and analyse data from a range of sources to gain insights, build reusable solutions and communicate them to the wider community.*

- Research Data Scientists possess competency in computational statistics, inference and machine learning as well as mathematical and computational modelling of complex systems, knowledge representation and operations research.
- They possess specialist knowledge of open and reusable tools and use these approaches to ask questions and draw insights from data.
- They possess strong skills in data cleaning, wrangling and analysis.
- They are expert collaborators interfacing effectively with domain experts and other specialists in data science teams and applying reproducible research best practices to research directly through collaboration.
- They will be aware of relevant legal, ethical, regulatory and compliance considerations and know how to translate this into their roles.

*At the Turing, these roles are hosted within the **Research Engineering Group (REG)** and appointed to work on multiple projects across different research programmes.*

⁴ The Alan Turing Institute 2024, Meet the Team.

<https://web.archive.org/web/20240614145317/https://www.turing.ac.uk/research/research-engineering/meet-the-team>



Persona: Research Software Engineers (RSEs)

Research Software Engineers^{4,5} are data science team members whose core responsibilities are to collaborate with researchers to build and support the use of software that implements and supports research activities.

***Definition:** RSEs manage software for research projects contributing to designing, developing and maintaining complex codebases that underpin applications of research.*

- Research Software Engineers possess competency in software development, distribution, and documenting and explaining software.
- They possess specialist knowledge of software development best practices in research software including practices such as version control, testing, documentation and reusability.
- They will support the release and maintenance of software through predominantly open-source channels (using the “as open as possible, as closed as necessary” principle) and publication in research journals.
- They apply and teach a broad set of technical skills and expertise by being embedded in research projects.
- They will be aware of relevant legal, ethical, regulatory and compliance considerations and know how to translate this into their roles.

*At the Turing, these roles are hosted within the **Research Engineering Group (REG)** and appointed to work on multiple projects across different research programmes.*

Persona: Research Computing and Infrastructure Engineers

Research Computing and Infrastructure Engineers^{4,6} are data science team members whose core responsibilities are to provide expert management of research computing resources and infrastructure required for research projects.

***Definition:** Research Computing and Infrastructure Engineers build, coordinate and maintain research computing infrastructure such as secure computing, reproducible software and declarative data tools.*

⁵ The Turing Way Community, 2024. Research Software Engineer: Overview.
<https://web.archive.org/web/20240614154829/https://the-turing-way.netlify.app/collaboration/research-infrastructure-roles/rse>

⁶ The Turing Way Community, 2024. Research Infrastructure Developer: Overview.
<https://web.archive.org/web/20240614161642/https://book.the-turing-way.org/collaboration/research-infrastructure-roles/research-infrastructure-developer>



- Research Computing Engineers possess competency in building and coordinating computing infrastructure such as cloud computing and high-performance computing.
- They possess specialist knowledge of open source practices (Infrastructure as Code and Configuration Management) to make computing infrastructure accessible to people from different backgrounds.
- They can interface effectively and collaborate with researchers and other specialists from the data science team to ensure access to computing resources and to support the use of computing infrastructure.
- They will be aware of relevant legal, ethical, regulatory and compliance considerations and know how to translate this into their roles.

*At the Turing, these roles are hosted within the **Research Engineering Group (REG)** and appointed to work on multiple projects across different research programmes.*

Persona: Research Community Managers (RCMs)

Research Community Managers^{7,8} are data science team members whose core responsibilities are to provide opportunities for engagement and communications for research communities.

***Definition:** RCMs involve members of research projects and their communities in collaboratively defining challenges, developing milestones, integrating research best practices and co-creating solutions that are effective and impactful.*

- Research Community Managers possess competency in open, inclusive and reproducible practices to embed these in the research projects and communities they work with.
- They possess expert knowledge in a range of socio-technical skills including scientific communications, stakeholder engagement, project management and domain expertise.
- They are expert collaborators effectively working with domain experts and other specialists in data science teams as well as external stakeholders to build a shared understanding in the community of research goals, the research roadmap and processes.
- They are expert communicators who can facilitate, amplify and champion collaborative development of community-based research processes, accessible project outputs and positive research outcomes.

⁷ Sharan, M., Karoune, E., Bennett, A., Lacey, A., and Gould Van Praag, C. 2024 (forthcoming). Positioning Research Community Management in Data Science and AI Research.

⁸ Sharan, M., & Karoune, E. (2023). Research Community Management - Skills framework. Zenodo. <https://doi.org/10.5281/zenodo.8337627>



- They will be aware of relevant legal, ethical, regulatory and compliance considerations and assist other team members to apply these for the community.

*At the Turing, these roles are hosted within the Tools, Practices and Systems research programme's **Research Community Management team** and appointed to work on specific projects or research programmes.*

Persona: Research Application Managers (RAMs)

Research Application Managers⁹ are data science team members whose core responsibilities are engaging with diverse stakeholders in applying research outputs, such as software, for real-world use.

They are inspired by the Product Management function in industry and adapted for the research context.

***Definition:** RAMs develop and adapt research outputs for real-world problem-solving, typically in collaboration with external stakeholders. They ensure openness and reproducibility and optimise for impact.*

- Research Application Managers possess competency in the reuse and adaptation of research outputs for wider adoption.
- They have specialist skills in identifying potential future key users and target audiences through researching and developing an understanding of the user community.
- They possess specialist knowledge of open, inclusive and reproducible practices to promote these best practices in the research projects and communities they work with.
- They possess strong stakeholder engagement and collaboration skills to facilitate, support and advocate for the user perspective including research output adoption by people outside of academia.
- They can co-develop a Product Roadmap with researchers and potential users, and will expertly balance diverse directions and potential outputs of the project to articulate the highest priorities that optimise for impact.
- They interface effectively with data science teams to embed user needs and real-world impact potential from the early design stage of the research outputs.
- They will be aware of relevant legal, ethical, regulatory and compliance considerations and assist other team members to apply when related to their work.

⁹ The Turing Way Community, 2024. Research Application Managers: Overview.
<https://web.archive.org/web/20240614153947/https://the-turing-way.netlify.app/collaboration/research-infrastructure-roles/ram.html>



*At the Turing, these roles are hosted within the Tools, Practices and Systems research programme's **Research Application Management team** and appointed to work on multiple projects across different research programmes.*

Persona: Data Wranglers

Data Wranglers¹⁰ are data science team members whose core responsibilities are to increase data quality and readiness so data is ready for researchers to use.

Definition: *Data Wranglers work with unrefined sources of data, often multiple sources and in varied formats, and build systems for collecting, storing, and analysing these data to provide 'analysis-ready' or 'research-ready' datasets.*

- Data Wranglers possess competency in computer programming and data engineering.
- They have expertise in cleaning, restructuring and filtering data into analysis-ready formats.
- They possess specialist knowledge of data privacy, data standards, data management & stewardship and data infrastructure.
- They possess data analytical skills to conduct preliminary analyses to ensure the completeness of data and preparation for future analysis.
- They can interface effectively with data collectors and data analysts with the ability to translate data requirements between domain experts and technical experts.
- They will communicate effectively to summarise findings in domain-specific research papers and data documentation as well as run workshops to ensure knowledge sharing across the research team.
- They will be aware of relevant legal, ethical, regulatory and compliance considerations and assist other team members to apply when related to their work.

*At the Turing, these roles are hosted within the **Data for Research (Data Wrangling) team** and appointed to work on specific projects or research programmes.*

Persona: Research and AI Ethicists

Research and AI Ethicists are data science team members whose core responsibilities are to conduct research and develop approaches to meaningfully address and advise on the ethical and social implications of the use of (AI) systems and data-driven technologies in society.

¹⁰ The Turing Way Community, 2024. Data Wrangler: Overview.
<https://web.archive.org/web/20240614154343/https://the-turing-way.netlify.app/collaboration/research-infrastructure-roles/data-wrangler.html>



***Definition:** Research and AI Ethicists help navigate ethical and societal considerations related to research and technology, ensuring that research is carried out responsibly and with consideration for its impact on society. AI Ethicists specifically guide ethical practices in the design, development, use and governance of AI technologies.*

- Research Ethicists have specialist knowledge of ethical frameworks to ensure responsible data practices and the ethical and safe design, development and deployment of AI technologies.
- They possess expertise in research methods, particularly in participatory and qualitative research methods, to conduct literature reviews, and analyses and communicate findings to multiple stakeholders including policymakers.
- They expertly engage with a range of stakeholders, particularly government agencies and the public, to co-create and communicate resources and training for ethics and responsible research and innovation.
- They can interface effectively with data science team members and other stakeholders to identify and manage the risks and biases associated with data science and AI research.
- They will be aware of relevant legal, ethical, regulatory and compliance considerations and assist other team members to apply when related to their work.

*At the Turing, the ethics researchers and research assistants are hosted under the **Public Policy research programme** and advisors for research ethics sit in the **Turing Research Ethics Panel**.*

Persona: Public Engagement Practitioners

Public Engagement Practitioners are data science team members whose core responsibilities are to bring a diverse set of practices ranging from public events to research leadership and crowdsourcing efforts in data science and AI at different stages of the research lifecycle.

***Definitions:** Public Engagement Practitioners develop and deliver public engagement activities to get researchers engaging with the public (and patients in health research) and vice versa, creating opportunities for knowledge exchange and involvement.*

- Public Engagement Practitioners possess competency in engaging with and communicating data science research to the public.
- They possess expert knowledge in a range of socio-technical skills including scientific communications, public engagement, event management, project management and domain expertise.



- They have specialist knowledge of planning, embedding and assessing the impact of public engagement with research.
- They are expert collaborators effectively interfacing with the data science team and members of the public to ensure they understand and can contribute to the research.
- They are experts at communicating with public audiences including facilitating public events and writing public-facing research outputs.
- They will be aware of open, inclusive and reproducible practices and work with specialists to embed these in the research project.
- They will be aware of relevant legal, ethical, regulatory and compliance considerations and assist other team members to apply when related to their work.

*At the Turing, the Public Engagement Practitioners are part of the **Events and Engagement Team**.*

Personas: Research Project Managers and Programme Managers

Research Project Managers and Programme Managers are data science team members whose core responsibilities are to ensure research projects comply with the Institute's processes and policies and are delivered on time and within budget.

Definitions:

- *Research Project Managers ensure that the research projects are executed on time while meeting the project milestones, funding requirements and institutional as well as national policies.*
 - *Programme Managers support multiple projects and research teams under a research programme or department, providing them with operational and business management support in planning, implementing and delivering the research goals and outputs.*
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- Research Project Managers possess competency in the planning and organisation, communication, and strategic oversight of data science and AI research projects.
 - They have strong interpersonal skills including collaboration, stakeholder management and engagement, leadership with authority, negotiation, conflict resolution and accessibility management.
 - They possess specific technical skills for project management and may also possess domain-specific knowledge for the research projects they work on including research practices, data science and AI.
 - They possess a strong awareness of legal, ethical, regulatory, budgetary, and compliance considerations and support the project team in applying those into their work.
 - They will be aware of open, inclusive and reproducible practices and work with specialists to embed these in the research project.



*At the Turing, these roles are hosted within the **Programme Management Unit** and appointed under specific projects or research programmes.*

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