

FINAL REPORT

DISCOVERY PROJECTS



**Transforming Collections:
Reimagining Art, Nation
and Heritage**

January 2025

University of the Arts London | Tate

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Authors

*susan pui san lok, Mick Grierson, Anjalie Dalal-Clayton, Christopher Griffin, Hannah Barton,
Jon Gillick, Ananda Rutherford, Jerneja Rebernak, Fleur Kaminska*

Executive Summary

About Transforming Collections

Transforming Collections was led by University of the Arts London (UAL) Decolonising Arts Institute in collaboration with UAL Creative Computing Institute, and close partnership with Tate as an Independent Research Organisation. Our additional 14 project partners were: Arts Council Collection, Art Fund, Art UK, Birmingham Museums Trust, British Council Collection, Contemporary Art Society, iniva (Institute of International Visual Art), JISC Archives Hub, Manchester Art Gallery, Middlesbrough Institute of Modern Art (MIMA), National Museums Liverpool, National Museums Scotland, Wellcome Collection, and the Van Abbemuseum, Eindhoven.

Transforming Collections was underpinned by the belief that a national collection cannot be imagined without addressing structural inequalities, engaging debates around contested heritage, and revealing contentious histories embedded in objects. In 1999, the late sociologist and cultural theorist, Stuart Hall, posed the question 'Whose heritage?'. Hall called for the 'unsettling' and 'reimagining' of heritage and nation.¹ More than 25 years on, the need to critically question and transform notions of 'heritage' and 'nation' remains as urgent as ever.

The project combined critical art historical and museological research with participatory and interactive machine learning (ML) design. A series of artistic research residencies engaged with emerging findings, and embedded creative activations of the research within the project's public programme. The project sought to surface suppressed histories, amplify marginalised voices, and re-evaluate artists and artworks long ignored or side-lined by dominant narratives and institutional practices. It aimed to enable search and research across collections, to surface patterns of bias and relations of power, and interrogate policies and practices of classification, categorisation, description, and display. Critically and creatively connecting, interrupting, and disrupting collections, this interdisciplinary collaboration has opened up new interpretative frames to imagine an evolving 'national collection', at once connected yet distributed. *Transforming Collections* aims were to 'unsettle' and enrich existing knowledge with multiple and multivocal narratives, and 'potential histories' of art, nation and heritage.²

The project was designed around five parallel and interweaving work strands:

- Strand A: Surfacing Bias Across Collections (critical case studies)
- Strand B: Resurfacing Artists and Artworks Across Collections (critical case studies)
- Strand C: Participatory Design of ML (ideation and refinement workshops)
- Strand D: Interactive ML Technology Development (prototyping and testing)
- Strand E: Public Engagement Programme (in person and online)

¹ Keynote speech by Stuart Hall given on 1 November 1999 at 'Whose Heritage? The Impact of Cultural Diversity on Britain's Living Heritage', National Conference held in Manchester, UK.

² Ariella Aïsha Azoulay, *Potential History: Unlearning Imperialism* (London and Brooklyn, NY: Verso, 2019).

Summary of Activities

The first year of *Transforming Collections* focused on recruitment, building a diverse team of researchers and practitioners of colour (with over 50% representation to support research capability, capacity and early careers into the future); developing collaborative interdisciplinary working processes; developing data sharing guidance and ethical working principles; undertaking initial partner workshops; identifying early case studies; gathering diverse datasets from Tate and various partners and organisations; and early public programme development including a call for practice researchers in residence.

The initial 12 to 18 months of activity across Strands A and B of the project saw the extended and expanded audit of selected UK public art collections (building on audit data from the AHRC Black Artists and Modernism project, 2015–18), to produce an updated indicative snapshot of acquisitions over a specific period from 1900 to 2022. Strands A and B also saw the auditing of Tate Collection's subject index tagging since 2000 and the digitisation of iniva's uncatalogued archive of c.3,000 slides and c.180 artists' files. Between the UK collections audit, Tate Collection audit and iniva digitisation, and ongoing data gathering from partner collections, the project brought existing and new datasets into critical relation for the project's research purposes. The iniva dataset makes searchable hitherto hard-to-access documents relating to artists of colour³; and offers potential counterpoints to objects and data both present and absent in the project's UK collections partners. Digitisation within the project also represents a significant step in iniva's ongoing development of this vital resource within the Stuart Hall Library, located at UAL.

Over the same period, activity across Strands C and D of the project focused on consultation, co-design and testing of early ML prototypes with 15 of our project partners through an iterative participatory and interactive process. Regular cross-strands meetings ensured that critical research and ML design processes were mutually informed and driven. Participatory design and feedback mechanisms were established across the project partnerships to embed and sustain collaborative and ethical approaches. As the project progressed, invited workshop participants included diverse academic researchers, staff from partner institutions, as well as representatives from concurrent Towards a National Collection (TaNC) programme Discovery Projects. A cross-TaNC Projects workshop on data ethics was delivered in January of 2024 and the findings have been published in the TaNC report 'Ethics as Practice: Report on the 1st Discovery Project Ethics Workshop'.

The second year of the project saw the expansion of the team with six Postdoctoral Research Fellows joining between September 2022 and January 2023, and four artists taking up 15-month practice research residencies to engage with the project's emerging findings. Over 15 collections research case studies were generated in various forms including articles, papers and artworks, progressing in tandem with the interactive ML prototype development. In April 2023, the project delivered an international conference to engage general and specialist audiences in the Netherlands, building on UAL's existing partnership with Van Abbemuseum in Eindhoven and developing research networks, including with the Nieuwe Instituut in Rotterdam and the Research Center for Material Culture at the Tropenmuseum in Amsterdam. The conference took place in the context of the Rewinding Internationalism exhibition, to foreground practice as research, where in-progress findings and ML prototypes were shared. Ongoing research case studies,

³ Transforming Collections refers to 'Black artists' for consistency with the term used in a collections audit initiated by the AHRC Black Artists and Modernism (BAM) project, significantly extended and expanded by the AHRC TaNC project. The project also refers to 'artists of colour' while recognising that artists may choose to identify by neither or different terms, as suggested by the [#BAMEover statement for the UK](#).

interactive ML prototype testing and continued co-design with partner organisations culminated in a third All Partners Workshop in November 2023. During the second year, planning continued for a week-long public programme in autumn 2024 in collaboration with Tate Learning, in tandem with an online Art UK showcase of selected artists and artworks surfaced through the project.

In the third year of the project, a Displays Producer was appointed to support the delivery of the *Transforming Collections* x Tate Learning public programme, with a focus on the four artists' practice research displays and Late events. Two software engineers also joined the team, to support the final phase of iterative development, design and delivery of the interactive ML analytical tool. Researchers disseminated evolving project findings through numerous UK and international conferences, symposia, seminars and webinars, including at BBC Broadcasting House (BRAID launch events, September 2023), the Wellcome Collection (January 2024), Basel Academy of Art and Design (June 2024), National Portrait Gallery (September 2024) and Rijksmuseum (CIDOC, November 2024).

The Art UK online showcase went live in the summer of 2024, highlighting *Transforming Collections* researchers and case studies through Curations and Stories that featured works from the 19th century up to the 1990s. The collaboration with Art UK has resulted in the addition of 10 artists who were not previously represented on the platform, as well as 65 new artwork records, and a total of 76 new images.

The collaboration with Tate Learning led to *Transforming Collections'* culminating public programme, Museum x Machine x Me, which took place between 2 and 6 October 2024 across Tate Modern and Tate Britain. Museum x Machine x Me encompassed a two-day conference, practice research displays, ML workshops for the hands-on exploration of the ML tool, pop-up artwork talks and archive displays and a Late event at Tate Britain. The programme attracted almost 8,000 visitors across the week.

Summary of Recommendations

The systemic and structural work of change cannot be imagined, delivered or sustained without centring and sustaining the humans historically decentred yet deeply implicated in this work. Inclusive, equitable and ethical collaborative practices must underpin and drive inclusive innovation in research. This includes acknowledging and mitigating programme pressures on project set up and recruitment timelines, their cumulative negative impacts on the project team and research capacity, and the importance of allocating strategic follow-on funding to mitigate the potential erosion of research outcomes and relationships. As we close the *Transforming Collections* project, our recommendations for consolidating the work of the project and the wider TaNC programme, to maximise the potential impacts of the five Discovery Projects, are set out below.

We recommend that future funding criteria should require projects to:

1. **Recruit a diverse, inclusive and representative research team** with lived personal and professional experiences relevant to the wider questions, aims, objectives and intended audiences and beneficiaries of the project.
2. **Engage diverse and directly implicated stakeholders as early as possible** in bid development, project conceptualisation, and iterative design and delivery stages, including researchers, artists, estates and archival donors.
3. **Value and embed practice-led or practice-based research and close interdisciplinary collaboration** to help understand research enquiries and impacts.

4. **Value and embed active engagement with the ethics and ethical implications** of the research in principle and in practice.

We recommend strategic investment in:

1. Further resource to **deepen and extend critical engagement and evaluation** activities beyond the end of the funded three-year period. This would enable the triangulation and **underpinning of heritage information as data, and human/digital interactions, with ethical practice**, e.g. by examining approaches to language across all Discovery Projects.
2. Further resource for an extended programme to **roll-out durational testing** of our **adaptable, interactive ML tools** designed to work with existing infrastructures. This would enable sustained engagement to gather **feedback over time** from **cross-partner, cross-project, cross-sector and cross-disciplinary** and **international** stakeholders.
3. **Flexible interactive tools** to **enhance existing and future infrastructures** with **critical prompts and reflexive values**. This is needed to encourage the **rethinking** of habitual formulations, hierarchies, values and vocabularies, and enable **dynamic categorisations** or tags to be created and refined by users, **'delinking and relinking' data** to reflect back the users' choices, surfacing biases as well as unexpected relations.
4. **Long-term cataloguing** work across project and programme partnerships informed by researchers' subject specialisms and interests, using the interactive ML application as a critical analytical tool. This would enrich digital records by making more **transparent** the choices of authors, **surfacing connections, contexts, and absences**.
5. **Conserving analogue archives** and collection materials recognising their **integral importance in relation to digital records**. Not to situate the digital in hierarchical opposition or superior progressive relation to the analogue but rather to **make explicit the gaps, discrepancies and omissions** across digital and analogue data, as part of the holistic and **inevitably incomplete record**.

Abstract

Transforming Collections aimed to enable digital search and research across collections, to uncover patterns of bias in collections systems and narratives, to reveal hidden connections, and to open up new interpretative frames and ‘potential histories’ of art, nation and heritage.⁴ The project was underpinned by the belief that a national collection cannot be imagined without addressing structural inequalities, contested heritages and contentious histories embedded in objects. In 1999, the late sociologist and cultural theorist Stuart Hall posed the question ‘Whose heritage?’. Hall called for the ‘unsettling’ and ‘reimagining’ of heritage and nation. Twenty-five years on, the need to critically question and transform notions of ‘heritage’ and ‘nation’ remains as urgent as ever.

Led by UAL in close partnership with Tate among 15 partners across the UK, *Transforming Collections* sought to surface suppressed histories, amplify marginalised voices, and re-evaluate artists and artworks long ignored or side-lined by dominant narratives and institutional practices. The interdisciplinary approach brought together academic and artistic research into collections and museum practices, combined with participatory interactive machine learning (ML) design. The ML development was shaped and driven by researchers’ case studies and questions, interrogating small, bespoke, ‘messy’ datasets as well as larger collections’ data. The focus was not on achieving a technical solution to address problems in collections, but on developing lightweight adaptable tools that can support their critical analyses. The resultant critical analytical tool (ML CAT or Collections Transformer) has the potential to aid the rethinking of habitual formulations, hierarchies and values expressed in collections’ text-based digital records by offering critical prompts; while the creation of dynamic categorisations or tags refined by the user (that would not otherwise be made visible through standard search functions within collections databases), can surface unexpected connections and relations.

Transforming Collections culminated in a major public programme, Museum x Machine x Me, across Tate Modern and Tate Britain, which saw project insights and findings shared with wide-ranging audiences. Foregrounding a series of artistic residencies that critically and creatively engaged with the *Transforming Collections* research and developing ML tools, Museum x Machine x Me generated dialogues and expanded understandings of the ways in which the *Transforming Collections* research can support museums in reimagining an inclusive, evolving, (re)distributed ‘national collection’ that enables new, multivocal stories to be told.

⁴ Azoulay, *Potential History*.

Aims and Objectives

Transforming Collections' response to the TaNC programme call to 'dissolve barriers' between collections was focused less on 'dissolving' and more on surfacing their complexity and multiplicity. Bringing together decolonial intersectional feminist praxes and creative machine learning, the project approached challenges around digital search and research capability as entwined priorities, bound up with questions of power, agency and responsibility. The project has built on the insights and findings of previous research projects led by UAL, namely the AHRC Black Artists and Modernism project (BAM, 2015-18, in partnership with Middlesex University) and the UKRI MIMIC project (Musically Intelligent Machines Interacting Creatively, 2018-21), as well as the recent Tate-led TaNC Foundation Project, *Provisional Semantics* (2020-22), driven by the underlying questions:

1. Whose heritage? Whose voices, bodies and experiences are centred and privileged in collections? What are the problematic concepts used to label, classify, categorise and describe objects? And how do these perpetuate racist, xenophobic, misogynist, heteronormative, white supremacist and ableist views?
2. How can we surface and transform the architectures, algorithms and relations of oppression that structure and define collections' narratives? Can decolonial feminist approaches to machine learning help to counter or resist the replication of colonial and imperial modes of perception embedded in cataloguing and interpretation practices – and AI technologies? How can we ethically engage and empower diverse stakeholders in transforming the politics and processes of representation?
3. What could an equitable, inclusive, distributed, connected, evolving 'national collection' look like? How might we look across collections to evidence systemic problems, or create multivocal narratives that enrich knowledge within collections? What inspiring, unexpected or uncomfortable stories could such a national collection tell?

Transforming Collections' objectives were to develop and deliver a series of critical, creative and ethically grounded research case studies, surfacing patterns of bias, revealing hidden or unexpected connections, and opening up new interpretative frames and potential narratives of art, nation and heritage. Crucially, the project's questions and case studies drove the development, modelling and testing of inclusive, interactive technological approaches that could enable cross-search of collections and support critical analytical research capability. The project's development and design integrated an ambitious live and online public engagement programme into its dissemination plans to foreground the importance of artistic practice research in the effective and affective articulation of research questions and impacts.

The *Transforming Collections* project has:

1. Recruited diverse researchers and practitioners of colour, ensuring more than 50% representation in the project team, to support research capability, capacity and early careers into the future.
2. Completed an extended and expanded audit of selected UK public art collections, to produce an updated indicative snapshot of acquisitions over a specific period from 1900 to 2022.

3. Digitised iniva's uncatalogued archive of c.3,000 slides and c.180 artists' files, to establish an important new dataset for the project's research purposes. The dataset makes searchable hitherto hard-to-access documents relating to artists of colour; and offers potential critical counterpoints to objects and data both present and absent in the project's UK collections partners. Digitisation also represents a significant step in iniva's development of this vital resource within the Stuart Hall Library, located at UAL.
4. Consulted, co-designed and tested early ML prototypes with 15 of our project partners through an iterative participatory and interactive process.
5. Delivered an international conference to engage general and specialist audiences in the Netherlands, building on an existing partnership with Van Abbemuseum and developing research networks, including with the Nieuwe Instituut in Rotterdam and the Research Center for Material Culture at the Tropenmuseum in Amsterdam.
6. Produced a series of critical case studies underpinned by decolonial and intersectional feminist approaches that inform and are informed by the interactive ML development. These have been disseminated through workshops, seminars, conferences, symposia, online and peer-reviewed publications, and project webpages.
7. Developed adaptable and transferable supervised ML software through participatory design processes, with interactive ML methods. These lightweight tools will enable researchers, curators and wider audiences to cross-search collections and diverse datasets; uncover unexpected connections; surface hidden works and histories; and empower diverse users to control the process of determining significance in search terms.
8. Built supervised ML software (algorithm and interface) which will be hosted and maintained at UAL for a minimum of 10 years on the CCI public GitHub, with resources to support dissemination to partners for beta testing and potential wider roll-out.
9. Developed accessible online project resources for general audiences, linked to UAL DeAI and CCI webpages, including dedicated UAL YouTube playlists.
10. Developed, presented and prepared for manuscript submission a series of articles and essays towards an edited journal issue and a book publication.
11. Developed and delivered a major public engagement programme in collaboration with Tate Learning, including physical displays of artists' practice research, an international conference, and an extensive programme of participatory workshops, conversations, talks, performances and interventions across Tate galleries.
12. Collaborated with Art UK and partners to showcase selected artists and artworks online.

Partnership Structure

Lead Institutions

University of the Arts London's (UAL) **Decolonising Arts Institute** (DeAI) led on the project's conceptualisation, design, structure, strategic direction and delivery, including project management, planning, coordination, administration, and communications. DeAI worked in close collaboration with UAL's **Creative Computing Institute** (CCI), whose team led on the participatory machine learning co-design and technological development strands of the project. As UAL's main partner and Independent Research Organisation, **Tate** co-led, co-developed and co-delivered specific project research strands, contributing expertise, insights, facilitating access to Tate Collection data, and co-curating the public engagement programme across Tate Modern and Tate Britain.

Project Partners and Collaborating Organisations

Initially launching with 16 partners including Tate, the Government Art Collection and Glasgow Museums later had to step back from the project. However, *Transforming Collections* welcomed a new partner in the final year, when one of the project Co-Investigators moved from Tate to National Museums Scotland. The *Transforming Collections* partnership reflected the nationwide scope and ambition of the project to engage, benefit and positively impact collections across the UK, large and small. As such, it built on UAL's long history of collaboration with Tate, as well as previous projects with 12 of our partners. These include the major AHRC Black Artists and Modernism project (2015-18) led by UAL in partnership with Middlesex University, and several DeAI projects: the Decolonising British Art seminar series (2020-21, supported by British Art Network and Paul Mellon Centre); the Decolonising Collections research residencies (2021-22, supported by Art Fund); the Digital Artist Residency (2021-22, in collaboration with iniva); and the workshop/seminar series, *Doing the Work* (2021-22, in collaboration with Contemporary Arts Society).

Partner organisations across museum, collection, arts, charity and archive sectors contributed collections management expertise and curatorial research insights, supported access to collections databases, participated in ML co-design workshops, as well as public engagement and dissemination activities. The partnership included three Collaborating Organisations who were direct beneficiaries of the project funding. Selected collections also supported artists undertaking practice research residencies from January 2023 to April 2024.

- The **Arts Council Collection**, **British Council Collection**, **Birmingham Museums Trust**, **Manchester Art Gallery**, **Middlesbrough Institute of Modern Art**, **National Museums Liverpool**, **National Museums Scotland**, and the **Wellcome Collection** facilitated access to their collections management data and records, offered curatorial research support, and participated in selected workshops/seminars. **JISC Archives Hub** enabled access to its numerous art collections among its 350 repositories.
- The major arts charities, **Art Fund** and **Contemporary Art Society**, provided data on their UK-wide collection acquisitions and donations since the 1900s, including grants awarded, gifts and

bequests, artists and exhibitions profiled through the magazine *Art Quarterly*, and organisational histories.

- **Art UK** provided analytics on its aggregated collections data on c.48,000 artists, c.250,000 artworks, user-generated tags, descriptions, and collaborated on the online showcasing of researchers, artists and artworks through selected Curations and Stories.
- **iniva** digitised its unique artists' archive, which is physically housed within iniva's Stuart Hall Library and located at UAL's Chelsea College of Art.
- **Van Abbemuseum** in Eindhoven co-hosted an international conference in April 2023 to situate the project's key questions, emerging research and ML development, in relation to artistic and curatorial interventions into 'national' and 'international' collection praxes within the context of the Netherlands and discourses around Dutch colonialism and its legacies.

Staffing Structure

Project Management and Administration

The Principal Investigator (PI) **Prof susan pui san lok** led the team of Co-Investigators and Researchers (totalling 15 by the end of the project), supported by Project and Partnerships Manager **Jerneja Rebernak**, Project Administrator **Fleur Kaminska** and the Public Programme Coordinator **Ariel Haviland** (2023-2024). The PI was further supported by a **Management Board** which met every six months to track the project's progress against identified objectives and milestones. The Management Board members were: **Prof Pratap Rughani** (UAL Associate Dean of Research), **Benjamin Stopher** (Dean of UAL CCI; until departure from UAL in 2024), **Prof Malcolm Quinn** (UAL Associate Dean of Research; until departure from UAL in 2024), Danielle Tran (UAL Director of Education; until departure from UAL in 2024), **Maria Chatzichristodoulou** (UAL CCW Dean of RKEE; from 2024); **Emily Pringle** (Tate Head of Research until December 2022), **Anne Barlow** (Director, Tate St Ives; from 2024). An external **Advisory Board** met formally once a year and informally as needed, to contribute cross-sector expertise and ensure the relevance and impact of the project. The Advisory Board members were: **Melanie Keen** (Director, Wellcome Collection), **Prof Dorothy Price** (Professor of Modern and Contemporary Art and Critical Race Art History, Courtauld Institute), **Sara Wajid** (co-CEO, Birmingham Museums Trust; until 2023), **Rachael Minott** (Assistant Director of Engagement, Birmingham Museums Trust; until departure from Birmingham Museums Trust in 2023), **Prof Stephanie Dinkins** (Transmedia Artist and Kusama Endowed Chair of Art, Stony Brook University; from 2023), **Dr Alexandre White** (Assistant Prof of Sociology and History of Medicine, John Hopkins University; from 2023), Toby Watley (Director of Collections, Birmingham Museums Trust; from 2024).

Principal Investigator (PI)

[Professor susan pui san lok](#) (Professor of Contemporary Art and Director of the UAL Decolonising Arts Institute) led the *Transforming Collections* project, directing all research activity and co-leading the public engagement programme, with overall responsibility for the delivery of the project.

Co-Investigators (Co-Is)

[Dr Anjalie Dalal-Clayton](#) (Research Fellow, UAL Decolonising Arts Institute) and **Christopher Griffin** (Senior Curator: *Transforming Collections*, Tate) co-led on Strands A&B of the project, focused on surfacing bias across collections and resurfacing artists and artworks. Dalal-Clayton undertook an extended and expanded audit of works by black artists in UK public collections acquired since 1900 while Griffin oversaw the Tate-focused historiographic case studies.

Hilary Knight (Digital Director, Tate; Co-I until June 2022) and **Hannah Barton** (Senior Project Manager, Tate Digital; Co-I from July 2022 to April 2023) led on Tate Collections' Subject Index tagging research, exploring the ways in which the Subject Index tagging processes had been managed over time, uncovering problematic language in explicit and euphemistic forms, and considering the implications for the project research and diverse users' experience (Strands A&B). **Liam Darbon** (Director of Digital and Innovation, Tate) took over the role (April 2023 to March 2024), which **Barton** resumed after moving to National Museums Scotland (from January 2024), refocusing the project's questions in relation to the NMS Digital Collection, connected to Jon Haworth as research collaborator (Senior Commercial Systems Manager, Tate).

[Professor Sonia Boyce](#) (Chair in Black Art and Design, UAL; Co-I from July 2022 to May 2023) contributed to the development of a case study focused on iniva's archive (Strands A&B).

[Professor Mick Grierson](#) (Professor and Research Leader, UAL Creative Computing Institute) and [Professor Rebecca Fiebrink](#) (Professor, UAL Creative Computing Institute) co-led on Strands C&D of the project, focused on participatory co-design workshops and interactive ML technology development.

[Dr Athanasios Velios](#) (Reader in Digital Documentation at UAL Camberwell, Chelsea and Wimbledon colleges; Co-I until December 2022) contributed to the project's early technological development with a focus on possibilities, problematics and limitations of data integration, ontologies and Linked Data, including the potential to record collections' uses of the ML tool (Strands C&D).

[Dr Peaks Krafft](#) (Senior Lecturer and MA Internet Equalities Course Leader, UAL Creative Computing Institute; Co-I until September 2023) contributed to ethical considerations of artificial intelligence in terms of conceptualisations of data, and the critical impacts and implications for the technological design, engagement and outputs of the project (Strands C&D).

Mark Miller (Director of Learning, Tate) co-led Strand E with the PI, focused on public engagement through the project's culminating public programme.

Research Fellows

Ananda Rutherford developed collaborative case studies on collections information systems and practices. She supported Dalal-Clayton on the collections audit (Strands A&B), and worked with [Dr Charlotte Webb](#) (Senior Lecturer Online courses, UAL Creative Computing Institute, until August 2023) on developing and applying data ethics principles in practice across project strands.

Dr Jon Gillick (from July 2022) and **Dr Ireti Olowe** (from January 2023) focused on the ML development and user experience from programming and visualisation perspectives (Strands C&D). Two AI software engineers **Polo Sologub** (from November 2023) and **Kathryn Webb** (from November 2023 to August 2024) were

engaged in the final phase of the interactive machine learning development and design, to produce an adaptable critical analyser tool and supporting resources.

Five further **Postdoctoral Research Fellows** (from September 2022) developed critical case studies with selected partner collections and organisations, engaging with the emerging data and the evolving ML tool. Wide-ranging studies by **Dr Tiffany Boyle, Dr Alice Correia, Dr Andrew Cummings, Dr Tehmina Goskar** and **Dr Ian Sergeant** explored patterns of patronage, the language of benevolence, and texts and contexts relating to the acquisitions and interpretations of works by artists including Sonia Boyce, Hamad Butt, Avinash Chandra, Tam Joseph, David Medalla, Vong Phaophanit, Keith Piper, Donald Rodney, Gurminder Sikand, F.N. Souza and Maud Sulter, among others.

Research Assistants

Kit Bower-Morris (from February 2022 to November 2023) contributed to the early ML prototype development by coordinating and delivering participatory co-design workshops with the team and partners (Strand C).

Veera Jussila was seconded to UAL CCI (from Sept 2022 to April 2023) and contributed to the early ML prototype development with a focus on image search.

iniva Archivist

Kaitlene Koranteng (Archivist and Engagement Producer, iniva; until March 2023) led on the digitisation of iniva's artists' archive.

Public Programme Coordinator

Ariel Haviland (from Aug 2023) coordinated the Strand E public programme activity for the week-long public programme in October 2024.

Displays Producer

Rebecca Gremmo (May to October 2024) supported the production of the artists' practice research displays at Tate Modern.

Overall Programme

	Year 1 2021/22				Year 2 2022/23				Year 3 2023/24			
	Quarters				Quarters				Quarters			
	1	2	3	4	1	2	3	4	1	2	3	4
Strand A: Surfacing Bias Across Collections												
Collections audit extended and expanded (1900-2022)												
iniva artists' archive digitised												
Develop case studies on structural and systemic biases												
Case studies presented at conference and/or workshops												
Develop papers into articles/essays for edited journal/book												
Strand B: Resurfacing Artists and Artworks												
Close readings of selected artworks												
Develop case studies exploring new connections & relations between works across collections												
Case studies presented at conference and/or workshops												
Develop papers into articles/essays for edited journal/book												
Strand C: Participatory Design Workshops												
Ideation & refinement workshops with stakeholders												
ML v1 UI prototyping, user studies, testing, evaluation												
ML v2 UI prototyping, user studies, testing, evaluation												
Develop papers into articles/essays for edited journal/book												
Strand D: ML Technology Development												
Develop ML adapter layer to interact with collections data												
Ongoing refinement, collaborative testing & feedback												
Develop papers into articles/essays for edited journal/book												
Strand E: Public Engagement and Impact												
Establish & maintain project resources on GitHub												
Establish & maintain accessible public project pages												
Conference & workshops with partners & stakeholders												
Publish workshop, conference & seminar documentation												
Edited book/journal proposal(s) in progress												
Tate Learning programme R&D, production, installation												
Artists practice research residencies in progress												
Artists displays development / design / build / install / live												
Tate installation and public programme live & documented												
Art UK online showcase development, design, production												
Art UK online showcase live												

Events and Consultations

Event / Consultation	Date	Location(s)	Attendees
Audit Consultation	04.02.2022	Online	Tate Information Management team
Audit Consultation	23.02.2022	Online	Cartwright Hall, Bradford
All Day Workshop: Strands C&D	29.03.2022	UAL Decolonising Arts Institute (DeAI)	13 (project team + 1 additional Tate staff)
Tate Collection Research Workshop	30.03.2022	Tate Britain	14 (12 Tate staff including 2 Tate Co-Is + 2 TaNC Project team members)
Audit Consultation	22.04.2022	Online	Wellcome Collection
All Day Workshop: Strands A&B	27.04.2022	Tate Britain, iniva, UAL DeAI	16 (project team + 3 additional Tate staff + 2 additional iniva staff)
ML Co-design Conversation	03.05.2022	Online	Wellcome Collection
Audit Consultation	05.05.2022	Online	Sheffield Museums
ML Co-design Conversation	10.05.2022	Online	Arts Council Collection
ML Co-design Conversation	10.05.2022	Online	JISC Archives Hub
ML Co-design Conversation	11.05.2022	Online	British Council Collection
ML Co-design Conversation	11.05.2022	Online	Art UK
Audit Consultation	16.05.2022	Online	Leicester
All Day Workshop: All Partners	18.05.2022	UAL Creative Computing Institute (CCI)	34 (project team, UAL stakeholders, 18 partner organisation representatives)
Audit Consultation	23.05.2022	Online	British Museum
Audit Consultation	23.05.2022	Online	Herbert Art Gallery, Coventry
Audit Consultation	24.05.2022	Online	National Portrait Gallery
Audit Consultation	24.05.2022	Online	Bristol
ML Co-design Conversation	11.06.2022	Online	Contemporary Art Society
Audit Consultation	20.06.2022	Online	Wolverhampton
ML Co-design Conversation	27.06.2022	Online	Manchester Art Gallery
ML Co-design Conversation	01.08.2022	Online	Birmingham Museums Trust
International Partner Visit	15.09.2022 16.09.2022	VAM	Van Abbemuseum (VAM) collections and curatorial staff
ML Co-design Conversation	21.09.2022	Online	Government Art Collection
ML Co-design Workshop	25.10.2022	Online	8 (representatives from 4 project partner organisations: BCC, ACC, iniva, GAC)
All Day Workshop: All Partners	23.11.2022	UAL CCI	46 (project team, UAL stakeholders, 25 representatives from partner organisations)

Artists Welcome Workshop	17.01.2023	Tate Britain	23 (4 artists and 19 project team members)
Prototypes Conversation	01.02.2023	Online	Tate
Data Conversation	02.03.2023	Online	Birmingham Museums Trust
Two Day International Conference & Workshop	20.04.2022 21.04.2023	Van Abbemuseum	c.65 delegates, public-facing event
Artists Mid-Residency Seminar	04.07.2023	Tate Modern	c.30 delegates (project team, UAL stakeholders and representatives from partner organisations)
All Day Workshop: All Partners	15.11.2023	Tate Modern	c.50 (project team, UAL stakeholders and representatives from partner organisations)
TaNC Programme: Data Ethics Workshop	23.01.2024	Wellcome Collection	c.25 (all TaNC Projects)
TaNC Programme: Discovery Project Webinar	15.03.2024	Online	c.100 attendees
Artists End of Residency Seminar	01.05.2024	Tate Modern	c.30 delegates (project team, UAL stakeholders and representatives from partner organisations)
ML Analyser Workshop with Tate Research & Interpretation division	24.07.2024	Tate Britain	c.10 delegates (project team and representatives from Tate as partner organisation)
Museum x Machine x Me ML Workshop	02.10.2024	Tate Modern	c.34 participants – mostly conference attendees (mix of project partner organisations, students and general public)
Museum x Machine x Me ML Workshop	04.10.2024	Tate Britain	c.100 participants (general public attendees to the Museum x Machine x Me Late at Tate Britain)
Museum x Machine x Me Public Programme: Conference	02-03.10.2024	Starr Cinema, Tate Modern	c.200 attendees, plus 28 contributors. (Tate and partner organisation representatives, GLAM sector collection managers, academic researchers and students, independent consultants & representatives from start-ups working with GLAM collections)
Museum x Machine x Me Public Programme: Artists Practice Research Displays	02-06.10.2024	South Tank, Tate Modern	c.5,700 visitors (general public and conference delegates)
Museum x Machine x Me Public Programme: Late	04.10.2024	Tate Britain	c.2,000 visitors (intergenerational attendees including traditional Lates audience: primarily young people and students, as well as new audiences to Tate including conference attendees, followers of featured artists and contributors, and people interested in AI/ML technology and the arts)

Museum x Machine x Me Public Programme: Artists Archive Display and Film Screening	05.10.2024	L5, Tate Modern	45 attendees (people interested in the work of Maud Sulter and/or Evan Ifekoya)
TaNC Programme Conference: ML Workshop	20.11.2024	Contact Theatre, Manchester	15 attendees (conference attendees plus 10 project team members)
TaNC Programme Conference: Ethics as Practice Panel Discussion	21.11.2024	Contact Theatre, Manchester	c.70 attendees (TaNC projects representatives, policymakers, GLAM sector practitioners, academics)

In addition to the above events and consultations, one-to-one co-design consultations and conversations continued throughout the project.

Research Approach

Context

Transforming Collections sought to complicate the ‘digital cultural record’ by embedding decolonial approaches and decolonising impulses to interrogate the structures and narratives of art, nation and heritage. Building on the findings of the AHRC Black Artists and Modernism project (2015–18, led by Prof Boyce with Prof Lok as Co-I and Dr Dalal-Clayton as Research Fellow), the UKRI MIMIC project (Musically Intelligent Machines Interacting Creatively, 2018–21, led by Prof Grierson), and the recent TaNC Foundation project, *Provisional Semantics* (led by Tate with Dr Dalal-Clayton as Co-I and Rutherford as Research Fellow). The project also built on UAL and Tate’s past and current work on the challenges facing collections. These include ‘Tate Encounters’ (Dewdney, Dibosa, Walsh, 2007–12) and the HLF-funded ‘Archives and Access’ project involving digital access, participation and learning with archives; revisions to the ‘Art and Artists’ database; and an ongoing audit of legacies of slavery in the historic collection (2012–17). Tate’s ‘Accounts and Accountability’ project (led by Griffin) addressed the history of collection interpretation and the ways in which it has perpetuated racism, imperialism and white supremacy, to underline the need for all new written accounts to be representative of Tate’s commitment to anti-racism, institutional accountability and inclusive language.

Transforming Collections took up the problem of pervasive colonial perspectives and persistent oppressive narratives, whereby public institutions (including collections) contribute to and perpetuate an exclusionary and reductive ‘shared’ cultural archive that fails to recognise, represent or reflect the heterogeneous histories and experiences of the racialised and minoritised global majority.⁵ Structural and systemic biases were acknowledged across cultural, museological and technological dimensions and spaces of the project. Researchers at the intersection of social justice and artificial intelligence (AI) have shown that AI systems can amplify racism, sexism, ableism and other forms of discrimination; ML can be used to detect and balance bias in text collections;⁶ and data augmentation can help to prevent discrimination and disambiguate data structures;⁷ while data feminism presumes that oppressive systems of power harm all and hinder the possibility of creating lasting social impact with data science.⁸ Artists, activists and academics (such as Stephanie Dinkins’ transmedia practice) continue to build the movement towards equitable and accountable AI (such as the Algorithmic Justice League, founded by Joy Buolamwini, 2016), and ethical treatment of data to combat racial injustice (such as Black Beyond Data, led by Jessica Marie Johnson and Yomaira Figueroa-Vásquez).

⁵ Gloria Wekker, *White Innocence: Paradoxes of Colonialism and Race*, 2016.

⁶ Lucas Dixon et al., ‘Measuring and Mitigating Unintended Bias in Text Classification’, in *Proceedings of the 2018 AAAI/ACM Conference on AI, Ethics, and Society* (AIES ’18: AAAI/ACM Conference on AI, Ethics, and Society, New Orleans LA USA: ACM, 2018), 67–73, <https://doi.org/10.1145/3278721.3278729>.

⁷ Shubham Sharma et al., ‘Data Augmentation for Discrimination Prevention and Bias Disambiguation’, in *Proceedings of the AAAI/ACM Conference on AI, Ethics, and Society* (AIES ’20: AAAI/ACM Conference on AI, Ethics, and Society, New York NY USA: ACM, 2020), 358–64, <https://doi.org/10.1145/3375627.3375865>.

⁸ Catherine D’Ignazio and Lauren F. Klein, *Data Feminism*, Strong Ideas Series (Cambridge, MA: The MIT Press, 2020), <https://data-feminism.mitpress.mit.edu/>.

Approach

Transforming Collections sought to evolve an ethical and interdisciplinary braided approach underpinned by decolonial feminist praxes by 1) folding the critical art historical and museological research into the interactive ML development and participatory design; 2) ensuring the technological development was driven by researchers' questions and needs; and 3) embedding creative practice-based research in collections and artists' active engagement with the interactive ML tools in development. This approach addressed barriers between collections, audiences and artworks by:

- Ethically engaging diverse researchers as core stakeholders invested in the development, design and testing of the ML prototypes;
- Building on existing systems to create adaptable interactive ML tools for critical analytical purposes;
- Enabling researchers, partners and wider audiences to create, test and train ML models to cross-search bespoke collections datasets using the ML tools, enhancing discoverability, accessibility and encouraging criticality by surfacing patterns and connections in the data;
- Generating wide-ranging user and research case studies to evidence the need for sustained critical analyses to interrogate and transform collections;
- Creating a critical, reflexive, research-driven, open and lightweight ML tool, framework and resources, available to all TaNC programme projects, partners and related institutions, with the potential to roll out beyond the TaNC programme timeframe;
- Establishing accessible online resources to share discoveries with general and specialist audiences e.g. UAL DeAI project pages and YouTube channel, UAL CCI GitHub;
- Engaging wide-ranging audiences through an ambitious public programme centring artists' practice research through high-profile displays and online showcases.

Questioning whether a future, unified 'national collection' is realisable or desirable and imagining instead an evolving, distributed, uneven and dynamic 'whole', *Transforming Collections* sought to deepen and complexify connections and engender new relationships between objects, collections and the publics they seek to engage and represent. We developed an ethical and inclusive approach to ML to support the critical analyses of collections text and image data, to contribute to the democratisation and decolonisation of relations of power in the human/digital sphere, between museum, people and machine – not only in terms of how collections' data is defined, held and accessed, but also in relation to the collaborative production, expansion and contestation of knowledge. The project still has the potential to significantly transform the galleries, libraries, archives and museums (GLAM) sector, and thus impact on related disciplines and practices, such as art history and museology. Mobilising ML as critical analytical tool, to slow down habitual thinking and workings, and surface at scale the evidence of systemic problems in collections, as well as artists and artworks 'hidden in plain sight', we aimed to demonstrate the radical possibilities for *Transforming Collections* and reimagining art, heritage and nation.

Impact on Digital Search

Transforming Collections has not attempted to solve the decades-long challenge of developing universal or unifying database and search standards. Rather, we started from the assumption that information systems are never neutral or objective: that there will always be problems of bias, ‘misclassification’ and inconsistencies in data; and that the so-called ‘truth’ of labels or categories can always be contested, whether they appear to be factual or speculative, conventional or controversial.

We approached linguistic data as both bridge and barrier to visibility, searchability and value. We sought to address barriers by testing ML’s capacity to uncover patterns in data, combined with data science techniques, to reveal and examine latent biases: e.g. the persistence of problematic and offensive language and terminologies that may reflect inherited colonial views and imperialist values, thus perpetuating systemic discrimination and exclusion; or patterns in patronage and purchase data that expose networks of power and influence. Our aim was to build bridges between inconsistent datasets by developing a ML tool that could be trained to search different objects, formats (e.g. texts, images) and data management systems, thereby enabling unexpected connections between collections, and new interpretative frames, narratives and histories to emerge.

We worked with partners and collaborating organisations who hold or support distinct UK public art collections of varying scales, from large collections deemed nationally significant to smaller yet arguably equally significant and influential municipal or civic collections. Regardless of size and profile, all hold a strikingly low percentage of works by Black artists (less than 5%), compared to the representation of the UK population from ‘minority ethnic’ or ‘non-white’ backgrounds (c.18%, 2021 Census). Our partners share a commitment to understanding how artists and works have come to be under- or misrepresented, classified, categorised, ‘highlighted’ or hidden, described, narrativised and de/valorised within collections and the wider culture. We have:

- Developed adaptable supervised ML software that can work with small bespoke datasets, derived from different formats and locations, enabling digital cross-search and research into this bespoke collections data;
- Used selected interactive ML methods and participatory design approaches working with diverse academic and non-academic stakeholders to control the process of determining significance according to individual experience and expertise, e.g. defining labels, designating values and generating bespoke metadata;
- Trained interactive ML models to reveal patterns in data within and across disparate datasets; to see what is ‘highlighted’ or hidden, ‘similar’ or ‘different’, under-explored or absent within collections; to surface old/new relationships and create interconnections;
- Discovered new and unforeseen links between disparate objects, stories, histories and locations.

Impact on Research Capability

We have brought decolonial, critical race theory and intersectional feminist approaches to both the ML development and design,⁹ and to the analyses of connections surfaced using the evolving ML framework, as braided work strands. A series of research case studies focused on works by ‘artists of colour’ demonstrated the significant need for enhanced and expanded research capability for multi- and cross-disciplinary academics (e.g. engaged in art historical, museological, artistic and curatorial research), and the potential for the ML analyser tool to help meet this need, hence the potential benefit to museum and heritage studies, information and archival sciences more widely. Researchers’ expertise in identifying, contextualising and interrogating the latent colonialism, racism and imperialism of collection terms, concepts and information hierarchies, shaped the iterative ML development. The resulting ML tool enables researchers to better evidence enduring problematic practices by surfacing patterns in language, imagery, the privileging or deprivileging of particular subjects, objects, themes and understandings through time and across locations. Applied ethically and reflexively, the ML tool has the potential to impact positively on research capability, by slowing down habitual thought processes, choices and assumptions; by scaling up the evidence available that attests to the reparative, restorative work that needs to be done; and by generating new connections that can lead to radical re-framings of artists, works and the collections themselves. In addition to research case studies, a series of practice research residencies undertaken by artists of colour resulted in works that activate the critical and creative potential of ML in transforming how we access, navigate and understand collections. Emphasising the importance of physicality and materiality of collections’ architectures, spaces, objects, documents and ephemera that exceed the digital, the project underlined the need to breach and complicate digital/analogue boundaries in order to broach new understandings and possibilities for what collections can become.

At Tate, the *Transforming Collections* project afforded the time and resources to evidence unequivocally the ways in which biases are manifested (in language, inaccuracy, overdetermination, the selection and prioritisation of information, absence and erasure), to recognise the impact that they have on shaping art historical discourse and artistic careers, to reckon with the specificity and scale of these inequalities, and to draw clear and constructive distinctions between discriminating and discriminatory interpretation, in order to develop new approaches to the researching, writing and editing of collection texts at Tate, and across the sector.

At iniva, the project enabled the strategic partial digitisation of iniva’s uncatalogued archive of nearly 3,000 slides and 180 artists’ files, which established a valuable dataset for critical comparison with partners’ collections data. The digitisation process surfaced questions and ambiguities around archival donation policies and processes, and the need to address artists’ rights within a changing archive. This work forms part of iniva’s ongoing strategy. The digitisation of materials within the context of the project enabled iniva to secure further funding to continue the work, and thus represented a vital step towards iniva’s creation of a unique research resource, now publicly accessible. The archive demonstrates iniva’s historic championing of ‘artists from around the world whose work and ideas provide new perspectives for Britain’s [still] predominantly western-centric view of the visual arts’, and their continuing work ‘predominantly with British-born and British-based visual artists of African and Asian descent’. As a direct outcome, iniva is hosting a LAHP CDA-funded PhD student from UCL (2024-27) who will utilise the archive for their research into artist archives in the UK.

⁹ Margaret L. Andersen and Patricia Hill Collins, ‘Why Race, Class, and Gender Matter’, in *Inequality in the 21st Century* (Routledge, 2018); Christina Dunbar-Hester, *Hacking Diversity: The Politics of Inclusion in Open Technology Cultures*, Princeton Studies in Culture and Technology (Princeton, NJ: Princeton University Press, 2020).

Impact on Public Engagement

Transforming Collections embedded public engagement at key points in its design and delivery. UAL DeAI project webpages and a UAL CCI GitHub were established in Year 1, with content regularly updated to engage general audiences in the project's aims, activities and findings emerging through research case studies and artists' practice research residencies. By the end of the project, a rich archive of images, texts, reports and recordings was made available through the project pages and dedicated YouTube playlists, with the open-source GitHub hosting ML resources including videos, walk-throughs and tutorials, and various publications in progress.

At the mid-point of the project in Year 2, we held an international two-day conference at Van Abbemuseum in Eindhoven called *Transforming Collections, Rewinding Internationalism*, to share work-in-progress and gain feedback from specialist audiences already engaged and committed to interrogating museums and collections from decolonial perspectives, building on and expanding networks in the Netherlands. Attended by c.65 delegates, the conference was significant as the first public opportunity for wider audiences including artists, museum professionals and digital humanists outside the UK to engage with the evolving ML prototype.

Towards the end of Year 3, *Transforming Collections* culminated in a major public programme called Museum x Machine x Me, curated in collaboration with Tate Learning. The week-long programme presented project research findings and emerging outputs within the wider contexts of arts and digital humanities discourses, GLAM sector challenges, practice and research at the intersections of museums, heritage and AI. Tate Modern hosted a two-day conference and practice research displays, a screening and panel discussion, while Tate Britain hosted conversations, pop-up talks, interventions and performances, with interactive machine learning workshops taking place across both sites. Specific artworks came in focus through close readings across the Tate Britain galleries while other archives were showcased across the programme, allowing direct engagement with artworks and artefacts analysed within the project.

Museum x Machine x Me will have a lasting impact on Tate Learning going forward, with plans to embed learnings into upcoming programmes. By expanding beyond traditional research dissemination formats, the programme provided a variety of engagement points, enabling the project to share the research ideas and outcomes with diverse audience groups including academic and institutional stakeholders, as well as specific communities of artists, independent researchers, consultants and start-ups invested or implicated in collections. Attracting nearly 8,000 attendees, Museum x Machine x Me successfully realised new and ambitious approaches to cross-site and cross-disciplinary programmes engaging intergenerational audiences in new art and technologies.

Transforming Collections also worked with Art UK to highlight researchers' case studies through selected artists and artworks online. So far, Art UK has added 10 artists previously unrepresented on the platform, as well as 65 new artwork records and 76 new images to their database, with more content due to go live in early 2025. As the aggregate site for all public art collections in the UK, this collaboration demonstrates the potential for research-grounded Curations and Stories to enhance the visibility and discoverability of hitherto hidden or overlooked artists and artworks.

Project Design and Methodologies

Transforming Collections was designed around five parallel and interweaving work strands.

Strand A: Surfacing Bias Across Collections – Critical Case Studies

Strand B: Resurfacing Artists and Artworks Across Collections – Critical Case Studies

Strand C: Participatory Design of ML – Ideation and Refinement Workshops

Strand D: Interactive ML Technology Development – Prototyping and Testing

Strand E: *Transforming Collections* – Public Engagement and Impact

Collections research case studies (Strands A&B) and ML technology (Strand D) were developed in tandem, ensuring that critical research and design processes were mutually informed and driven. Embedded participatory design and feedback mechanisms (Strand C) were established to sustain a collaborative ethical and interdisciplinary approach. Project strands drew on the collections audit data, and the new digitised data from iniva's archive, along with diverse datasets provided by Tate and our 14 UK partners and organisations. Strands addressed the outlined project questions as follows:

In **Years 1 and 2**, work strands converged through a series of c.30 workshops/seminars/consultations interweaving critical research enquiries and ML co-design, following a participatory action methodology to avoid extractive relationships.¹⁰ Project partners, collaborating organisations and local stakeholders were invited to participate in selected workshops, along with representatives from all the TaNC Discovery Projects. Three major All Partners Workshops took place to share research case studies in progress (Strands A and B) and test the ML prototype in development (Strands C&D).

Year 2 saw four artists of colour join the project to undertake practice research residences, engaging with selected partner collections including Tate. After an initial period of research, artists developed proposals for critical and creative interventions in response to the connections surfacing through the research case studies, and the potentialities and risks of ML in the context of collections (Strand E).

In April 2023, the **mid-point** of the project was marked by an international conference co-hosted with Van Abbemuseum (VAM), timed to coincide with their major exhibition, 'Rewinding Internationalism' (November 2022 to May 2023). The conference provided an international context for reflecting on the project's questions, methodologies and progress, situating the notion of a 'national collection' and questions of access, inclusion and decolonisation in relation to other local-international initiatives and practices (e.g. Collecting Otherwise at the Nieuwe Instituut), and testing the ML prototype. Importantly, this context foregrounded the potential of exhibition-making as a critical site of creative archival research, featuring new artists commissions including by Prof susan pui san lok, works from numerous European museum collections across ten galleries, and a keynote from the transdisciplinary American artist and academic, Professor Stephanie Dinkins (Strands D&E).

Towards the end of **Year 3**, *Transforming Collections* culminated in an ambitious high-profile public programme, Museum x Machine x Me, curated with Tate Learning across two sites, Tate Modern and Tate Britain. Framing the project to emphasise the shared agency and responsibility of individuals, institutions

¹⁰ Sasha Costanza-Chock, *Design Justice: Community-Led Practices to Build the Worlds We Need*, Information Policy series (Cambridge, MA: The MIT Press, 2020).

and technologies, the programme of discursive and participatory events included a two-day conference, artists displays and an expanded Late event, with the aim of engaging a broad and diverse audience. An accompanying print and digital Museum x Machine x Me catalogue was produced as a record and resource, contextualising and summarising the project's questions, case studies, highlighting artists' residencies, selected artworks and emerging outputs, in order to extend the project and programme's reach and impact beyond the funded period.

Alongside UAL DeAI project pages, playlists and UAL CCI GitHub resources, an online showcase in collaboration with Art UK highlights particular research case studies through spotlighted artists and artworks. At the end of the project, a selection of articles and interviews were in preparation for publication in *Tate Papers* (February 2025), with an edited book publication in development (Strand E).

Research Results

Strands A&B: Surfacing Bias Across Collections/Resurfacing Artists and Artworks

Strands A&B have focused on four areas of activity: a collections audit; a Tate case study; selected digitisation of Iniva's artists' archive; and a range of case studies shaped and informed by this evidential knowledge base.

The purpose of the **collections audit** (led by Dr Anjalie Dalal-Clayton with Ananda Rutherford) was to create a dataset of currently held information on works by Black artists in a UK-wide selection of 31 public collections.¹¹ The first audit stage updated the lists of modern and contemporary works (initially identified as part of the AHRC Black Artists and Modernism project) by extending the audit period from 1900 to 2016, to 1900 to 2022. Data collecting and processing was completed for the 31 collections in November 2022: 3,767 artworks within the scope of the audit, by 578 individual artists and artist groups were identified. The second stage, which expanded on the basic inventory and acquisition data to gather related information, such as biographical data, cataloguing records, descriptive and interpretive texts, was completed in January 2023. The resulting dataset evidences which artists are currently represented (or not) within a sample of UK collections, and the extent and distribution of their representation over place and time. It further indicates the volume, variety and variability of available (and absent) information, and related interpretation material currently held.

A range of ethical considerations emerged while conducting the audit: these relate to the racialised classifications employed to identify artists and their potential to perpetuate divisions; how this audit might be mobilised and instrumentalised outside of the project; and how this in turn might be detrimental to the artists identified through the audit. The project stresses the limitations of the audit methodology and discourage its wholesale application by other organisations. As with the earlier Black Artists and Modernism audit, the data should be regarded only as broadly indicative of acquisition practices in a specific selection of collections within the specific period under review. As such, the data should not be interpreted as a comprehensive or definitive assessment of collection holdings, but rather as points of departure for further research, revealing, for example:

- Patterns of patronage in acquisitions policies and practices that have shaped public art collections
- Patterns in documentation, e.g. in the types of information recorded, or the privileging or omission of certain kinds of information in different contexts
- Changes in display and interpretation practices over time in relation to minoritised artists
- Patterns in the use of problematic or euphemistic concepts used to label, classify, categorise, describe and valorise (or devalorise) artists, makers, works and objects in collections

The **Tate case study** (led by Christopher Griffin and Hannah Barton) engaged Tate Research, Interpretation and Digital teams, addressing the project's research questions in several ways. Firstly, by surveying and consolidating all existing collection information known to perpetuate bias, including critical commentaries

¹¹ For continuity with the AHRC BAM project, the term 'Black artist' is defined as an artist with African, Caribbean, Asian or MENA-region heritage.

from staff and audiences (e.g. in the form of offensive or euphemistic language, the absence or erasure of certain histories, and the under-representation or misrepresentation of identities). Secondly, by analysing editorial approaches and interventions within collection texts (e.g. catalogue entries, gallery captions) to address instances of discrimination. Thirdly, by scrutinising the infrastructures that determine how Tate manages, produces, stores and presents information and makes discoverable the 150,000 collection items on www.tate.org.uk through a process called Subject Index tagging.

An internal review of the ways in which descriptive terms are applied to collection items during the acquisition and cataloguing process, and subsequently data processed and linked, revealed variances in approaches to Subject Index tagging since its introduction over 20 years ago. Examples of incorrect, problematic and inconsistent tagging also represented the risks of reproducing biases and perpetuating harmful experiences for Tate's audiences. By mapping the numerous departments, disciplines, systems and platforms implicated in knowledge capture and production, information management, and the online presentation of Tate's collection, the review made evident the contingency of cultural knowledge production. The ongoing research addresses questions of authorship, ownership and responsibility over the Subject Index tagging process; the extent and approach to any remediation work on tags and texts, examples of which demonstrate the ethical considerations to be embedded in the project's ML development.

A series of historiographic case studies undertaken by project researchers analysed text-based digital records ranging from interpretation panels to acquisition notes, as well as analogue accession documents, correspondence and exhibition ephemera, to reflect critically on the ways in which artworks have been understood over time. These analyses also informed the interactive machine learning development, for example, by training the prototype to identify the recurrence of orientalist tropes in artwork descriptions. Interrogating Tate collection as a case study has been key to *Transforming Collections* in addressing how system architectures come to define information practices and collection narratives. As home to 'the national collection of British art from 1500 to the present day', Tate represents a microcosm of the wider GLAM information landscape. As such, it makes a significant contribution – and hence exerts significant influence – on the wider cultural digital record.

The **National Museums Scotland** case study (led by Dr Hannah Barton) further addresses and critiques collection cataloguing as a form of critical practice, referring to Tate's Subject Index tagging system and National Museums Scotland's online collection search facility as examples. The study has considered the technical systems that underpin online collection search facilities and the cross-disciplinary museological practices that contribute to the management and development of collection data as a contingent form of knowledge production. Many collecting institutions use technical systems and databases to record information about objects. To produce object records, system users will typically input data into a variety of fields via workflows. When data entry completes, records may then be searched, linked, referenced and interpreted by other users. Catalogues might also be digitalised and expressed via an online search facility, replete with technical affordances that aid, inhibit or otherwise inform the ability of a user to retrieve or interpret the collection object via a website interface. Once made publicly available, object records will contribute to emerging forms of cultural knowledge, themselves mediated in uneven ways via networked assemblages of digital technologies. It is in this context that the research considers the 'contingent' forms of knowledge production that emerge from the interplays between technical systems, museological cataloguing practices and the development of website user interfaces, and asks, how might institutions account for this dynamic, to be inclusive of the extant and emerging biases latent within their contingent catalogues?

Digitisation of iniva's archive of approximately 200 'artists from around the world' was completed in spring 2023. Founded in 1994 in response to the lack of 'Black and Asian' artists within the mainstream visual arts sector, the digitisation of the archive was a strategic step towards enriching iniva's offer as a unique research resource. Pragmatically addressing the question of how we might surface suppressed histories, amplify marginalised voices, and re-evaluate artists and artworks ignored or sidelined by dominant narratives, the digitisation process established a dataset for comparative critical analyses. The cataloguing of the digitised archive, now an accessible public resource, is an ongoing activity led by iniva.

A range of **critical case studies** have led to numerous outputs, including published or in-progress articles, papers, reports and presentations, including:

Dr Hannah Barton (Co-Investigator, Tate then NMS), on the technical systems that underpin online collection search facilities and the cross-disciplinary museological practices that contribute to the management and development of collection data as a contingent form of knowledge production (see above National Museums Scotland case study).

Prof Sonia Boyce (Co-Investigator), on the questions raised by digitising iniva's artist's archive around its constitution, care and relation to other archives and collections.

Dr Tiffany Boyle (Postdoctoral Research Fellow), on the acquisition of works by the artist Maud Sulter in museum collections across Scotland and works by Donald Locke in the Tate Collection.

Dr Alice Correia (Postdoctoral Research Fellow), on the acquisition and interpretation of artworks by artists of South Asian heritage, focused on F.N. Souza (1924–2002), Avinash Chandra (1931–1991) and Gurminder Sikand (1960–2021), encompassing: close critical reading of the internal and public-facing interpretive information written by Tate curators between 1993 and 2022 about Souza's painting *Crucifixion* (1959, T06776), revealing significant Eurocentric biases, errors and omissions in how his career and artistic reference points were perceived and presented; an audit of works by Chandra in public collections that has revealed the importance of W.G. Archer to Chandra's career, who, as Emeritus Keeper of the Victoria and Albert Museum's 'India Section', rooted Chandra's work within a particular South Asian framing that has had ramifications for how his work is positioned and interpreted today; and the purchase of eight paintings by Sikand by six public collections in the Midlands and northern England during her lifetime, underlining the significance of 'the regions' to Sikand's thoughtful, practice-led, decolonial feminism within the narrative of British art.

Dr Andrew Cummings (Postdoctoral Research Fellow), on Tate's acquisition, description and display of work by queer artists of the global majority including Hamad Butt (1962–1994) and Kim Lim (1936–1997). The research considers absences in the records around the pre-history, institutional delay and possible identity politics at play, in the acquisition of Hamad Butt's *Familiars* (1992, T14779), rejected multiple times for purchase by Tate in the mid-1990s and eventually entering the collection as a gift in 2014, supported by a letter from 60 artists, curators and academics. Cummings also looks at tendencies to describe work by Lim (one of the most widely collected artists of the global majority in public art collections in Britain) as 'delicate', 'meditative', 'restrained', 'decorative', which emphasise the supposed influence of her Asian heritage on her art, in contrast to evidence in Lim's archives that the artist saw her work in wholly different terms. Experiments with the ML prototype surfaced more widely the pervasive tropes in the language used to describe works by artists with East and Southeast Asian (ESEA) heritage, from Richard Lin Show Yu to Yuko Shiraishi, highlighting orientalist generalisations and assumptions that are further perpetuated in

descriptions of work by artists said to be influenced by ‘Eastern’ art and culture, such as James McNeill Whistler and Albert Joseph Moore.

Dr Anjalie Dalal-Clayton (Co-Investigator), on the process and ethics of the Collections Audit (with Ananda Rutherford); on the acquisition and interpretation of work by the artist Tam Joseph (b.1947) across several collections; and Tate Britain’s interpretation strategies for Rex Whistler’s mural *The Expedition in Pursuit of Rare Meats* (1927), including the recent commission from the artist Keith Piper (b.1960). The research on Joseph seeks to reposition the artist whose work, held in 13 UK public collections, has been presented almost entirely in terms of its socio-political content and contexts, rather than in relationship to the canon of British art and contemporary art history. Despite the regular appearance of two paintings, *Spirit of the Carnival* (1982) and *UK School Report* (1984), in major collection displays and survey exhibitions, including Tate Britain’s *Life Between Islands: Caribbean-British Art 1950s – Now* exhibition (2021–22), Joseph is absent from the mainstream narratives of British art since the 1980s. Dalal-Clayton reflects on the potential of the project’s ML text analyser tool to help art historians, curators and collections cataloguers to identify at scale, examples of the tendency to approach the interpretation of work by racialised and minoritised artists in such delimiting and partial ways, and proposes a slow, object-centred and artist-directed approach as an effective alternative. A further case study offers a critical analysis of the institutional interpretation history of Whistler’s mural over nine decades, and Tate’s attempts since 2020 to address the racist and imperial attitudes that informed the artwork’s production and celebration, looking then at Keith Piper’s *Viva Voce* (2024) (the first commissioned artist’s response and most recent interpretation to be presented by Tate) to reflect on the benefits of artistic practice-based research as alternative methods for contextualising and interpreting the racist images and logics that reside insidiously in public art museums and collections.

Dr Tehmina Goskar (Postdoctoral Research Fellow), on patterns of patronage and the mechanisms, influences and languages that shape the acquisitions that make up the UK’s public art collections. This three-part case study examines the *Transforming Collections* Audit data on 3,767 artworks with a focus on 1) Gifts: Identifying approximately 41 types of acquisition from 321 distinct expressions of acquisition across the sample of 31 national and civic collections, gifts and gift-like exchanges account for 24% of acquisitions with nearly 10% being a direct gift from artist to museum; if the architecture of museum documentation is designed to forget or misremember the networks and negotiations between museum, artist, curator, donor, sponsor and funder, seldom exposed to the public, this dataset opens up alternative forms of understanding gift-giving and exchange systems in the context of decolonial thinking and diverse worldviews. 2) Patronage: Analysing the mechanics and relationships of how artworks by racialised artists enter public collections and the contextual histories of specific acquisition processes and impulses (including philanthropic support of the Government Art Collection through the Robson Orr TenTen Award (2018-), British Council Collection acquisitions following their major international touring exhibition *Common Ground* (2003-2007), positive action schemes by the Contemporary Art Society and the Art Fund, and interventions by artists’ family estates), the research examines the effect of acquisition contexts on the uses, perceptions and interpretation of artworks and their public ownership; and argues that monetary value plays a relatively small role in acquisitions and the patronage of artists, and it is proximity to a patron’s networks of influence that frequently overrides this, providing institutions and artists with ‘positional goods’ with which they can build further patronage networks. And 3) Benevolence: The language of benevolence heavily influences the politics and processes of representation in public art collections, increasingly entwined with the language of equity over the last decade. Experimenting with the ML tool to train it to recognise the encoding of benevolence and equity in the public documentation of museums, using training datasets drawn from approximately 10,000 excerpts of texts (such as collections and acquisition policies, annual reports,

particularly the Contemporary Art Society, Art Fund, Government Art Collection, Arts Council England Cultural Gifts Scheme, Arts Council Collection, British Council Collection and Tate), this study combines human–computer interaction and cultural analysis approaches to pattern changes and features of language use relating to acquisitions and collections development, with the aim of intensifying the spotlight on the often-occluded mechanisms and relationships underpinning public art collections.

Christopher Griffin (Co-Investigator), on discrepancies between the comparative breadth of acquisitions and depth of knowledge around particular works, revealing that while Tate has broadened its representation of artists in the collection over the last 20 years, cataloguing has not kept pace to ensure that knowledge is also deepened (see above Tate case study.)

Prof susan pui san lok (Principal Investigator), on the acquisition, interpretation and display of works by Vong Phaophanit (b.1961) and Clare Oboussier (b.1963) in the Tate Collection; on the constitution, care and relation between archives and collections, through practice research into the Gate Foundation archive within the Van Abbemuseum Collection; and a film exploring movements in and out of visibility, collections and display of works by artists including Keith Piper (b.1960), Lubaina Himid (b.1954), David Medalla (1942–2020), Jananne Al-Ani (b.1966), Lesley Sanderson (b.1962), Neil Conroy (b.1938) and Phaophanit/Oboussier. Analyses of collection and archival data relating to Phaophanit's *What Falls To The Ground But Can't Be Eaten* (1991) and *All That's Solid Melts into Air (Karl Marx)* (2006), made in collaboration with Oboussier, highlights institutional aspirations to address past oversights, tensions, gaps and misinformation in the complex exhibition planning and decision-making processes relating to acquisition, display and storage; and recurring orientalist tendencies in interpretation approaches. Circling archives and squaring collections, practice research into the Van Abbemuseum Collection and UK-based artists' archives has driven the concurrent development of two artworks by lok, *REWIND/REPLAY* (2022–23) and *Re Moves* (ongoing), that attend to the multitudes of unheard voices, within, without and outside museums, and attempt to experimentally explore ways to re/sound, re/voice, re/imagine and re/constitute 'our' archives and collections in motion.

Ananda Rutherford (Postdoctoral Research Fellow), on the process and ethics of the collections audit (with Dr Anjalie Dalal-Clayton); embedding data ethics within the methodology of the project (with Dr Charlotte Webb); ethical practice across the TaNC programme (with other Discovery Projects researchers); and more broadly at the intersection of academic research, technological innovation and museum collections, suggesting ways to mitigate the harms of working within structurally racist and traditionally normative organisations and conventions of practice that involve a shift from formal data sharing agreements towards ethical frameworks that address behaviours and values in practice. A case study problematising artwork cataloguing and machine learning (with Dr Jon Gillick), focused on a Tate dataset of online object-description texts identified as problematic in terms of language and content and efforts within Tate to reappraise artwork descriptions through a critical, ethical and anti-racist lens, to reflect on what is needed to produce ethical, equitable, anti-racist information on artworks, what role machine learning can effectively play, the misapprehensions and gaps between the expectations and promise of AI, and the implications of its application within the museums and gallery sector.

Dr Ian Sergeant (Postdoctoral Research Fellow), on the acquisitions and narratives around the work of the late artist Donald Rodney (1961–1998) held across seven national and civic collections; on cultural archives between the 1970s and 1990s, initiated by racialised and minoritised artists, that either exist independently of national public collections or have since been acquired by public collections; and analyses of artworks in the Tate Collection, including *Standing Figure with African Masks* (2018, T15143) by Claudette Johnson MBE,

and Rotimi Fani-Kayode's photographic series, *Abiku (Born to Die)* (1988, P82469–P82472). While the latter's title locates these artworks within traditions of Yoruba mythology of Western Nigeria, the exploration of Fani-Kayode's representations of Black masculinities and sexualities in *Abiku* and other artworks acknowledges the artist's knowledge and use not only of Yoruba traditions but also European art history, in defiance of essentialist, binary and heteronormative assumptions.

Dr Charlotte Webb (Postdoctoral Research Fellow), on the interdisciplinary formulation, reflection, testing and embedding of data ethics within the methodology of the project, towards a data ethos (with Ananda Rutherford).

Strands C&D: Participatory Design and Interactive ML Technology Development

The technological approach within Strands C&D of the project has focused on human-centred **participatory co-design as method**.¹² Early discussions within the project foregrounded the need for critical, ethical approaches to data. These led to the creation of two documents, both of which were shared with our partners: a **Data Sharing Working Guide** explaining how we intended to use data within the project; and a set of **Data Ethics Working Commitments**. The data ethics commitments comprised a set of principles and prompts to guide the research, and structure the series of internal and partner-facing workshop sessions focused on testing and embedding the principles within practice. The project team participated in a data ethics workshop in January 2024 in collaboration with other TaNC Discovery Projects.

Our primary technological output is a critical analytical tool in the form of an open-source software called Collections Transformer. This web-based tool was designed through the many rounds of research engagement between the Strands C&D team with researchers and museum professionals from Strands A&B within the internal project team, as well as with external project partners, and wide-ranging audience participants at *Transforming Collections* public programme workshops. Around 30 partner consultations and participatory workshops were held throughout Years 1 & 2 of the project, ranging in scale from one-to-one conversations to smaller group sessions and all partners workshops, with the aims of sharing research developments, exploring design ideas and user needs and experiences, understanding the challenges and 'pain points' for researchers or partner organisations relating to the goals of the project, and providing hands-on demos of machine learning or ML prototypes.

Collections Transformer is centred on the activity and process of creating what we have called 'analysers'. An 'analyser' is a bespoke machine learning model trained directly by end-users (e.g. art historians and museum professionals) through an iterative process called Interactive Machine Learning (IML). The process of creating an analyser is intended to present ways to define, interrogate and test narrow hypotheses about patterns that may be found in texts or images drawn from collections databases or related sources. The purpose of this engagement with machine learning tools is to assist in surfacing and evidencing the sometimes explicit but often subtle, pervasive influence and inscription of colonial views, values and ideologies in collections, through the ways that certain kinds of information are constructed, included, withheld or prioritised. This might be evidenced, for example, through patterns in the habitual use of problematic or euphemistic

¹² Peter M. Asaro, 'Transforming Society by Transforming Technology: The Science and Politics of Participatory Design', *Accounting, Management and Information Technologies* 10, no. 4 (October 2000): 257–90, [https://doi.org/10.1016/S0959-8022\(00\)00004-7](https://doi.org/10.1016/S0959-8022(00)00004-7).

language in interpretative texts, or recurring concepts in curatorial approaches towards racialised and minoritised artists, or the presence or absence of certain kinds of artworks or artists in collections, or through the rhetoric in the policies that shape acquisitions decisions, and thus collections.

While Collections Transformer leverages standard modern approaches to machine learning (in particular, it uses few-shot learning and prompting with Large Language Models or LLMs, also called Foundation models), the design of the tool carefully controls the ways in which users can interact with an underlying model. As a result, the experience of using this machine learning tool is dramatically different from common perceptions of ML as primarily a tool for automation. Findings from Strand C demonstrate that in many cases, the value to GLAM sector users of the machine learning built into Collections Transformer is not as a means of automation or a tool for efficiency. Instead, as an assistive, interrogative tool, it can support critical thinking and offering a structured reflexive workflow for exploring and finding evidence to substantiate intuitions and hypotheses, while also functioning as a mirror that reflects back the user's own assumptions or biases underlying their choices as they train the analyser.

As well as making the code for Collections Transformer's implementation open source, the Strands C&D team have also prepared documentation covering the options for using and installing the software, including a series of tutorial videos demonstrating intended applications and best practices for using the tool, shaped by the ways in which Strands A&B researchers and project partners have used and tested the prototypes through its iterations over the course of the *Transforming Collections* project.

Strand E: Public Engagement and Impact

Year 1

Year 1 focused on early conversations and development work around the *Transforming Collections x Tate Learning* public programme which would conclude the project, and the shaping of an open call for practice researchers in residencies which launched in autumn 2022 and attracted 58 applications. Fifteen artists were shortlisted and four artists selected by panels comprising TaNC project investigators and Tate curators. **Evan Ifekoya, Christina Peake, Erika Tan** and **Yu-Chen Wang** took up 15-month virtual residencies, engaging with the project's emerging findings, exploring connections across collections, and existing and emerging interactive ML software as potential investigative and creative tools. The resulting physical and/or virtual commissions critically and creatively engaged with selected partner collections, leading to new works and physical displays as part of the major public programme, *Museum x Machine x Me*, in October 2024, which attracted c.5,700 visitors over five days.

Year 2

Year 2 was marked by our mid-project international conference **Transforming Collections, Rewinding Internationalism** at the Van Abbemuseum, Eindhoven, on 20 and 21 April 2023. Bringing artistic, curatorial, art historical and museological practices into critical dialogue with machine learning development, the conference shared ongoing research and emerging project findings, and took place in the context of the closing days of the exhibition, *Rewinding Internationalism*, which featured a major new commissioned installation work by *susan pui san lok* centred on the Gate Foundation archive within the Van Abbemuseum

Collection. Conceived as a generative cross- and interdisciplinary site of speculation and experimentation, the conference was addressed to artists, curators, researchers, academics, archivists and creative computing technologists interested in exploring decolonial feminist praxes through the interrogative, interruptive and disruptive potential of practice-led research in and with museums.

Convened by susan pui san lok, Nick Aikens (Curator, Van Abbemuseum) and Scarlett Lösch (Digital Archivist, Van Abbemuseum), the programme opened with exhibition viewings, a performance and a keynote by transdisciplinary artist and academic, Stephanie Dinkins. Speakers included Amal Alhaag, Prof Sonia Boyce, Dr Alice Correia, Prof Rebecca Fiebrink, Irene Fubara-Manuel, Dr Jon Gillick, Dr Tehmina Goskar, Prof Mick Grierson, Christopher Griffin, Setareh Noorani and Ananda Rutherford. Sessions explored ongoing case studies and research on architectures and archaeologies of absence, decolonising data and unlearning erasures, and approaches to disrupting collections. The conference was attended by c.65 delegates and included a hands-on participatory interactive ML workshop with c.35 active participants, including representatives from organisations and institutions in Amsterdam, Aarhus, Rotterdam, Stockholm, Utrecht and organisations from across the UK. Edited conference recordings will be published on the Van Abbemuseum YouTube channel in due course.

Year 3

Year 3 culminated in a major public programme, **Museum x Machine x Me**, curated by susan pui san lok and Mark Miller, which took place across Tate Modern and Tate Britain between 2 and 6 October 2024. The ambitious programme of discursive, exhibitionary and participatory events unfolded through several modalities, with the aim of sharing the questions, critical and creative propositions and findings of the *Transforming Collections*’ research project with broad and diverse audiences, attracting nearly 8,000 attendees over five days, including 5,700 to the artists displays alone.

A two-day conference at Tate Modern brought project researchers into conversation with local and international academics and industry professionals traversing the fields of art history, museology, collections management, machine learning, AI and other digital technologies. Opening with a keynote conversation between artist and Professor Stephanie Dinkins (Stony Brook University) and Professor Roopika Risam (Dartmouth College), chaired by Dr Ramon Amaro, their generous reflections on the intersection of ‘museum’, ‘machine’ and ‘me’, from decolonial artistic, curatorial, archival and digital humanities perspectives, set the tone and ground for the four sessions that followed under the themes:

- Museums x Machine Learning: What Do Museums ‘Want’? And ‘What does AI need from us?’
- ‘Please Give Generously’: Giving, Keeping, Caring and Giving Back
- Looking, Listening, Reading and Writing Otherwise
- Re/voicing, Re/sounding Collections

Speakers included project Co-Investigators, Prof Mick Grierson, Prof Rebecca Fiebrink, Dr Anjalie Dalal-Clayton, Christopher Griffin; and project Research Fellows, Dr Alice Correia, Dr Andrew Cummings, Dr Jon Gillick, Dr Tehmina Goskar and Ananda Rutherford. Invited contributors included Dr David Dibosa (Tate), Dr Melanie Keen (Wellcome Collection), Dr Charl Landvreugd (Stedelijk Museum), Professor Ewa Luger (Edinburgh College of Art), Elinor Morgan (Middlesborough Institute of Modern Art) and Dr Alexandre White (John Hopkins University).

Tate Modern was also host to substantial temporary displays in the South Tank and Level 5 Exchange, presenting the practice research in progress of artists Evan Ifekoya, Christina Peake, Erika Tan and Yu-Chen Wang. The expanded Late evening programme at Tate Britain featured Tate Collection artist Keith Piper in conversation with Dr Anjalie Dalal-Clayton, award-winning artist and TedX speaker Karen Palmer AKA Storyteller from the Future, and representatives from Hyphen Labs, an international collective of women of colour focused on art, technology and activism. The critical, experimental and creative ways in which ML can be ethically engaged and activated to transform collections was foregrounded throughout the programme.

Hands-on Machine Learning workshops ran as part of both the conference and the Late event, affording a wide-range of audiences opportunities to learn about and interact directly with the ML analyser tool, connecting the area of machine learning and AI in museums for new audiences. These took place in proximity to the artists and archive displays, pop-up talks and close readings led by project researchers, including a conversation between Dr Ian Sargeant with Hardish Virk.

Impact at Tate

The impact of Museum x Machine x Me at Tate has been considerable. Whilst Tate Learning has programmed across Tate Britain and Tate Modern for many years, it is rare to run interrelated events across both sites as part of a single research programme. The *Transforming Collections* project has demonstrated how core themes and ideas can successfully connect historic and modern, international and British art in Tate's collection, as well as create bridges between the physical galleries, breaking down geographical barriers, and drawing across new and existing audiences.

A core aim of the programme was to expand beyond traditional research dissemination formats, such as academic focused conferences and symposia, incorporating a range of opportunities and events that invited diverse audiences to engage with the project themes. The interdisciplinary programme enabled a wide range of audiences to pick and choose the most suitable and valuable means for them to engage with the research themes.

Museum x Machine x Me programme learnings will inform strategic decisions around formats, contributors and audience development for future programming, especially as the Learning Department moves into a new Seasonal Programme model in 2024. The *Digital Intimacies* season in spring 2025 is already reflective of the impact this project has had on Tate's public programming, adapting existing formats to best showcase technological concepts and facilitate wide public interaction with digital tools.

Project Outputs

Transforming Collections has generated a range of outputs, including:

- Digitisation of iniva's artists archive towards a public research resource;
- Critical and interdisciplinary case studies (papers, articles, book chapters);
- A two-day international conference in partnership with Van Abbemuseum;
- A major week-long public programme curated with Tate Learning across Tate Modern and Tate Britain including new artworks created by the artist researchers in residence;
- Selected artists and artworks showcased online with Art UK;
- Accessible project pages, playlists and related digital resources for general audiences;
- Novel adaptable ML software for dissemination across the TaNC programme;
- Edited journal articles and book publications in development.

Year 1 led to the **digitisation of iniva's artists archive**, a vital step towards iniva's ongoing work to establish this as a new digital research resource.

Year 2 was marked by an **international conference** in partnership with Van Abbemuseum, with conference recordings to be published by Van Abbemuseum.

Years 2 and 3 saw various **critical and interdisciplinary collections case studies** presented (including conference papers, journal articles, book chapters), and selected artists and artworks highlighted through an **online showcase with Art UK**.

By the end of Year 3, updated content on project activities was shared on accessible UAL DeAI **project pages** including video and audio recordings and downloads, while **novel adaptable ML software** was made available to project partners and collaborators for beta testing, with resources including tutorials and walk-through shared on the UAL CCI GitHub.

The project concluded with **Museum x Machine x Me**, a **major public programme curated with Tate Learning** across Tate Modern and Tate Britain, including a two-day international conference, the presentation of **new artworks** generated by the artist research residences through practice research displays, ML workshops and an expansive late evening programme with discursive and participatory conversations, pop-up talks, archival displays and performances.

Publications include the **Museum x Machine x Me catalogue** in print and digital formats, highlighting case studies, researcher reflections and artists residencies; selected articles and interviews in **Tate Papers** (February 2025); various forthcoming journal articles; and an edited book in development.

Cross Project Collaboration

A Cross Project Workshop proposal was developed by Dr Sara Perry, Dr Katrina Foxton (*Unpath'd Waters*), Dr Anna-Maria Sichani (*Congruence Engine*) and Ananda Rutherford (*Transforming Collections*), to address a gap in programme-level engagement with research and data ethics practices. The workshop, which took place at the Wellcome Collection in January 2024, brought together representatives from the five Discovery Projects and the TaNC programme directorate to explore ethical concerns and develop recommendations for policy and practice. This resulted in the researchers' co-authored report, **'Ethics as Practice: Report on the 1st Discovery Project Ethics Workshop'** published in September 2024.

A related panel, 'Ethics as Practice: People, Data and Research', was delivered in-person and live-streamed as part of the final TaNC programme conference in November 2024, to highlight the role and importance of ethics in funded research programmes at the intersection of technology, heritage, academia and their publics. The researchers presented the findings of the report, highlighting the importance of systematic and comprehensive ethical scrutiny and values-based working, as well as the need for guidance and support in navigating through these matters at a programme level. They then invited several panellists to participate in a structured question and answer session based on the report's findings and their respective research and experiences. The panellists were: Tao-Tao Chang (Associate Director, Infrastructure & Major Programmes AHRC), Dr Tehmina Goskar (PDRF *Transforming Collections*, UAL) and Dr Paola Di Giuseppantonio Di Franco (University of Essex).

Sustainability and Infrastructure

The *Transforming Collections* project generated a range of print and digital outputs including through data acquisition and processing, research and user studies, technical experiments, archive research outcomes and the creation of new ML tools and models. These will be hosted on the UAL Creative Computing Institute (CCI) public GitHub for a minimum of 10 years, with resources to support dissemination to partners for beta testing and potential wider roll out. UAL CCI commits to maintaining all publicly viewable information in line with w3c and uk.gov guidance, maintaining open and freely accessible data where appropriate, and acting as a resource for future projects.

The research workshops conducted with all *Transforming Collections* teams and stakeholders have led to the creation of raw and analysed data regarding ways in which curators, artists, historians and other professionals identify and classify different forms of bias, and how researchers can design new kinds of Machine Learning tools to support these forms of activity. The resulting prototype IML software (Collections Transformer) allow people without ML or AI expertise to create customised text and image ‘analysers’. These analysers can be interactively trained to identify specific kinds of text and image information within large collections from a small set of examples. Our interactive prototype supports any user to create customised analysers securely with their own data, which aids in the sustainability of the project through supporting greater use. Further, analysers created with this system can be stored in the UAL repository where they will be available for further public research, or stored separately by content owners at their discretion.

Software and technical outputs are licensed under a permissive BSD license, to prevent barriers to adoption. In addition, in order to support sustainable infrastructure and value beyond the life of the project, technical documentation, including instructions for both local and cloud-based deployment and use of these specific technical outputs has been made available. This documentation also supports the deployment of our systems on commonly available cloud-based services that many UK institutions currently rely on and consider secure, including Microsoft Azure. Therefore, the systems we have developed remain deployable by any technical team without specialist machine learning capability. All technical outputs are currently stored on our enterprise Git server which has large file support and version control. Further, downloadable software is available for research purposes from this repository which can also allow for further research to be conducted without the need for cloud services, and it is our commitment that this will be maintained for the public good until 2035.

Final Recommendations

The Towards a National Collection conference held on 26 April 2023 at the British Museum highlighted institutional impulses towards standardisation, diversification and a sense of opportunity and urgency around the potential for the cumulative efforts and learnings of 30 years of investment into the digitisation of collections so far, to converge through the TaNC programme and consolidate into a digital strategy for dissolving barriers, broadening access, knowledge and representation. There was also a welcome questioning of ‘what a true digital landscape really means’, a call to ‘truly unlock potential’ and for ‘honest[y] about challenges’.

Sessions structured around the themes of ‘Innovation’, ‘Inclusion’ and ‘Collaboration’ belied their mutual entanglement and dependency as necessary conditions for meaningful engagement and world-changing research, that might not only critically challenge understandings of what the ‘challenges’ are, but also open up and transform understandings of what a ‘national collection’ might be or become. For *Transforming Collections*, inclusive practices have been fundamental to genuine collaboration and innovation in research that might afford or generate alternative world views and ‘worldings’.¹³ The pervasive simplistic and binaristic characterisation of stakeholders as ‘researchers and communities’, ‘collections and audiences’, or ‘institutions and individuals’ (misrepresented, marginalised or excluded historically and in the present), or the recognition of excluded subjects after the fact, fails to address deeply embedded structural power differentials. ‘Barriers’ are often invoked as a technological challenge to be addressed in the domain of ‘digital innovation’, while social and cultural barriers are more likely to be considered at the ‘end point’ of project delivery and dissemination, notionally addressed through a belated ‘bringing in’ of so-called ‘hard to reach’ audiences. So-called ‘collaboration’ can disguise extractive and instrumentalising practices, unless frameworks and mechanisms for reflexivity, accountability, attribution are embedded, and the ways and processes by which lines between choices, decisions, actions and consequences are drawn are also made transparent.

There is also, perhaps, a latent tendency to understand ‘true’ in this context as ‘pure’, as in a ‘pure digital landscape’. Rather than seeing the ‘digital landscape’ as an idealised future space to be ‘cleaned up’ and removed from the analogue, we might lean into the empowering notion of ‘honesty’ (if it is reciprocated and sustained) – to embrace the messy realities, complexities and contradictions of the digital and analogue artefacts and collections in the past, present and future, as inhabiting a shared and contested continuum. We might then approach the inconsistencies and gaps between analogue and digital records not as problems to be resolved and closed, but as opportunities to necessarily expose and explore the partiality of ‘truths’ and knowledges from privileged perspectives, and how these are constructed and perpetuated through particular periods, contexts and practices. This includes the truths of the hidden labour, entangled exploitations and ecological impacts powerfully demonstrated by the *Anatomy of an AI System*, cited by international guest speaker and Ars Electronica CTO, Horst Hörtner (a map of human labour, data and planetary resources using the example of Amazon Echo to show the countless components and factors behind the production of artificial intelligence systems¹⁴). If ‘standardisation’ does not enable

¹³ Gayatri Chakravorty Spivak, ‘The Rani of Sirmur: An Essay in Reading the Archives’, *History and Theory* 24, no.3, October 1985, pp.247–72.

¹⁴ Kate Crawford and Vladan Joler, ‘Anatomy of an AI System’, 2018, <https://anatomyof.ai/>.

heterogeneities, differences and gaps and hidden relations to remain or become visible, it risks replicating existing harms.

Another international guest, Setareh Noorani, spoke eloquently to the collective collaborative work at the Nieuwe Instituut on ‘collecting otherwise’, articulating the urgency of committing to collective care and accountability while testing modes of activation, contestation, and negotiation, to invigorate relations with archives and collections. Questions of heritage necessarily prompt questions of provenance, ownership, restitution and reparation too. As such, in the process of ‘unlocking potential’ for greater connectivity and accessibility, we must also ensure greater care in respecting the rights of the living, deceased, and their ancestors, identified and otherwise, whose objects have been variously ‘gifted’, donated or dubiously acquired. Attention to records and rights necessitates time and human-centred care, to rethink, enact, redress, revisit, and human-scale resistance to uncritical acceleration at scale. Here, ‘standardisation’, should refer to the standard embedding of ethical considerations, including the Nieuwe Instituut’s notion of an ‘archival care rider’, which might be expanded into an ‘archival and collections care rider.’

The systemic and structural work of change cannot be imagined, delivered or sustained without centring and sustaining the humans historically decentred yet deeply implicated in this work. Inclusive, equitable and ethical collaborative practices must underpin and drive inclusive innovation in research. This includes acknowledging and mitigating programme pressures on project set up and recruitment timelines, their cumulative negative impacts on the project team and research capacity, and the importance of allocating strategic follow-on funding to mitigate the potential erosion of research outcomes and relationships. As we close the *Transforming Collections* project, our recommendations for consolidating the work of the project and the wider TaNC programme, to maximise the potential impacts of the five Discovery Projects, are set out below.

We recommend that future funding criteria should require projects to:

1. **Recruit a diverse, inclusive and representative research team** with lived personal and professional experiences relevant to the wider questions, aims, objectives and intended audiences and beneficiaries of the project.
2. **Engage diverse and directly implicated stakeholders as early as possible** in bid development, project conceptualisation, and iterative design and delivery stages, including researchers, artists, estates and archival donors.
3. **Value and embed practice-led or practice-based research and close interdisciplinary collaboration** to help understand research enquiries and impacts.
4. **Value and embed active engagement with the ethics and ethical implications** of the research in principle and in practice.

We recommend strategic investment in:

1. Further resource to **deepen and extend critical engagement and evaluation** activities beyond the end of the funded three-year period. This would enable the triangulation and **underpinning of heritage information as data, and human/digital interactions, with ethical practice**, e.g. by examining approaches to language across all Discovery Projects.

2. Further resource for an extended programme to **roll-out durational testing** of our **adaptable, interactive ML tools** designed to work with existing infrastructures. This would enable sustained engagement to gather **feedback over time** from **cross-partner, cross-project, cross-sector and cross-disciplinary** and **international** stakeholders.
3. **Flexible interactive tools to enhance existing and future infrastructures** with **critical prompts and reflexive values**. This is needed to encourage the **rethinking** of habitual formulations, hierarchies, values and vocabularies, and enable **dynamic categorisations** or tags to be created and refined by users, **'delinking and relinking' data** to reflect back the users' choices, surfacing biases as well as unexpected relations.
4. **Long-term cataloguing** work across project and programme partnerships informed by researchers' subject specialisms and interests, using the interactive ML application as a critical analytical tool. This would enrich digital records by making more **transparent** the choices of authors, **surfacing connections, contexts and absences**.
5. **Conserving analogue archives** and collection materials recognising their **integral importance in relation to digital records**. Not to situate the digital in hierarchical opposition or superior progressive relation to the analogue but rather to **make explicit the gaps, discrepancies and omissions** across digital and analogue data, as part of the holistic and **inevitably incomplete record**.

Contacts

Prof susan pui san lok

Transforming Collections, Principal Investigator

Professor of Contemporary Art and Director, UAL Decolonising Arts Institute

s.lok@arts.ac.uk

Prof Mick Grierson

Transforming Collections, Co-Investigator

Professor of Creative Computing and Research Lead, UAL Creative Computing Institute

m.grierson@arts.ac.uk

Dr Anjalie Dalal-Clayton

Transforming Collections, Co-Investigator

Research Fellow, UAL Decolonising Arts Institute

a.dalalclayton@arts.ac.uk

Dr Andrew Cummings

Transforming Collections, Postdoctoral Research Fellow

Research Fellow, UAL Decolonising Arts Institute

a.cummings@arts.ac.uk

Dr Tehmina Goskar

Transforming Collections, Postdoctoral Research Fellow

Research Fellow, UAL Decolonising Arts Institute

t.goskar@arts.ac.uk

Ananda Rutherford

Transforming Collections, Postdoctoral Research Fellow

Research Fellow, UAL Decolonising Arts Institute

a.rutherford@arts.ac.uk

Links

Transforming Collections Project Page:

<https://www.arts.ac.uk/ual-decolonising-arts-institute/projects/transforming-collections>

Transforming Collections ML Resources, UAL CCI GitHub

<https://github.com/ual-cci/transforming-collections-ml-analyser>

Transforming Collections Zotero Library:

https://www.zotero.org/groups/4566230/transforming_collections/item-list

Museum x Machine x Me Conference Recordings, UAL DeAI YouTube channel

<https://www.youtube.com/watch?v=lzdZkAYwXvk&list=PLQu1B40IaOdgcHGVbyxCH1Vmditws8lv>

Ethics as Practice: Report on the Discovery Projects Ethics Workshop

<https://zenodo.org/records/13683142>

Press

Museums Journal, March/April 2025, forthcoming

The Art Newspaper, December 2024, forthcoming

Artnet, 9 November 2024

<https://news.artnet.com/art-world/ai-in-museums-2563665>

The Art Newspaper, 4 October 2024

<https://www.theartnewspaper.com/2024/10/04/new-display-tate-modern-highlights-role-technology-can-play-expanding-scope-uk-museum-collections>

Art Plugged, 28 September 2024

<https://artplugged.co.uk/tate-and-university-of-the-arts-london-present-museum-x-machine-x-me/>

London Post, 19 September 2024

<https://london-post.co.uk/museum-x-machine-x-me-ual-and-tate-announce-conference-exploring-art-technology-and-national-collections/>

UAL Stories

[Transforming Collections: Art UK partner with UAL to platform underrepresented artists](#), 25 September 2024

[Museum x Machine x Me: UAL and Tate announce conference exploring art, technology and national collections](#), 10 June 2024

[Transforming Collections: Reimagining Art, Nation and Heritage – Announcing the Practice Research Residencies](#), 7 March 2023

[Transforming Collections, Rewinding Internationalism at the Van Abbemuseum](#), 22 February 2023

[Transforming Collections: Report on the first year](#), 20 October 2022

[Transforming Collections: open call for practice research residencies](#), 30 September 2022

[Transforming Collections: 6-month update and researcher vacancies](#), 4 May 2022

[UAL Decolonising Arts Institute awarded £3m AHRC grant to transform UK collections using emerging technologies](#), 21 September 2021

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