

Studio Quantum: Bengaluru

Date: 07.12.23

Location: Reading Room, Science Gallery Bengaluru

Duration: 3 hrs

In Attendance:

Guests:

Afra Khan, multimedia artist

Arindam Ghosh, Indian Institute of Science

Dhruv Jani, Studio Oleomingus

Jahnvi Phalkey, Science Gallery Bengaluru

Mathura Govindarajan, Paper Crane Labs

Purnima Tammireddy, writer

Sahej Rahal, multimedia artist

Shobhana Narasimhan, Jawaharlal Nehru Centre for Advanced Scientific Research

Tanveer Hasan, Centre for Internet and Society

Urbasi Sinha, Raman Research Institute

Vivek Chockalingam, Walkin Studios

Goethe-Institut Bengaluru/ Max Mueller Bhavan:

Michael Heinst - Director

Maureen Gonsalves - Head of Cultural Programmes

Amulya B - Communications Coordinator

Facilitator:

Madhushree Kamak, Science Gallery Bengaluru

Background:

Studio Quantum is a new global artist-in-residence programme and events series from the Goethe-Institut, designed to explore the relationship between emerging quantum technologies and the arts. Studio Quantum will enable and facilitate exchange between artists, academia, cultural practitioners and civil society. It will also allow international knowledge transfer that can break down barriers around quantum technologies and make this field more accessible and multidisciplinary. It will also empower artists to create work with and about quantum technologies.

Aims of event:

- Examine how various sectors can work together in a meaningful way to support artists and foster public understanding and dialogue around emerging quantum technologies.
- Imagine what a successful residency programme in Bengaluru could look like.
- Explore what kind of technical and non-technical support would be required to allow artists of all disciplines to develop work about or with quantum technologies.

Schedule of Events:

Activity	Facilitator	Time
Introductions and IceBreakers	Madhushree Kamak, Science Gallery Bengaluru	11:00 -11:10 AM
Introduction to Studio Quantum	Michael Heinst, Director, Goethe-Institut	11:10 -11:20 AM
Introduction to Quantum Research	Arindam Ghosh, Indian Institute of Science Responses: Shobhana Narasimhan Urbasi Sinha Tanveer Hasan	11:20 - 11:50 AM
Q&A		11:50 AM - 12:00 PM
Breakout Session 1	Madhushree Kamak, Science Gallery Bengaluru	12:00 - 12:40 PM
Breakout Session 2	Madhushree Kamak, Science Gallery Bengaluru	12:40 - 1:20 PM
Closing and Feedback		1:20 - 1:30 PM
Lunch		1:30 - 2:30 PM

Session 1: Introductions



An icebreaker activity was held along with introductions to enable the participants to get to know each other better. This also helped to establish everyone's initial perception and opinions around quantum technology.



Dr Michael Heinst introduced Studio Quantum and the integration of the international concept into the local bangaloREsidency programme.

Session 2: Introduction to Quantum



Dr Arindam Ghosh delivered a brief introduction on the history of quantum research. From the dual nature of light and Einstein's theory of relativity to Heisenberg's uncertainty principle and Schrodinger's cat - his talk took the participants through the timeline of how physicists have studied the nature of reality as we perceive it. He also expanded on three fundamental ideas of quantum research - Entanglement, Superposition and Topology. This was followed by a dive into the concept of the "Observer" and the impact of measurement. He also explored the "Multiverse Theory" which has captured the public imagination through cinema and popular fiction - speaking about its origins and implications. This set the foundation for the next part of his talk which focussed on the potential applications and uses of quantum research for future technologies. Here a broad spectrum of possibilities from highly precise sensors and clocks to cryptography were discussed. Arindam provided the group with insights into the potential of the field as well as the current challenges faced by researchers.

Breakout Sessions:

Three breakout sessions were conducted in three groups.

Group 1: Arindam Ghosh, Tanveer Hasan, Mathura Govindarajan, Dhruv Jani

Group 2: Urbasi Sinha, Sahel Rahal, Purnima Tammireddy, Afra Khan

Group 3: Shobhana Narasimhan, Jahnvi Phalkey, Vivek Chockalingam, Maureen Gonsalves

Session 1:

“What Open Questions and Themes around Quantum Technology could the Residency explore?”

- How does quantum technology matter in our daily lives?
- How do we demystify big concepts such as “Quantum”?
- How do we increase access to knowledge behind quantum Research?
- What does a quantum utopia look like?
- Can quantum technology help us fundamentally redefine the world around us?
- What are the future implications of quantum technology? What role can it play in wicked challenges such as climate change or in helping us reach the Sustainable Development Goals?
- How does quantum technologies change how we gather and process data? Can it impact the productivity paradox?
- How do we understand “measurement”?
- Is the “observer” a special person? What makes an “observer” special?
- Quantum biology
- Quantum consciousness
- Quantum diplomacy

Session 2:

“What would be the objectives and outcomes of a Quantum Residency?”

Objectives:

- Establish uncertainty as an idea in the public domain and dialogue - by breaking apart concepts of probability and causality
- Realistic sense of the quantum research and technologies and their potential - make the knowledge accessible but demystify and reduce the hype
- Creating positive tensions between artists and scholars - collaboration should help dissolve mutual suspicion and mistrust between artists and scholars
- Nudge the outcomes towards the public good
- Prioritise a non-violent, non-commercial imagination of quantum
- Introduce the theme to young adults and students
- Use quantum to create a more equitable version of the world
- Both art and science should benefit from the process and move forward

Outcomes:

- Final projects should be interactive and should allow the public to participate
- Visitors could potentially interface with each other across two or more locations. There could be a multi-party, multi-artist or multi-location engagement to manifest the concept of **entanglement**

- Outcomes should be an intersection of work done by artist and scholars
- Projects should incorporate participative feedback
- Bring research together with culture - use of folklore, narratives, indie comics, Amar Chitra Katha, Tinkle to make it more accessible
- Programming around residency - work-in-progress events, talks, workshops
- Programmes should allow for accessible conversations and arguments that are understood by all

Session 3:

“What do we require for a successful Quantum Residency?”

- Clear criteria for selection of projects - proposals should be based on scientific rigour
- Careful selection of open-minded candidates whether artist and scientist
- Planning of pre-work and pre-residency period to ensure maximum utilisation of residency period
- Core team of advisors - artist and scientific with experience working with quantum technologies
- Organisation of regular interactions for the residents with various quantum scientists and researchers
- Final fact-checking to avoid misrepresentation of the science
- Artist in the lab & scientist in the studio - opportunities are provided to use each other's tools
- Congenial space arrangements to work - both in the lab and studio
- Technical support should be provided
- Residents should have access to a group of peers to discuss new ways/ formats of engagement
- Residents must have meaningful engagement with policy, legislation and frameworks of ethics around the use of quantum technology
- Access to tabletop technology and experimental infrastructure for artists and advisors working on the project
- Collaborations with partners who have strong community networks that will enable the content to be available in regional languages and be accessible to a broad group of people in the city
- Clear expectations from partner institutions in terms of **time commitment, timelines, structure of engagement, expectations**
- Access to other quantum related activities, events and research in the space - so the residents are up-to-date on the theme



Participants sharing ideas generated during the breakout groups



Groups brainstorming and discussing the prompts

Resources:

Open Quantum Institute: <https://gesda.global/solutions/open-quantum-institute/>
<https://home.cern/news/news/computing/bringing-quantum-computing-society>

Conclusion:

The workshop was a successful starting point for an artist residency on quantum technology and the arts in Bengaluru city, within the context of Goethe-Institut/ Max Mueller Bhavan's bangaloREsidency . Participants represented key research groups in the city working on quantum technology as well as cultural institutions and creative practitioners with a strong interest in new technologies. The opening lecture by Arindam set the stage for the later discussions by unboxing the weird world of quantum. It made apparent how little quantum research is understood or discussed in the public domain. It also provided an opportunity for all the participants to begin thinking about the complexities of knowledge in this specific domain.

The breakout sessions served to streamline the discussion and allowed the artists and scholars to question and debate what purpose such a residency could serve. It was clear that there was an apprehension about not just the use of new quantum technologies and its regulations, but also how accessible this would be to the public. Through their discussions, the groups generated some key objectives for the residency - including demonstrating the relevance of quantum technology to everyday life, interrogating its use and regulation as an emerging technology and utilising the collaboration of the artist and researcher during the residency to push the boundaries of knowledge in this space.

The participants also worked together to develop a broad list of thematic areas and questions that could be explored in the residency. From Quantum biology and Quantum diplomacy to projects that manifested in multiple locations - many seeds were planted to develop an expansive open call for the residency.

Finally the participants —from institutional settings and otherwise — agreed upon some key elements that would be required for a successful residency. Alongside technical and infrastructure support, there was an overwhelming agreement on a need for a collegium of experts in the field to be available to the resident for discussions and feedback. In order to improve the nature of the outcome, there is also a need to bring in policymakers to interact with the residents to speak to the social impact of quantum technologies. Similarly the participants stated a clear need to bring in relevant community partners who could ensure that the outcomes of this project were accessible to a large and diverse audience in the city.

Together these inputs will be used to frame the Studio Quantum Residency programme in Bengaluru in 2025. Science Gallery Bengaluru will also use these insights to inform future exhibitions on the theme of quantum.