

ARTSCI4Innovation at Wits: How Artists-in-Lab Residencies can catalyse innovation in an African research university

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Abstract

This paper advances a case for institutionalising ARTSCI4Innovation, the University of the Witwatersrand's (Wits) emerging programme of artist residencies embedded in scientific and engineering laboratories. It argues that such residencies represent more than an aesthetic complement to research—they constitute a vital mode of transdisciplinary knowledge production in an African context. Drawing on international precedents such as Arts at CERN and Zurich University of the Arts' artists-in-labs, the paper situates the programme within theoretical frameworks of Mode-2 knowledge and the Triple Helix model of innovation. However, it extends these Euro-American paradigms through Clapperton Chakanetsa Mavhunga's African Science and Technology Studies (STS), which redefines science as a doing before it was an institution. From this vantage, innovation emerges not only within formal laboratories but also across Africa's transient workspaces—the inventive ecologies of healers, mechanics, tinkerers, and digital artisans whose practices embody what Mavhunga calls a science of the people.

Integrating this African STS lens enables a shift from art-science translation to co-production of situated knowledge, linking Wits' laboratories with Johannesburg's informal innovation networks and advancing the goals of South Africa's 2019 White Paper on Science, Technology and Innovation toward inclusive, sustainable development. The paper outlines design principles for ARTSCI4Innovation that enact this vision through curated residencies, cross-sector partnerships, and new evaluation metrics centred on epistemic justice and community learning. Ultimately, it contends that Wits can serve as a continental prototype for a southern model of art-science collaboration—one that bridges institutional research and everyday technē, transforming the university into a living nexus of African innovation.

The fundamental goal is to nurture a new generation of people who have not only the functional technical skills but also the broader contextual and collaborative abilities to truly innovate. (Ottimo & Mau, 308)

The precursor to the ARTSCI4Innovation programme:

2018: Watershed: Art, Science & Elemental Politics, a programme of exhibitions and academic symposia to provoke new thinking about water. Wits East & West campus and Origins Centre, 10 - 21 September, 2018. (Manderson & Doherty 2021)

The ARTSCI4Innovation pilot programme - Wits artists-in-lab residencies to date:

2022: Daa Ahmedien (Egypt)

Structured Light Lab, School of Physics

2023: Renzo Fillinich (Chile)

Structured Light Lab, School of Physics

2024: Ale de la Puente (Mexico)	Structured Light Lab, School of Physics (with Goethe-Institut Quantum Studio)
2025: Hugh Sillitoe (UK)	Lightning Research Lab, School of Electrical Engineering
2025: Warrick Sony (SA)	School of Architecture and Planning
2026: Tebogo Mashane (SA)	Sydney Brenner Institute for Molecular Biosciences, Health Sciences-

1) Introduction: From “innovation theatre” to innovation practice

Universities worldwide are under pressure to demonstrate societal impact while sustaining rigorous research. In this context, artist residencies in scientific laboratories offer a practical instrument: artists enter working labs as long-term collaborators, not as after-the-fact illustrators. When well-designed, these residencies generate new questions and methods, enrich lab cultures, build public-facing narratives of science, and prototype social and technological innovations. Wits has already taken concrete steps in this direction via the Wits Innovation Centre (WIC) in collaboration with the Wits School of Arts: establishing the ARTSCI4Innovation programme. Since 2022 the programme has, convened artists’s residencies in the form of postdoctoral fellowships in the Science and Engineering & Built Environment faculties, and co-hosting in 2026 an Artist-in-Lab residency with the Sydney Brenner Institute for Molecular Biosciences (SBIMB). These initiatives position Wits to begin formalising the ARTSCI4Innovation as a flagship programme.

What distinguishes ARTSCI4Innovation from generic outreach is placement: artists become lab affiliates, accessing instruments, data, workflows, and safety regimes; labs gain new representational and conceptual resources; the university gains boundary-spanning prototypes, which we can understand as “boundary objects” that speak to funders, policy makers, industry, and civic audiences.

Going further however this paper argues that Wits’ emerging ARTSCI4Innovation programme needs to do more than import Euro-American “art-in-labs” models; it should localise these models within Africa’s own technoscientific traditions. Following Clapperton Chakanetsa Mavhunga’s insight that “science in Africa has always been a doing before it was an institution,” this initiative should push to treat laboratories as only one node in a wider ecology of experimentation that includes Johannesburg’s informal and community workspaces. In this sense, ARTSCI4Innovation can extend Wits’ innovation mission into what Mavhunga calls a science of the people—linking the university’s formal research infrastructures to the inventive practices already animating African life.

2) International precedents: evidence and patterns

Many world-class institutions have embedded artists inside high-intensity science and technology environments over the last two decades. These precedents demonstrate feasibility, risk patterns, and value propositions that are relevant to Wits.

SymbioticA (University of Western Australia) is a wet-lab in a biology department dedicated to artistic research on living systems. Since it was launched in 2000, over it has hosted over 120 residents, spawned formal postgraduate degrees, and had a significant global influence on bio-art practices and ethics globally (Catts and Bunt 2001).

Zurich University of the Arts (ZHdK) – artists-in-labs (AIL) has, since 2003, placed artists in laboratories across medicine, natural sciences, and engineering, and now runs Master-level transdisciplinary residencies. AIL is a robust higher-education model with curated placements and published reflections (Hediger 2016).

SETI Institute Artist-in-Residence (California) embeds artists with astronomers/astrobiologists in multi-year collaborations, with public outcomes and STEAM education spinoffs; the residency model has matured, since it was started in 2004, to include stipends and K-12 facing “Beyond Silos” projects. A related initiative, the “COSMOS astronomical project”, has included the South African artist, an ex-Wits Fine Arts Professor, Karel Nel, since its inception in 2004.

ANAT Synapse (Australia) partners artists with research organisations (e.g., CSIRO labs) for 16-week creative research residencies, with clear stipend structures. Started in 2004, ANAT has established a 20-year track record of over 50 residencies across 60 host organisations.

Ars Bioarctica (Bioart Society, Finland) has since 2008, placed artists at the Kilpisjärvi Biological Station with seasonal labs in sub-arctic environments. This is a successful example of field-station residencies tightly coupled to environmental science.

Arts at CERN (Geneva) has run structured residencies since 2012 (e.g., Collide, Accelerate), pairing artists with particle physicists to interrogate and communicate frontier research. The programme has been recognised by the European Commission’s S+T+ARTS initiative for innovative collaboration (Koek 2017).

And finally, in this small sample of ArtSci initiatives, the S+T+ARTS (European Commission) has mainstreamed art-driven innovation through hundreds of residencies and prizes since 2016; its STARTS4AFRICA line (2024+) explicitly localises this model in African contexts (Senegal, Ghana, Tanzania, Nigeria). This underscores the timeliness of a pan-African ecosystem into which Wits can plug. In fact, STARTS4AFRICA have already made contact with Tshimologong about hosting their workshops in Johannesburg.

Collectively, these cases show that artist placements are durable, grant-attracting, and capable of producing both cultural value and research-adjacent innovation, from new imagery and public interfaces to conceptual and methodological reframing in the lab.

3) A theoretical justification for artists in labs

3.1 Mode-2 knowledge and the Triple Helix

Informing many of these initiatives listed above is a striving towards transdisciplinarity. As theorised in Gibbons et al.’s “Mode-2” knowledge, artistic engagement is inherently context-driven, transdisciplinary, and socially distributed, Integrated within other forms of research it foregrounds problem-solving beyond disciplinary silos. While in relation to Etzkowitz & Leydesdorff’s Triple Helix model, which articulates how universities co-innovate with industry and government, artist-in-lab programmes operationalise both: artists help translate emerging science

into legible forms that travel across helices, catalysing new partnerships and funding opportunities.

3.2 Boundary objects and epistemic cultures

Another important justification for the impact of artists in labs comes from Star & Griesemer's "boundary objects" framework which explains how collaborators from different social worlds coordinate without consensus by working through shared artefacts flexible enough to be interpreted locally yet robust enough to maintain identity across settings. Artistic practice always involves the production of objects, even when the object is the artist's body as in dance or performance art. Artist–scientist teams can co-produce such boundary objects, speculative models, visualisations, immersive installation, that will enable labs, funders, publics, and policy makers to "see together" and act.

3.3 An African Science and Technology Studies lens: innovation from below

While the frameworks of Mode-2 knowledge and the Triple Helix, and the notion of boundary objects clarify how universities, industry, and government co-produce innovation, they remain rooted in Euro-American institutional genealogies. To situate ARTSCI4Innovation within an African epistemic landscape, we can draw on Clapperton Chakanetsa Mavhunga's call for a Science and Technology Studies of Africa, articulated in *Transient Workspaces: Technologies of Everyday Innovation in Zimbabwe* (2014) and subsequent essays. Mavhunga proposes that African technoscience be understood from the perspective of everyday inventive practices rather than through externally imposed models of laboratories, research councils, and industrial R&D. He describes African science as "a doing before it was an institution" — an ensemble of practices, improvisations, and situated knowledges emerging in what he terms transient workspaces: the fields of farmers, the repair sheds of mechanics, the bush paths of hunters, and the marketplaces of tinkerers.

Seen through this lens, innovation is not an imported system to be implemented but a lived practice already in motion within African societies. Mavhunga's concept of indigenous innovation or science of the people foregrounds the inventive labour of ordinary citizens: those who repurpose discarded materials, devise local energy solutions, or engineer workarounds for infrastructural failure. Such actors operate outside the formal triad of the Triple Helix yet embody a fourth strand of the innovation ecosystem: the popular sector whose resourcefulness sustains much of the continent's technological life.

Integrating this African STS perspective enriches ARTSCI4Innovation in three ways. First, it widens the definition of "laboratory." Beyond Wits' formal scientific spaces, the city of Johannesburg teems with transient workspaces - makers' markets, township garages, and digital street studios - that can function as parallel laboratories of experimentation. Recognising these as legitimate research environments allows the residency programme to connect academic inquiry with grassroots technē. Second, it transforms the artist's role from translator of science to co-producer of situated knowledge. Rather than communicating existing research to publics, artists can collaborate with community inventors, healers, and technologists to formulate new questions, materials, and prototypes. Third, it aligns the programme with South Africa's policy

commitment to inclusive innovation, reframing the university as a broker between formal science and popular ingenuity.

In practical terms, this means designing residencies that bridge the Wits labs with Johannesburg's informal innovation ecosystems; inviting, for example, a biomedical artist to co-work with herbal practitioners, or an engineering resident to collaborate with township recyclers on circular-economy prototypes. Evaluation metrics would then include not only academic and artistic outputs but also community knowledge exchange, social usefulness, and mutual learning. By embedding these principles, ARTSCI4Innovation could serve as a pilot for a "science of the people" approach within African higher education.

Ultimately, positioning the programme within Mavhunga's African STS framework de-centres Eurocentric models of innovation and grounds Wits' initiative in local epistemologies of practice. It reframes art-science residencies as instruments of epistemic justice ie. spaces where institutional laboratories meet the inventive capacities of Africa's transient workspaces, generating a genuinely southern model of collaborative knowledge production.

3.4. Thinking with Boundary Objects: Mavhunga's "transient workshops" as imagined by Russel Hlongwane with Low Def Film Factory (Francoise Knoetze and Amy Louise Wilson) - *Dzata: Institute of Technological Consciousness (2023)*

<https://arnolfini.org.uk/whatson/dzata/>

4) The South African and Wits context

South Africa's 2019 *White Paper on Science, Technology and Innovation* calls for transdisciplinary collaboration, public engagement, and innovation to address national priorities. Wits has positioned itself accordingly through the Wits Innovation Centre (established, together with its Innovation Support function, to catalyse cross-faculty innovation), and we have already piloted relevant programmes such as the ARTSCI4Innovation pilot. This has demonstrated that there is an interest and an appetite for such cross-faculty engagements. I am hoping that the next artist residency, co-hosted by the WIC and embedded in the Sydney Brenner Institute for Molecular Bioscience, will be precisely the kind of molecular-life-science context where art-science collaboration adds ethical and communicative range to the research being done by the Institute.

These moves align Wits with global peers while grounding ARTSCI4Innovation in concrete local practice.

The national policy environment explicitly supports this orientation and prompts us to take it further. The Department of Science and Technology's 2019 White Paper calls for "inclusive and sustainable innovation" through a whole-of-society approach. ARTSCI4Innovation can answer that call by extending innovation activity beyond formal laboratories to the "transient workspaces" of the city—echoing Mavhunga's description of Africa's inventive publics as partners in knowledge-making rather than passive beneficiaries.

5) Lessons from international models: what works

1. Clear placement design: Arts at CERN and ZHdK's AIL pair artists with specific labs, define residency length, and assign curatorial/academic mentors. This reduces friction and clarifies expectations.

2. Creative-research focus: ANAT Synapse dissuades pre-specified outputs; residencies prioritise exploratory collaboration while still offering stipends and timelines. This preserves genuine research conditions.

3. Wet-lab readiness & ethics: SymbioticA shows the importance of training, biosafety, and ethical frameworks when artists work with living systems or with human subjects.

4. Public-facing outcomes: all of these models demonstrate accessible public formats without trivialising science. They produce boundary objects: prototypes, performances, and exhibits.

5. African localisation: STARTS4AFRICA demonstrates a continental framework for art-driven innovation addressing local challenges; Wits can become a Southern African node.

While these programmes demonstrate methodological robustness, they largely arise from Euro-American contexts with strong R&D infrastructures. Integrating Mavhunga's African STS lens reminds us that in Johannesburg, innovation equally emerges from necessity-driven creativity such as mechanics in townships, digital artisans, herbal practitioners. The Wits model can therefore adapt international templates to an African ecosystem by valuing these "transient workspaces" as legitimate collaborators.

6) ARTSCI4Innovation: a programme architecture for Wits

6.1 Objectives:

Catalyse transdisciplinary research by embedding artists in labs to interrogate and extend scientific questions.

Build public trust through high-quality, research-grounded cultural outputs that render science legible and discussable.

Grow the innovation ecosystem by producing boundary objects that mobilise triple-helix partnerships and external funding.

Connect Wits' formal laboratories with South Africa's informal innovation spheres, acknowledging Mavhunga's conception of science as "lived, distributed practice."

6.2 Host environments:

Each host lab will be encouraged to identify external partners—community engineers, makerspaces, NGOs—reflecting the porous boundary between institutional and everyday technoscience emphasised by Mavhunga

Initial focus areas (based on existing Wits capacity and early pilots):

Life sciences (SBIMB; public health data visualisation).

Engineering & built environment (sensors, smart materials, mobility; ties to Gauteng city-region infrastructure challenges).

Physics & AI (structured light, detectors, simulation, human–AI interaction; link to national AI policy debates).

Earth & environmental sciences (mine residue, water, climate risk).

6.3 Residency formats

Core Residency (6–9 months): 1–2 artists paired with a lab; stipend; materials budget; lab mentor + curatorial lead; safety and ethics induction; public programme.

Sprint Residency/Hackathons (8–12 weeks): rapid prototyping tied to a specific challenge; demo day with partners; bridge to core or external grant. Sprints also allow rapid collaborations with community innovators, reflecting the nimble, ‘transient’ qualities of African inventive practice.

Affiliate/Visiting: short 2–4 week stays for international artists tied to seminars, critiques, and co-teaching.

6.4 Governance & roles

Programme Board (WIC + Deans + Research Office): policy, risk, funding, IP.

Residency Leads (curator/producer + academic PI): day-to-day coordination; deliverables; integrity of research and public outcomes.

Lab Mentors & Safety Officers: onboarding, biosafety training, instrument access (esp. life-sciences contexts where SymbioticA-style protocols are relevant).

6.5 Ethics, safety, and IP

Biosafety & Research Ethics: mandatory induction; alignment with Wits HREC/Animal Ethics where relevant; explicit protocols for biological, chemical, and data handling (learning from SymbioticA’s best practice).

Intellectual Property: “background IP” remains with originators; “foreground IP” handled via pre-agreed frameworks; default to open licences for cultural outputs unless commercial sensitivity applies.

Care and representation: adopt “situated knowledges” sensibility; transparency about uncertainties; avoid instrumentalising communities in public engagement.

6.6 Selection criteria (artists & labs)

Artists: demonstrated research practice; capacity for collaboration; relevant technical or conceptual fit; sensitivity to ethics/publics.

Labs: leadership commitment; clear research question(s) open to reframing; willingness to allocate mentor time and instrument access; defined public-engagement interest.

6.7 Programme cadence & outputs

Each residency produces a research dossier (process documentation + reflections), a public prototype (installation, film, performance, dataset/visualisation), and a translation artefact (teaching module, policy brief, community workshop). These become boundary objects and “evidence” in grant narratives and advisory boards.

7) Evaluation: from activity to value

7.1 Value lenses

A growing body of practice (ANAT, Arts at CERN, AIL, SymbioticA) and research on artist residencies suggests multi-level value: to individuals (skills, networks), organisations (culture, methods, communication), and regions (policy dialogues, innovation narratives). Kim Lehman's review offers a model for conceptualising these intersecting value streams (Lehman 2107).

7.2 Indicators and methods

For labs and PIs

Cultural/epistemic: evidence of reframed research questions; new visualisation or design methods adopted in lab workflows.

Communicative: improved public abstracts; media coverage quality; invited talks jointly delivered with artists.

Network/innovation: new partnerships (industry/NGO/museum), co-authored grant proposals, participation in triple-helix fora.

For artists

Research depth: lab methods acquired (documented training); reflective writing on scientific processes; peer recognition.

Outputs: exhibitions, films, datasets, toolkits; invitations to conferences and journals.

For Wits & region

External funding: success in S+T+ARTS-type calls, science-communication grants, philanthropic funds for public engagement.

Public impact: audience diversity metrics; qualitative feedback; education outreach

Policy & governance: references in municipal/provincial innovation strategies; participation in national STI consultative processes.

Methods: mixed-methods evaluation: pre/post interviews; contribution analysis; media/discourse analysis; audience studies; learning analytics from workshops; case-study write-ups modelled on Medical Museion's research-through-exhibitions (Arnold et al, 2021)

Evaluation will not only assess disciplinary impact but also the extent to which residencies enact epistemic justice—bringing vernacular inventors and publics into co-production with formal research. Indicators include mutual skill transfer, co-authored artefacts, and sustained networks between labs and community innovators.

8) Risks and mitigations

Tokenism / "innovation theatre": Avoid "show-and-tell only" formats; require research dossiers and integration into lab meetings; place artists for enough time (≥ 6 months) with mentors and milestones, as in AIL/ANAT.

Safety & ethics (bio/chem/data): Mandatory training; defined scope of techniques; partner with biosafety officers; adopt SymbioticA-style wet-lab protocols; IRB/HREC alignment.

IP confusion: Boilerplate residency agreements clarifying background/foreground IP; pre-agreed public licences for cultural outputs where feasible.

Time burden on labs: Budget mentor time into grants; recognise supervision in workload models; align residencies with lab cycles to avoid peak instrument demand.

Sustainability: Blend internal seed funds (WIC) with external programmes (S+T+ARTS, philanthropy), and create a pipeline from short sprints (Lightning Lab) to core residencies and major grants.

9) Funding and partnerships

Internal: WIC seed grants, co-funding by host schools; Wits postdoctoral fellowships, research office support for matching funds.

External: S+T+ARTS residencies/prizes; cultural foundations (Wellcome's historic Sciart shows precedent for biomedical public engagement funding lines and archives); industry sponsors seeking research communication and speculative prototyping; museums/galleries for co-production of exhibitions.

10) Why Wits, why now?

Wits is uniquely positioned in the African innovation landscape: a research-intensive university with strong science and engineering faculties, an active Innovation Centre, and proximity to Johannesburg's cultural industries and public institutions. The support given to WIC's ARTSCI4Innovation pilot programme since 2022 has demonstrated institutional will and early success. Formalising ARTSCI4Innovation will build a distinctive comparative advantage: an African model of artists-in-lab that addresses local priorities (health inequity, water, energy transitions, AI justice) while connecting to global programmes (S+T+ARTS).

Wits' position at the intersection of high-intensity research and vibrant informal economies uniquely qualifies it to prototype a new kind of African art-science nexus. In Mavhunga's terms, the university can operate as a broker of transient workspaces—linking the inventive energies of Johannesburg's people with formal research infrastructures.

11) Conclusion

Artist residencies in laboratories are not cosmetic add-ons; they are practical mechanisms for doing Mode-2, boundary-spanning research within a Triple-Helix ecosystem. International precedents demonstrate feasibility and value; theory explains why the model works (boundary objects etc). Wits has already started: WIC's piloting of artists-in-labs residencies have established a platform. The next step is to institutionalise ARTSCI4Innovation with clear

governance, ethics, and evaluation, and to scale through African and global networks. This is a small-footprint, high-leverage investment that strengthens Wits' research culture, grows public trust in science, and advances innovation with integrity.

In combining the frameworks of Mode-2 knowledge, the Triple Helix, and Mavhunga's African STS, ARTSCI4Innovation can redefine what a laboratory can be in Africa. It transforms Wits into a meeting ground where institutional science and everyday technē converge, modelling a genuinely African form of innovation—collaborative, reflexive, and socially embedded. By doing so, Wits can position itself not only within global art-science networks but also at the forefront of theorising and practising science of the people on the continent.

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